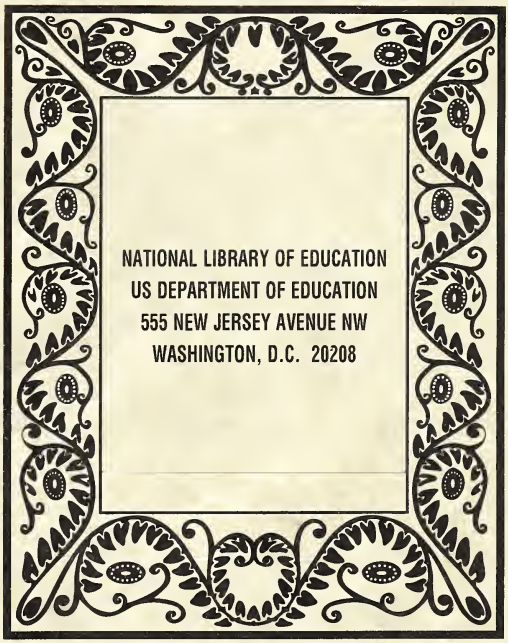
Annual Report of the Secretary of the Interior

FOR THE FISCAL YEAR ENDING JUNE 30

1939



ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR

FOR THE FISCAL YEAR ENDING JUNE 30

1939

UNITED STATES

GOVERNMENT PRINTING OFFICE

WASHINGTON • 1939

UNITED STATES DEPARTMENT OF THE INTERIOR
Harold L. Ickes, Secretary

•

For sale by the

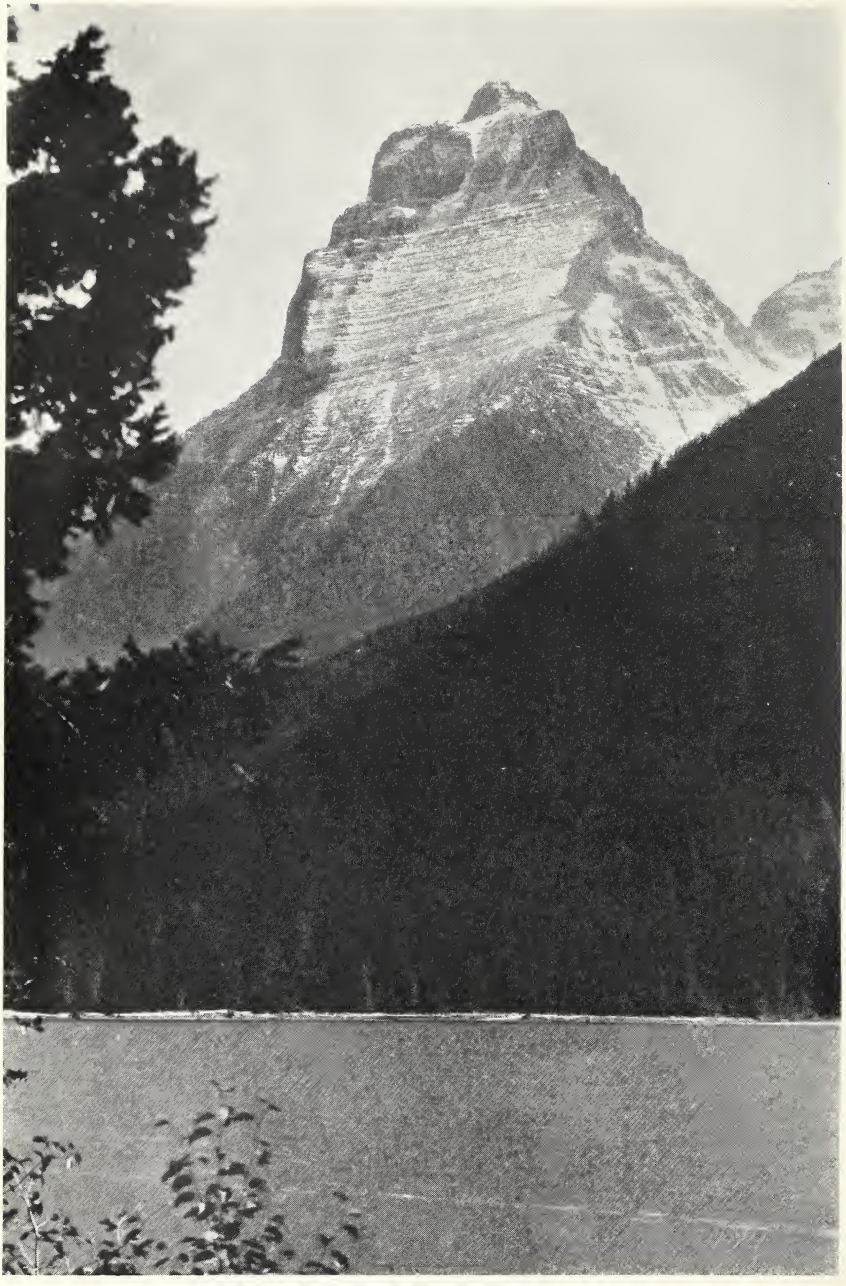
Superintendent of Documents, Washington, D. C.

Price 75 cents (paper cover)

CONTENTS

REPORT BY BUREAUS AND DIVISIONS

ILLUSTRATIONS



CONSERVATION PRESERVES GRANDEUR.

View of Kimberly Peak from Kintla Lake in Glacier National Park.

LETTER OF TRANSMITTAL

THE SECRETARY OF THE INTERIOR

WASHINGTON

My Dear Mr. President:

There can be no question about the advances we have made upon the conservation front. While other nations have to struggle to obtain necessary supplies, our problem is how best to utilize and at the same time to safeguard the rich resources with which we are blessed.

At this moment the greatest actual or potential danger with which we are faced are heedless attempts to break through our conservation laws and policies for the purpose of making quick war profits. Evidence of an inclination to raid our resources, to be sure, exists more in the form of mutterings than in specific movements. But if experience is any guide, we can expect open efforts more or less thinly disguised as patriotic enterprises. As you know, the misuse of our resources in the World War was devastating. We have not yet fully recovered from the damage wrought at that time. Today logs can still be seen lying in the Olympic National Park that were cut in a frenzy of anticipated use more than 20 years ago. They never were used, but a profit was extracted notwithstanding. Only lately have the years, at long last, obliterated the scars of reckless wartime grazing on national-park ranges which never were capable of supporting the great numbers of livestock that were turned loose upon them. Other examples could be cited at length, all adding up to the fact that another "break-through" of the conservation front would cause perhaps irreparable damage.

This review of the accompanying detailed annual report of the bureaus and agencies of the Department of the Interior reveals clearly that the last fiscal year has produced tangible results in the field of conservation.

The accounts of the various bureaus of the Department have a single theme—their achievements in striving for a wise use of our natural resources. Owing to the work that we have accomplished during the last 6 years, our country is in a much stronger position to withstand crises, particularly those of an international nature. In the matter of timber, a system of sustained-yield production has been established within the forests of the public lands, particularly the great timber reservoir of the Oregon and California revested land grants. Our people have become vastly more aware of the necessity for intelligent use of our petroleum reserves. The public ranges of the West are making an excellent comeback through the administration of the Taylor Grazing Act. Effective protection measures have been undertaken upon the vast areas of Indian lands.

Strenuous efforts have been made to strengthen the economies of our territorial and island possessions.

Among the outstanding accomplishments recorded during the fiscal year was the discovery and development of the supply of potash on the public lands. Because of this, our dependence upon foreign supplies of potash was materially lessened and the cost of fertilizer reduced. Never before has the Bureau of Reclamation stored up such a vast amount of water for the arid sections. Within 120 days of its completion, the Bureau's Bartlett Dam offset a serious water shortage in Arizona. Transmission lines of the Bonneville project, already under construction, as well as the lines for which plans were completed during the year, will make Columbia River power available to many of the population centers of Oregon and Washington, as well as to large rural areas.

Particularly notable was the work of the Bureau of Reclamation, which was faced with a growing and pressing demand for more irrigation in the West.

BUREAU OF RECLAMATION

Despite the steady and swift progress being made by the Bureau of Reclamation in the largest construction program of its 37 years of existence, the demand for the Bureau's self-liquidating irrigation projects outran the capacity to supply them. Even though water storage was at an all-time peak, the supply was inadequate to meet the demand.

In water storage, a fivefold increase within 6 years was recorded during the year. No sooner were storage and diversion dams completed than they were called upon for service. New lands opened for farm settlement on the Owyhee project in Oregon and Idaho were quickly taken up during the year. On the last area opened for homestead entry, four times as many applications were received as there were farm units available. Inquiries from other farm seekers are still coming in.

The record with respect to the hydroelectric power produced as an important byproduct of reclamation, was equally impressive. Installation of the seventh great generator at Boulder Dam made this power plant the largest in operation in the world, with a capacity of 860,000 horsepower.

The gross income earned by Boulder Dam during the year totaled $4,321,000. On June 1, 1939, the city of Los Angeles began paying at its contract rate for energy it received from Boulder. For power used during that month, the last of the fiscal year, the city alone paid $157,105.

A milestone in the steady progress of the Bureau was passed with the enactment of the Reclamation Project Act of 1939. This law, perhaps the most important in the field since the original Reclamation Act of June 17, 1902, will make it possible to adjust many difficulties of the water users, to draft new contracts gearing repayments to the ability of the farmers to pay, to reclassify lands from time to time, and to accomplish other needed reforms. The Congress also heeded the Bureau's pleas for a more comprehensive investigation program,

and appropriated $900,000 for studies of water resources and proposed developments.

Activities of the Bureau broadened on all fronts. At the end of the year, preparations were under way, with the cooperation of the Farm Security Administration, to assist in placing needy but qualified home seekers on Federal Reclamation Projects. An opportunity for former residents of the Dust Bowl to settle on reclamation developments was offered, and a number of such families was given a new start. In Arizona, the Bureau was able to extend badly needed help in an emergency when its Parker Dam power was made available during a critical power shortage caused by drought. In the Northwest, the Bureau joined with the Bureau of Fisheries to institute a major program for the control of migratory fish at Grand Coulee Dam, by establishing new spawning grounds, thus making possible the preservation of the fish.

Construction on Bureau projects forged ahead. At the close of the year, work was in progress on 30 projects in 12 States. Work was completed on eight dams. At Grand Coulee Dam, the second major contract was 38 percent completed at the end of the year.

Construction work was started on the Shasta Dam and power plant on the Sacramento River, about 9 miles north of Redding, Calif. This newest of the larger dams will be 3,500 feet in over-all length and will have an ultimate installed capacity of 375,000 kilovolt-amperes. The project will alleviate critical water shortage in three important agricultural areas in the State. In size and importance, the Central Valley enterprise is without precedent among the remedial projects undertaken by the Bureau.

Progress was made on the All-American Canal system, the largest irrigation ditch in the Western Hemisphere. The 80-mile canal from the Imperial Dam to the West Main Canal in the Imperial Valley was practically completed at the end of the fiscal year, except for certain structural work. The first 43-mile section of the Coachella Canal, a branch of the All-American Canal to the Coachella Valley, was 55 percent finished.

In Colorado, work was put under way on the Colorado-Big Thompson project, which will provide a supplemental water supply for 615,000 acres of land now under cultivation east of the Rocky Mountains. Other important dams under construction included Marshall Ford in Texas, Vallecito in Colorado, Grassy Lake in Idaho, Boca in Nevada and California, Seminoe in Wyoming, Fresno in Montana, Deer Creek in Utah, and Roza in Washington. Several of these were nearing completion with the installation of power-plant machinery and equipment in progress.

The year's work brought the accomplishments of the Bureau to an impressive total. In its 37 years of existence, the Bureau has completed construction on 156 storage and diversion dams, 48 powerhouses, 2,812 buildings, 20,101.4 miles of canals, ditches, and drains, 81.8 miles of tunnels, 4,661.6 miles of telephone lines, 285.4 miles of dikes, 6,337 flumes, 20,597 culverts, 13,738 bridges, and 198,521 other irrigation structures. Reservoirs of the Bureau now have a combined capacity of 47,121,170 acre-feet of water. This complete

"plant" last year made possible the production of agricultural crops valued at $113,463,000.

The Reclamation Fund is decreasing. By the close of the 1941 fiscal year it will be so depleted that the Bureau will be unable to carry on the construction of its projects. Either the Reclamation Fund should be increased by an advance from the general fund of the Treasury, or certain of the more costly projects now being constructed should be financed by appropriations from the general funds of the Treasury, or in other ways.

NATIONAL PARK SERVICE

Additional areas, significant for their historic or scenic value, were brought into the Federal park system during the year. Five national monuments and three national historic sites were established, increasing the system to a total of 154 units. As the result of these additions, and boundary adjustments, the areas administered by the Service were increased by 1,623,295 acres, to a total of 20,817,228 acres. More than 16,250,000 persons visited the parks during the travel year ending September 30, 1938.

Many effective conservation steps were taken by the Service during the year. Intensive training of and additions to fire-prevention personnel, augmented equipment, as well as favorable weather conditions, resulted in a 10-year low record of fires in the Federal park area. Active support for the proposed Kings Canyon National Park in California came from all directions. Legislation to establish the park was passed by the House during the first session of the Seventy-sixth Congress and was reported favorably by the Senate Committee on Public Lands and Surveys. Meanwhile, pending the establishment of the park, negotiations were begun for the acquisition of various additional tracts to be made part of the park area.

The long fight to acquire the Carl Inn tract of giant sugar pines for addition to Yosemite National Park culminated successfully. In the field of historic conservation, the year was notable for the acquisition of the Subtreasury building on the site of the old Federal Hall in New York City. Fort Laramie National Monument, Wyo., was another noteworthy historic acquisition. As an outpost of military protection during the pioneer period in the West, Fort Laramie was important in frontier history.

In the continued effort to make improved service available to the travelling public, many steps were taken, including new accommodations in several parks and monuments. The historic American Buildings Survey was continued and the long-planned catalogue of drawings and photographs included in the permanent graphic records, was compiled and published during the year. Public Works Administration funds made possible construction of many long-needed building projects, among them the restoration and development of the Chesapeake and Ohio Canal. Construction work on the Blue Ridge and Natchez Parkways continued.

During the year the Service noted a steadily increasing demand for information circulars and printed pamphlets containing general

information about park areas and services. In spite of an increased allowance for printing, the shortage of informative literature was acute.

Extensive work was accomplished under the park C. C. C. program. The fiscal year closed with 311 C. C. C. Camps operating under the supervision of the Service, compared with 294 the year before. This work followed a general program of conservation and recreation development. This included construction of minor roads, trails, dams, cabins, and other park structures, as well as water and sanitary systems.

At the close of the fiscal year the activities of the Service's branch of buildings management were transferred to the Federal Works Agency in accordance with Reorganization Plan No. 1. Between the time that the functions of building management were first placed under the Department of the Interior in 1933 and the transfer, the branch had grown in size and had greatly extended its scope. In 1933 the unit operated 45 buildings and 5 memorials in Washington, D. C. At the time of the transfer it was the largest organization of its kind in any one city, operating 128 buildings and 7 memorials and monuments in the National Capital.

Two major problems face the Service in the years immediately to come. One is to round out the Federal park system by the inclusion of those areas whose highest value is that of conservation or recreation. The other problem is that of personnel. There is a basic need for trained, permanent employees to operate the system. The resources placed under the protection of the National Park Service are bound to suffer if an adequate protective and administrative force is not provided. Replacement of the remaining temporary personnel by permanent Civil Service employees offers the only completely satisfactory solution.

PETROLEUM CONSERVATION DIVISION

The Petroleum Conservation Division continued its vigorous administration of the Connally "Hot Oil" Act. Federal Tender Board No. 1, operating in the east Texas area, reviewed close to 5,000 applications for tenders during the year. The Division reported that a total of 903 new wells was completed during the fiscal year in the east Texas area, where 25,858 producing oil wells were already in existence.

Eight refineries were operating on Federal tenders in the east Texas field at the beginning of the fiscal year. Sixteen natural gasoline plants connected to 24,168 wells on June 30, 1939, reported operations to Federal Tender Board No. 1.

Several investigations were carried forward during the year outside of the east Texas area. One examination surveyed the oil proration procedure in Arkansas, Kansas, Louisiana, New Mexico, Oklahoma, and Texas to determine how such procedure affects administration of the Connally Act. Operating conditions in several areas were scrutinized. Staff members of the Division testified before legislative committees in California and Illinois in connec-

tion with proposed petroleum conservation legislation. It is to be hoped that cooperative relationships can be established with those States and others to further the conservation and protection of our great natural resource of petroleum.

DIVISION OF GRAZING

The fifth year of administration of Federal range grazing districts found the conservation activities of the Division of Grazing far advanced. While the first work of the division, following its establishment in 1934, was devoted to organization, the last year witnessed definite accomplishments along progressive conservation lines. The collection of data on periods of grazing use, movements of stock from range to range, and the qualifications of present and prospective uses, was improved. Agreements and cooperative arrangements with States and Federal agencies were continued. A detailed system for more efficient management of Federal lands was put into effect.

A 2-year study of the essential functions of the Division resulted in a new organization set-up.

During the year, grazing licenses and permits were issued to 19,342 stockmen, owning 11,032,642 head of livestock in 50 grazing districts. In addition, under the cooperative Grazing Association plan in Montana, 28 grazing associations managed approximately 240,000 head of livestock on lands of all ownerships.

An increase from 45 to 90 C. C. C. camps assigned to the Division enabled more extensive improvement work on the range than theretofore was possible. Major activities of the C. C. C. units included development of water supplies, fence construction, building of stock trails and corrals, rodent control, truck trails, bridges, check dams, and the like. The opening of truck and stock trails will greatly facilitate the movement of animals from winter to summer range, or to market.

Effective coordination of conservation activities on the ranges was brought about by the appointment on each advisory board of a wildlife representative. This will enable a clearer understanding between the stockmen and the State and national wildlife agencies in the matter of use and preservation of the natural resources on the range. In addition to making possible vigorous enforcement of game laws within the grazing districts, it will also make easier the control of predatory animals and the redistribution of big game in the so-called critical big-game areas, where starvation has been the natural accompaniment of excessive concentration.

It is a pleasure to report that the Division collected a greater amount in fees than its regular appropriation. Fee collections totaled $833,385, while the appropriation was $650,000.

It may be noted that Federal range regulation generally, including the assessment of nominal fees for use of the range, has met with support from virtually all of the 20,000 licensees engaged in the livestock industry. Only a small isolated group of 40 individuals in one of the 53 Federal grazing districts has disputed the Secretary's authority to collect fees for the issuance of temporary licenses.

Notwithstanding the fact that they had received the benefit of range improvements made possible through the collection of fees from other licensees, these persons obtained an injunction from the State court, restraining the regional grazier from interfering with their free use of the range. Appeal from this injunction was taken to the Nevada Supreme Court by the regional grazier. As a further means of securing fair play for the 20,000 other licensees who have cooperated with the Division, the Attorney General, pursuant to my recommendation, directed the United States Attorney to institute suits in the Federal Court for the collection of all delinquent fees from this group, which constituted only a small percentage of all of the users of the range in this particular grazing district.

OFFICE OF INDIAN AFFAIRS

To the Office of Indian Affairs, the year brought the maturing of its program, a great quantitative increase in Indian participation in their own affairs and the consolidation of efforts to assure the future of the Indians. Many of the most important results were, of course, in the field of intangibles.

Indian lands have ceased to dwindle; they are, in fact, slowly increasing. Indian natural resources have ceased to disappear through wasteful over-use; instead, they are coming back. Indians have ceased to be inactive while white men do their work; rather, more than half of the regular employees are Indians. The Indian death rate is no longer menacing the survival of the race; in fact, the yearly increase of Indians is more than that of other groups. Indians are no more the solitary element in the population of the country existing in a totally unorganized status; instead, political and industrial self-government is being achieved by an overwhelming preponderance of the tribes.

The process of assuring self-government to the Indians continued to make progress, although at a somewhat slower pace. A total of 12 tribes adopted constitutions and bylaws and 8 became incorporated. Added to the tribes which previously had adopted constitutions, this gave a total of 93 tribes under constitution and bylaws and 64 under charters of incorporation.

A large number of physical improvements were brought about by the Indian Service during the year. With the aid of Public Works Administration funds, 37 school buildings were erected and 5 hospitals remodeled. A total of 43 cottages was built and 7 infirmaries and dispensaries added. The total of new structures was 267.

The various technical Government agencies continued to supply specialized service to the Indians. These included the Social Security Board, the Soil Conservation Service, the Civilian Conservation Corps, the Federal Security Agency, the Works Progress Administration, the National Youth Administration, the Public Works Administration, the Public Health Service, the Smithsonian Institution, and the Bureau of American Ethnology. Liaison was continued between the Indian Service and the Forestry Service, the Bureau of Animal Industry, the Bureau of Public Roads, the Office of Education, the Division of Cultural Relations in the State Department, the

Bureau of Reclamation, the General Land Office, the Division of Grazing, and other units. The activities of these agencies were coordinated with the program of the Indian Service for the general welfare of Indians. A great human saga was written in the Indian country and in Indian life as the result of these efforts. Notable progress was made in the fields of agriculture, conservation and social and economic welfare.

Rehabilitation in its broadest sense made a steady advance during the year. A just appraisal of the results in the field indicates substantial and heartening progress by the various divisions whose activities have been characterized by a steadily increasing cooperation between government representatives and the Indian people. Of special importance was the work of the extension personnel, who perhaps more than other Service representatives, are in constant touch with the Indians. Credit was supplied for various types of agricultural and industrial enterprises. Additional lands, sorely needed, were purchased by many groups. Irrigation projects enabled desert areas to be put into useful production. Agricultural education was emphasized in the Indian schools and rehabilitation grants were made for housing, farm buildings and self-help enterprises. Excellent progress was reported in the improvement of Indian health as a result of the work of the Indian medical service.

The Indian Service pushed forward through the year its efforts to explain and interpret the new policies which have been set in motion. The very essence of a new day for Indians is a complete understanding of Indian and non-Indian problems as a basis for intelligent self-government.

On probably no subject in the history of the United States has there persisted a more dramatic and yet a more flagrant atmosphere of error than with respect to matters concerning the American Indian and his affairs. From the heroic distortions of the James Fenimore Cooper school of fiction to the fantastic sensationalism of some modern movies; from the early exploitation by land-hungry Europeans to present day petty racketeering, the history of white-Indian relations has been a history of inaccuracy or ignorance, relieved only occasionally by rare and refreshing currents of factual illumination.

One of the important aims of present-day Indian administration has been to intensify, to amplify, and to spread the hitherto feeble light of fact. Encouragingly, the public is beginning to learn that fact can be as interesting as fiction; that the unadorned truth about Indians and their affairs is more absorbing than misconception.

The Indian is no longer a vanishing race. It is neither dying out nor is it rapidly merging into the white society. Indians as Indians will apparently continue as a part of American life for a good many years. The Indian population is still more than holding its own in numbers, both in the country as a whole and on most of the reservations. The rate of increase is becoming accelerated. Should the rate for the past quarter century continue for another 25 years, Indians in the United States will number well over 400,000. While this is proportionately a very insignificant figure, it nevertheless presages a very serious pressure of Indian population upon existing reservation lands. Already this pressure is being felt in the Navajo jurisdiction

and in others where prospects of acquiring additional lands are not too hopeful.

The future of the Indian culture is brighter today than at any time since the advent of the white man. Not only will it continue to give deep satisfaction to the Indians themselves, but, in its interaction with white culture, it will make fundamental contributions to general American civilization.

THE BONNEVILLE ADMINISTRATION

Through steady progress of the work undertaken at Bonneville, the opening of this region to sound and progressive development was brought closer during the year. The harnessing of the vast power potentialities of the Columbia River will bring about far more significant benefits than the mere increase in the use of electricity in the home. Abundant power at low rates will open the way to a sound use of the great resources of this region which at present lie untapped. Additional activities in the Columbia River Basin, in accordance with the principles of progressive conservation, can provide new opportunities for thousands of marginal farmers and artisans who are looking for a chance to earn a livelihood in the traditional American way.

Essential to the opening of this region is the construction of necessary power lines. Fortunately, the year saw the beginning of construction of the transmission network which will make Bonneville power a tractable, available force. The lines under construction at the close of the fiscal year, together with extensions for which plans were completed, will make Columbia River power available to most of the population centers of Oregon and Washington.

The construction of the "backbone" line from the dam to the major substation at Vancouver was 65 percent completed at the close of the year. From this line, power will be dispatched to communities in western Oregon and Washington. The other major line, on which construction was started, is designed to serve Portland, Oregon City, Salem, Eugene, and the Willamette Valley.

Plans and specifications were completed for the circuit to connect Bonneville with Grand Coulee Dam. The linking of these two projects will permit an interchange of approximately 100,000 kilowatts of energy over a single circuit.

Construction of the initial distribution network of the Bonneville system is being hastened to meet requests for power which have been received from public power districts, municipalities, irrigation systems, rural cooperative associations, and private utility companies. Delivery of energy is awaiting the completion of necessary construction schedules, as the present lines in the area are either heavily loaded or inadequate to carry required quantities of power from the dam site. At the direction of the Congress public and cooperative purchasers will be accorded preference in the sale of energy.

The death of J. D. Ross, first Administrator of the project, on March 14, 1939, created a major problem in the selection of a successor. Pending an appointment of a permanent Administrator, Frank A. Banks, Construction Engineer of the Bureau of Reclamation, in charge of the erection of Grand Coulee Dam, was made Acting Administrator.

DIRECTOR OF FORESTS

The Office of the Director of Forests reported progress with a number of fundamental conservation problems during the fiscal year. These included the organization of the Oregon and California Revested and Reconveyed Grant Lands Administration; the surveying of forest resources; the preparation of a report covering the administrative organization of forestry within the Department; the direction and control of departmental forestry business; the administrative direction of Indian forest and range lands, and the rendering of technical advisory service to the Department on forestry matters.

Including the land in the Territory of Alaska, the Department of the Interior is responsible for the management of 600,000,000 acres of public lands. This represents approximately three-fourths of all the land now in Federal ownership and embraces a wide range of timber resources, including the productive forests of the O. and C. lands, the timber stands on Indian reservations, and the forests and wood-lands of the unappropriated and unreserved public domain.

During the year, major steps were taken to establish a plan of sustained-yield forest management on the O. and C. lands under the Act of August 28, 1937. Regulations providing for the sale of the timber under good forestry principles were placed in effect, and classification of the lands was started. The entire business setup of the administration was brought under direct control, and a substantial volume of timber was advertised and sold.

Although the funds made available for the protection of the interior forests of Alaska were inadequate to perform a complete job, a foundation was laid for future effective protection and administration. Considerable progress was made possible by cooperation with the C. C. C. and other Federal and private organizations in Alaska.

DIVISION OF TERRITORIES AND ISLAND POSSESSIONS

At the end of the fiscal year the Division of Territories and Island Possessions, under the Reorganization Act, was making plans for taking over the Bureau of Insular Affairs from the War Department. The Division was also busy with the advance arrangements for the United States Antarctic Service, which is sending an expedition to the Antarctic regions under Admiral Byrd.

In the realm of its Pacific interests, a contract was executed between the Department and the Pan American Airways, whereby areas on Canton Island were leased to the Airways company in connection with its commercial trans-Pacific service.

ALASKA

During the year continuous transportation service was rendered by the Alaska Railroad between Seward and Fairbanks. Although the railroad was operating at a deficit, the revenues for both freight and passenger service showed a considerable increase. Rail line passengers numbered 27,436 with revenues of $259,452. Freight amounted to 157,904 tons.

A new hotel, constructed with P. W. A. funds, was put in operation at the entrance to Mount McKinley National Park.

THE VIRGIN ISLANDS

The sugar business, basic industry of the island of St. Croix, suffered another serious set-back as the result of a drought which followed a severe water shortage in previous years. Both the sugar and cattle business suffered heavy losses. St. Thomas, on the other hand, continued to show improvement because of substantial increases in the shipping business and tourist trade. Efforts made to secure a measure of relief for the sugar farmers through the repeal of the $6 per ton sugar export tax and the granting of benefit payments to sugar growers failed.

Approximately 750 persons in St. Thomas were engaged in the production of goods sold through the Virgin Island Cooperatives. Sales of the three units totaled $60,752 during the year.

THE VIRGIN ISLANDS CO.

Extensive activities were reported by the Virgin Islands Co. Its operations included the production of sugarcane and the manufacture of raw sugar; the manufacture and sale of rum, distillates and alcohol; the management of a poultry farm, and the operation of a rock-crushing establishment. It also rented tractors and farm equipment to the farmers of St. Croix, performed general repair work and sold cattle and milk products. In its activities the company has employed directly a thousand persons and brought extensive improvements in pay, housing, sanitation, and general social conditions to the workers of the islands.

PUERTO RICO

The finances of the insular government made a very satisfactory showing during the year. The tourist business showed an increase.

The year was marked by tangible military recognition of the strategic importance of Puerto Rico in the defense of the Panama Canal, the South Atlantic and Gulf States, and trade routes of the Carribean. The island was made a separate military department and the establishment of naval and military air bases and a submarine base was authorized. The dredging of San Juan harbor was virtually completed. This will provide a safe and convenient anchorage for heavy warcraft. A large graving dock of the most modern type, which will be at the disposition of the Navy as well as of commercial vessels, also was under construction at San Juan.

PUERTO RICO RECONSTRUCTION ADMINISTRATION

Encouraging progress was made by the Puerto Rico Reconstruction Administration during the year, and a number of programs were put under way in cooperation with other agencies of the Federal Government. The United States Forestry Service and the Insular Forestry Service joined with the P. R. R. A. Forestry Division in pushing forward a general forestry program. The P. R. R. A. Rural Electrification program was coordinated with the efforts of the insular government to develop the island's natural resources.

The Bureau of Animal Husbandry and the insular government cooperated in the P. R. R. A. cattle tick eradication program. Roads, waterworks, public buildings, and other works were projected by the P. R. R. A. after deliberation with insular and municipal officials.

As an outgrowth of a series of conferences sponsored by the P. R. R. A. and attended by representatives of various insular and Government agencies a program of coordinated activities in connection with agricultural development was worked out, which shows promise of excellent results. It calls for the expansion of 4–H Club work, soil conservation, commercial crops, livestock and poultry farming. It provides for better farm management and home activities. Among its objectives is the improvement of animal husbandry. It also provides for the establishment of small plots upon which subsistence crops can be grown by needy and idle persons. A large number of far-reaching experiments to bolster the agriculture of the island were undertaken.

Extensive activities were reported by the various cooperatives which are operating under the P. R. R. A. program. The Lafayette sugar cooperative, during its crop season, produced a total of 225,843 bags. The organization of the Los Canos sugar cooperative was completed during the year and improvements started. Other cooperative groups are successfully reviving old industries as well as stimulating new ones. The growing of cotton in Puerto Rico came to a halt some time ago, but, with the reestablishment of mill and marketing facilities, the island is growing more cotton than ever before. Although the marketing of Puerto Rican wild oranges in the United States was stopped by an embargo because of the fruit fly, during the fiscal year a cooperative began to market these oranges in the form of canned juice.

In an effort to achieve a more stable economy for Puerto Rican farmers, efforts are being developed to find new uses for their products. The Lafayette sugar cooperative is attempting to increase the growing of sugar cane for the extraction of byproducts, such as butyl alcohol. For the manufacturing of this product, a $500,000 plant has been built at Lafayette in which alcohol will be extracted from sugarcane residue by a fermentation process developed in Puerto Rico. As the marketing of solvents increases, it is planned to step up the production of the plant. A number of solvents, which may be obtained from sugarcane residue, namely acetone and glycerine, are valuable war materials.

In the field of rural rehabilitation the P. R. R. A. achieved worthwhile accomplishments during the fiscal year. Land utilization was carried forward and the working knowledge of resettlement farmers improved in the direction of more modern agricultural practices. Good seed was provided, as well as swine and poultry. In 8 large rural resettlement projects 2,598 houses were built and a total of 541 were under construction at the end of the year.

In the general forestry program for Puerto Rico one of the most promising rehabilitation activities was the establishment of forest homesteads. The system is aimed at making each forest unit self-supporting and at providing permanent homes and living for several

thousand families. The settled forest homesteads at the end of the year took care of 700 farmers on 2,148 acres of forest land.

However, it is apparent that Puerto Rico faces a long and difficult pull. There is evidence on every hand of a splendid beginning in reconstruction and rehabilitation. There are more signs of success and happiness and fewer signs of destitution. It must be remembered that centuries went into the making of the conditions which the P. R. R. A. is attempting to rectify. When the situation is examined realistically it is apparent that it will take many more years to put the island back on its feet economically. The immediate need is serious. Thousands have been deprived of employment through the establishment of quotas in the sugar industry. The application of the Fair Labor Standards Act to Puerto Rico disrupted its industries, notably needlework. The reexamination of this legislation, as it affects the economy of Puerto Rico, might go a long way toward aiding the island in the solution of its own economic problems.

Fundamentally, the basic problem of Puerto Rico is that of finding a way to make possible an increased income to support its people on the basis of their American citizenship. It would be helpful if there could be a full utilization of its tropical agricultural and industrial resources in such a manner as to supplement and complement, rather than to compete with agriculture and industry on the mainland. Only in part can this be accomplished by a program of relief spending. Something more fundamental would be the coordination of an agricultural and industrial development and provision of proper credit facilities for Puerto Rico's farmers and tradesmen.

If capital can be made available to these deserving Puerto Rican farmers and businessmen for the next few years, it is reasonable to believe that Puerto Rico's economy will reach a more stable level. No solution of the island's economic difficulties, however, will avail that does not take into account its startling overpopulation.

OFFICE OF EDUCATION

The end of a 70-year association as a member of the Department of the Interior marked the close of the fiscal year 1939 for the Office of Education. At the beginning of the new fiscal year of 1940 the Office was transferred to the newly created Federal Security Agency under the Reorganization Plan.

During the year the Office of Education undertook many comprehensive studies and cooperative arrangements for the promotion of educational activities. Study discussion outlines were provided, radio educational programs were presented, and study guidance and allied activities were carried on. The radio project went into its fifth year of demonstration and service with a growing interest in radio education by schools and colleges, civic groups and mass audiences in general.

A large number of studies of a variety of educational problems was carried forward by the Office during the year. These included one of public-school buildings erected with P. W. A. aid; another of the

planning and design of school auditoriums; study of rural-school units; a survey of Federal funds made available for educational purposes, and a survey of "parent education" programs. Publication of reports and studies by the Office continued. A total of 61 new publications was delivered from the Government Printing Office during the year, and 69 new manuscripts were completed and sent to the Printing Office. Approximately 100,000 copies of School Life, the journal of the Office, were distributed to libraries and universities as well as to college and school administrators, teachers, and other citizens.

During the year the Office continued its educational work in the C. C. C. camps. A total of 91.5 percent of all enrollees attended organized classes. Thirty-seven percent of all C. C. C. enrollees participated in academic classes, and 47 percent attended vocational classes. Job-training instruction was taken by 65 percent of the corps members, and classes in first aid, safety, health, and related subjects were attended by 59 percent. A total of 8,445 youths who entered the corps illiterate were taught to read and write during the year. Approximately 5,000 enrollees completed the elementary grades and received eighth-grade diplomas, while 1,049 qualified for high-school diplomas. Ninety-six were given college degrees.

CIVILIAN CONSERVATION CORPS

During the fiscal year five agencies of the Department continued to utilize C. C. C. camps that were assigned to various types of conservation projects throughout the country. These agencies were the General Land Office, the Office of Indian Affairs, the Bureau of Reclamation, the National Park Service, and the Division of Grazing.

In addition to its C. C. C. work to control Federal coal-deposit-outcrop fires in Wyoming with which it has been occupied since 1933, the General Land Office assumed technical supervision of four new camps established on the O. and C. lands in Oregon. These camps were engaged in general forest conservation work, assisting the O. and C. Administration to administer the lands on the sustained-yield basis. A total of 27 miles of truck trails was constructed during the year and the camps worked on 72 forest fires which covered a total of 39,000 acres. One lookout tower was constructed and a total of 27 miles of forest-protection telephone line was strung, in addition to which 40 miles of line were maintained and improved. Some 400,000 trees were planted on 500 acres of cut-over land.

C. C. C. projects were carried forward on 71 Indian reservations. The construction of basic structures for the conservation of land and water and the preservation of forest stands and forage cover was continued. A number of dams were erected to supply water for range stock and also for subsistence gardens. Land heretofore open and exposed to trespass was protected by new and rebuilt fences. During the year 500 springs, small reservoirs and well-development jobs were completed. One hundred and fifteen impounding and large diversion dams were erected; 950 miles of fence were installed; 900 miles of truck and horse trails were put in, and insect- and tree-pest control was established over 100,000 acres.

On reclamation projects, C. C. C. camps continued their work of rehabilitation by the development of supplemental water supplies, the construction of new projects and the establishment of recreational facilities at irrigation reservoirs. Excellent progress was reported in the replacement of deteriorated water-control structures, in the lining of porous sections of canals and in the checking of canal erosion. The better physical condition of reclamation projects resulting from these permanent improvements was reflected in increased savings of irrigation water.

The National Park Service continued its cooperation with the States and directed C. C. C. projects for the protection, conservation and development of park and recreational areas in all parts of the country. During the year operations were carried on by an average of 54,410 enrollees in 311 camps, including 91 in continental national parks and 220 in State, county, and metropolitan parks and areas.

The Department was assigned 1,600 corps members for projects in the Territories and insular possessions, and their operations covered a wide range of permanent improvements and rehabilitation work. A record of accomplishment was marked up in the spring of 1939 by camps assigned to the grazing service for conservation projects on the Nation's public range lands. The work included spring developments, wells for water storage, rodent control, and construction of range fences, cattle guards, stock driveways, and the like.

Under the Division of Grazing the C. C. C. has constructed projects far beyond the scope or resources of any individual or group and consequently has made possible steady improvement of the range. This program has proven of inestimable value to livestock owners and doubtless has gone a long way to assist in the stabilization of the industry.

GENERAL LAND OFFICE

Effective measures to guard the valuable resources on the public domain against unwise use resulted from the work of the General Land Office during the fiscal year. Efficient administration of the conservation program was insured through the establishment within the Office of a branch of planning, use, and protection. This branch will handle range problems, including the analysis and classification of the public lands.

In spite of its increased responsibilities, the activities of the General Land Office were conducted at a profit. The total receipts during the fiscal year amounted to $7,756,288. This was nearly four times the amount of expenditures for its operation.

The discovery and development of a supply of potash on the public lands was an outstanding accomplishment of the conservation work of the General Land Office during the year. The domestic potash industry is now drawing heavily on these deposits. This essential plant food can now be produced without dependence upon foreign sources of supply. Another result of this development has been to bring down the price of fertilizers.

Important steps were taken by the General Land Office during the year for the protection of forest resources on 2,500,000 acres of public lands, including the O. and C. and the Coos Bay wagon-road revested land grants. This work was carried forward by the Land Office in cooperation with the office of the Director of Forests. Under this program an adequate supply of timber will be provided to insure continued operation of the lumbering industry upon which many communities in Oregon depend.

The conservation of the forage and water supply facilities on approximately 50,000,000 acres of public domain outside of Federal grazing districts was advanced through the issuance of limited grazing leases. A new range improvement program was inaugurated in some areas.

GEOLOGICAL SURVEY

The Geological Survey completed its sixtieth year with notable achievements and discoveries. Among the more unusual investigations was one of geologic factors that might have a bearing on the prevalence of tuberculosis in certain areas. A new mineral, shortite, was discovered in Wyoming and its nature and occurrence are being investigated. A two volume lexicon of geologic names, long in preparation, was published during the year.

Topographic surveys, Federal and cooperative, covered more than 27,000 square miles in 45 States and in Puerto Rico. A feature of the work was the increased use of stereophotogrammetric equipment, by which mapping is accomplished through the use of aerial photographs—a method in which the Geological Survey was a pioneer.

In the administration of the land classification and mineral leasing activities of the Geological Survey more than 9,500 reports were made regarding the mineral resources, water power, or storage possibilities of the public land, and the Government's ownership of reserves of coal, oil, gas, potash, phosphate, and other minerals. Technical supervision was given to more than 8,500 properties containing oil and gas and to more than 600 containing coal and 100 containing other minerals. On Indian lands more than 4,900 oil and gas leases were supervised. Mineral production during the year from public and Indian lands and naval petroleum reserves under the supervision of the Survey had an estimated value of $83,000,000. The revenue received by the Government as a result of this production amounted to about $9,500,000.

Water investigations were successfully prosecuted. As the result of a succession of alternating droughts and disastrous floods, the Nation has become more water-conscious and the problem of water conservation and protection has increased in public importance. Necessary planning is dependent upon adequate information on the flow of streams and the amount of underground water. During the year the funds made available for this work, including Federal and State and municipal contributions, were greater than ever before, and further increases are in prospect.

BUREAU OF MINES

The last fiscal year brought tangible results from the long efforts that have gone into the safety and investigational activities of the Bureau of Mines. Two remarkable records were achieved. The year was the first since mining became an important economic enterprise in the United States in which not a single major disaster occurred. When the long list of disasters which had occurred in American mines is considered, this result is memorable.

The second record was made when 120,733 persons in the mineral and allied industries earned certificates to show that they had completed Bureau of Mines courses in first-aid and mine rescue. This is the largest number ever trained in a 12-month period, and brings to more than 1,265,000 the total of those who have received such training. As a result of the Bureau's work, more than 1,000,000 coal miners have completed safety and rescue courses.

The relative immunity from mine fires and explosion disasters now enjoyed in the United States can be traced to the activities of the Bureau. Practically all of the accepted reforms in mining practices now in use in the minerals and allied industries can be attributed to the development of better methods by the Bureau.

The Bureau completed many special studies during the year on other health and safety problems of the minerals industry. The Health Division continued its investigations of the effect of the work on the health of employees in the mineral industries. In cooperation with the United States Public Health Service and the Port of New York Authority a study of compressed-air illness was completed. Valuable data and experience were gained that should be helpful in combating hazardous conditions incident to work in compressed air.

In production fields, the record was equally impressive. The Amarillo helium plant of the Bureau produced 6,301,000 cubic feet of helium during the fiscal year, of which the Army and Navy purchased 72 percent. Other shipments went to the Bureau of Standards, the Bureau of Entomology and Plant Quarantine, the Geological Survey, and the Weather Bureau for various experiments, researches, and uses. Approximately 1,022,000 cubic feet of helium were delivered for non-Government use, mainly for lighter-than-air craft and for treatment of respiratory diseases. Deliveries for non-Government use increased more than fourteenfold over those of the previous year.

The first sale of a substantial amount of helium ever made to a foreign government was effected at the end of the fiscal year after other previous offers to purchase were refused. A contract was executed in June for the sale of 220,000 cubic feet of the gas to Poland, and it left the Amarillo plant shortly afterwards. The helium was to be used for experimental stratosphere flights in Poland.

One phase of the Bureau's technological work during the past year, which bore promise for the future, consisted of comparative tests by the coal-hydrogenation laboratory on various types of low-rank coals from the West. It never has been profitable to market some of the western coals, but the reserves of them are so prodigious that

they offer a potential source of motor fuel in spite of the relatively low recovery of liquid hydrocarbon from them. Excellent work was accomplished in these studies.

As a component part of the Government's broad conservation plans, the Bureau studied various mineral deposits which occur in areas which will be served by large hydroelectric projects now under construction. Promising opportunities for new domestic industries were indicated. The ceramics industry, for example, shows possibilities of becoming more self-sufficient as a result of Bureau investigations in regions served by the Tennessee Valley Authority, Boulder Dam and Grand Coulee Dam.

A steady and persistent advance in hitherto unexplored fields of petroleum and natural gas technology marked the activities of the Petroleum and Natural-Gas Division. The results of the Bureau's investigations in the field of petroleum and natural gas technology have been so cordially received by the industry that the Bureau's engineers are in great demand for the study of problems applicable, not only to the whole industry, but also to individual deposits and fields. Studies were continued on well-spacing and related activities.

The vital importance of strategic minerals, made even more pressing by world conditions, received considerable attention from the Bureau. The Bureau was represented on the Mineral Advisory Committee to the Army and Navy Munitions Board, and upon commodity subcommittees investigating the national defense aspects of our mineral supply. As a part of this work, extensive reports were prepared on various phases of the deficient mineral problem for the use of the military branch of the Government. In addition, the Bureau did extensive work with regard to strategic minerals for the Congress, other Government agencies, industry, and the public.

CONCLUSION

The accomplishments which I have briefly outlined tell the story of the progress that we have made in safeguarding our storehouses of natural wealth. Conservation, however, should not be a static thing. It must be a dynamic, growing thing. We must work ceaselessly, if we are actually to attain the goal that we have set—the prudent use of the wealth which Nature has bestowed upon this Nation.

The vitalization of our conservation drive and the expansion of its front was given enormous help at the close of the fiscal year by your Reorganization Plan No. 2. This brought about changes that had long been desirable and which went far to consolidate the conservation activities of the Federal Government in this Department. The changes referred to resulted in placing within the Department of the Interior the Bureau of Biological Survey and the Bureau of Fisheries. The inclusion of these two great natural-resource agencies, together with a third, the Bituminous Coal Division, has made possible a blending of effort which will result in imparting the strength of unity to the many component parts that go to make up physical

conservation as we know it. In my estimation, no other single step for many years has so effectively forwarded the conservation movement.

As the result of these changes, this Department is in a better position than ever before effectively to continue and to improve upon real conservation as applied to our lands, range, minerals, forests, water power, wildlife, and the many other constituents which make up that body of basic wealth which we term our natural resources.

Very respectfully,

Harold L. Ickes

Secretary of the Interior.

Mountain Streams Roar Greeting to General Land Office Engineers Engaged in Surveying Under National Conservation Program.

GENERAL LAND OFFICE

Fred W. Johnson, *Commissioner*

MARKED progress in the safeguarding from unwise use of valuable resources on the public domain of the United States resulted from the work of the General Land Office during the fiscal year.

Keeping pace with the national conservation program, this Office, which for 150 years has served as the real-estate agency of the Government, successfully effected the important transition from previous activities involving disposal of the public lands, to operations designed to bring about their management and prudent use.

Efficient administration of the vital conservation program was insured through the establishment within the General Land Office of a Branch of Planning, Use, and Protection, to handle problems of research and surveys, improvements of the range, and analysis and classification of the public lands. Office reorganization also included the establishment of a Branch of Adjudication and an Administrative Division.

Despite its increased responsibilities, activities of the General Land Office were conducted at a profit, the total receipts during the fiscal year amounting to $7,756.288.71. This was nearly four times the amount of expenditures for its operation.

Popular interest in the conservation activities of the Office was met with the issuance of a new series of informational bulletins, describing its work.

By direction of Congress, the General Land Office during the year compiled and issued the 1938 edition of the Official Map of the United States.

Regulation of grazing on the vacant and unreserved public lands, in order to prevent soil erosion and damage to valuable forage and water resources, formed an important feature of the conservation work. This regulation was accomplished by the issuance of leases under section 15 of the Taylor Grazing Act of 1934. While the primary objective sought by the issuance of the leases was the control of grazing for the purpose mentioned, the leases during the fiscal year produced a revenue of $137,365.13, an increase of $89,433.06 over the receipts of the previous year.

The transition from the oil and gas permit-lease system to an exclusive system of leasing under the act of August 21, 1935 (49 Stat. 674), a conservation measure, was advanced well on its way to completion during the year. Four thousand eight hundred and fifty-four prospecting permits terminated, approximately one-half of which were exchanged for leases, leaving only 2,015 permits outstanding, which will terminate during the forthcoming year.

In addition to the large number of oil and gas leases which were issued, initial steps have been taken, because of threatened drainage, to sell at public auction leases on numerous tracts of known oil lands.

The domestic potash industry, largely dependent on federally owned potash deposits, continues to draw more heavily on these deposits to meet foreign competition and to supply the farmers with this essential plant food. One notable result of its discovery in and production from public lands has been to bring the price of fertilizers more nearly within the means of the consumer.

Due to the application of scientific principles to agriculture and to the industries, many minerals in the public lands heretofore considered of slight value are now being generally exploited. Among these, vermiculite is in great demand for insulation against heat and cold, gypsum and limestone for the conditioning of soils, and several species of clays for refining both vegetable and mineral oils. Increased activity in connection with these minerals, particularly those found near the surface, will result in erosional and other problems which will require study.

Conservation of valuable timber resources on 2,500,000 acres of revested Oregon and California Railroad and Coos Bay Wagon Road grant lands, in Oregon, was advanced by the activities of the General Land Office. Placing the lumbering operations in the area on a sustained-yield basis for the first time, administration of the tracts is being carried forward to insure the economic stability of the communities dependent upon the industry.

CADASTRAL ENGINEERING SERVICE

The Cadastral Engineer Service of the General Land Office executes cadastral surveys and resurveys of the public lands in the United States and Alaska; supervises mineral surveys for patent purposes; prepares the field notes and plats for such surveys; and acts as custodian of the records.

Field projects were carried on in 24 States, the Territory of Alaska, and in the District of Columbia, under 220 separate groups,

111 of which in 17 States were resurvey projects. A total of 36,249 miles was surveyed and resurveyed, embracing 5,992,000 acres, in addition to engineering investigations, miscellaneous surveys, and special projects which are not measurable on a quantity basis.

The preparation of plats and field notes of surveys is practically current. There were constructed 248 township base plats, 124 color overlay sheets, 124 supplemental plats, 115 special plats of miscellaneous surveys, and field notes were prepared in final form for the permanent record for these surveys. In addition, 116 mineral surveys, embracing 419 locations, were examined, platted, and approved.

Cooperative surveys and resurveys in response to requests from other Federal agencies were made for the Division of Grazing, Bureau of Reclamation, National Park Service, Geological Survey, and Office of Indian Affairs of the Department of the Interior, the Forest Service of the Department of Agriculture, and the Department of Justice.

Accepted surveys and resurveys.—There were accepted and placed on file plats representing 1,444,180 acres of original surveys of public lands, and, in addition, 1,914,355 acres of lands resurveyed, comprising an aggregate area of 3,358,535 acres.

Maps, plats, and diagrams.—The wall map of the United States was revised and the 1938 edition printed and delivered.

There have been prepared 204 miscellaneous maps, plats, diagrams, and tracings.

Photolithographic copies, etc.—There were sold 6,421 photolithographic copies of township plats, for which $3,210.50 was received; and 9,756 copies were furnished other Bureaus for official use. There were 2,882 maps mounted and distributed for official use, and distribution was made of 5,133 map publications and 126,259 circulars.

CIVILIAN CONSERVATION CORPS

Conservation of Forest Resources on the Oregon and California Revested Lands

Under the supervision of the Oregon and California Administration, General Land Office, the C. C. C. is providing facilities for the proper protection, reforestation, and utilization of the forests on approximately 2,500,000 acres of Oregon and California revested lands.

In addition to fire-suppression and fire-protection improvements, a permanent transportation system is being developed in order that

the most efficient conservation of the timber resources can be realized through the carrying out of a planned sustained-yield program. By having a road system in existence the young and thrifty forest can be left to reach maturity, while the older and more decadent timber can be utilized to supply the demands of industry.

The work of the Oregon and California C. C. C. camps is a sound financial undertaking, as the cost of operation of the camps eventually will be realized many times by the country through increased timber values and more efficient utilization.

Control of Coal Fires

Under the supervision of the General Land Office, the C. C. C. has done work of inestimable value in controlling underground coal fires which have been destroying valuable Federal coal beds in public lands in the vicinity of Little Thunder Basin, Wyo. To the close of the fiscal year, 19 separate coal-bed fires had been worked upon, 12 of which are reported extinguished or under control. On the remaining 7 work is progressing satisfactorily, giving promise that eventually they will be extinguished. In addition, there are 10 other coal-bed fires in the vicinity of Gillette, Wyo., upon which work must be done for several years, if these irreplaceable natural resources are to be saved from complete destruction.

REVESTED OREGON AND CALIFORNIA RAILROAD AND RECONVEYED COOS BAY WAGON ROAD GRANT LANDS

The act of August 28, 1937 (50 Stat. 874), provided a comprehensive land-use conservation program, requiring extensive field examination and classification of all the revested Oregon and California Railroad and reconveyed Coos Bay Wagon Road grant lands.

Pending completion of such classification and determination of the annual sustained-yield capacity of the timber-growing area, and in order to prevent the shutting down of operating lumbering concerns with resultant unemployment and hardship to a large number of persons, timber cutting proceeded under temporary regulations. On July 7, 1938, however, permanent regulations governing the sale of the timber, were approved. Regulations governing the issuance of temporary 1-year grazing leases were approved July 6, 1939.

Transactions concerning the revested and reconveyed lands follow:

Timber sales.—During the fiscal year 151 sales of timber on the revested Oregon and California railroad grant lands were made, involving 16,151.17 acres of land, containing 319,178,000 feet, board measure, of timber, with a value of $609,595.16. Total sales to June

30, 1939, aggregated 1,369, involving 160,702.30 acres, containing 4,412,428,000 feet, board measure, of timber, with a total value of $8,539,778.01.

Nine sales of timber on the reconveyed Coos Bay Wagon Road grant lands were made during the year, involving 727.30 acres of land, containing 24,348,000 feet, board measure, of timber, for which the sum of $48,776.46 has been or will be received. Total sales to June 30, 1939, 138, involving 21,582.08 acres, containing 854,138,000 feet, board measure, of timber, with a total value of $1,993,078.50.

Timber-cutting permits.—Seventy-eight timber-cutting permits were issued under the act of August 28, 1937, involving 1,566,000 feet of timber for which $3,362.00 has been received.

Extensions of time.—Three extensions of time within which to cut and remove the remaining timber on 240 acres of revested land were granted under the act of May 19, 1930 (46 Stat. 369). Total extensions granted, 71.

Timber rights terminated.—Rights under timber patents or sales were terminated in 124 cases.

RECEIPTS AND EXPENDITURES

The total cash receipts from leases, sales, and other disposals of public lands (including receipts from copies of records, sales of Government property, etc.) were $7,719,579.53, and from Indian lands $36,709.18, an aggregate of $7,756,288.71, all of which was deposited in the Treasury. The total expenditures from appropriations made for the conduct of the Bureau were $2,046,201. The excess of receipts over expenditures was $5,710,087.71. The receipts were $691,086.26 less than for the year 1938, but were larger than for any other year since 1927.

Receipts under mineral leasing acts.—Receipts from bonuses, royalties, and rentals under laws providing for the leasing rights on the public domain (including royalties and rentals on potash deposits and royalties on coal leases in Alaska) aggregated $5,932,492.14 of which $5,741,333.35 was received under the act of February 25, 1920 (41 Stat. 437). The largest receipts under this act were from lands in California, the amount being $2,705,140.39. Wyoming was second with $1,715,298.60. Receipts from other States follow: New Mexico, $832,717.91; Colorado, $135,168.12; Utah, $130,739.66; Montana, $112,744.13; Louisiana, $77,242.65; North Dakota, $23,591.22; Alabama, $5,838.97; South Dakota, $1,366.31; Arizona, $480; Washington, $358.61; Idaho, $326.25; Kansas, $180; Nebraska, $140; and Nevada, 53 cents. Under the provisions of the mineral

leasing act cited, each State receives 37½ percent of the receipts from the public lands within its borders, the reclamation fund receives 52½ percent, and the other 10 percent remains in the Treasury of the United States as a part of the general fund.

Receipts under the Taylor Grazing Act.—Fees for grazing within grazing districts, by districts and by States, and fees and rentals for leases issued under section 15 of the act.

Receipts from Grazing Districts

	District No.	By districts	By States	Fees and rentals under sec. 15	State total
Arkansas				$5.00	$5.00
Arizona	1	$17,529.03			
	2	8,281.05			
	3	1,704.80			
	4	12,524.89			
			$40,039.77	21,045.35	61,085.12
California	1	11,285.13			
	2	20,668.51			
			31,953.64	9,034.18	40,987.82
Colorado	1	18,405.00			
	2	2,885.99			
	3	13,835.18			
	4	6,501.25			
	6	5,036.48			
			46,663.90	3,181.24	49,845.14
Idaho	1	38,082.55			
	2	35,932.02			
	3	19,009.63			
	4	12,476.32			
			105,500.52	5,272.30	110,772.82
Montana	1	342.36			
	2	5,729.96			
	3	5,684.74			
	4	943.91			
	5	5,962.25			
			18,663.22	19,023.32	37,686.54
Nebraska				50.18	50.18
Nevada	1	54,400.66			
	2	37,464.15			
	3	14,012.90			
	4	27,199.75			
	5	2,324.68			
			135,402.14		135,402.14
New Mexico	2	19,564.65			
	3	37,199.98			
	4	27,960.98			
	5	8,779.57			
	6	48,998.16			
			142,503.34	4,971.63	147,474.97
Oklahoma				9.00	9.00
Oregon	1	1,233.92			
	2	20,971.95			
	3	21,124.79			
	4	15,176.92			
	5	5,450.43			
	6	7,577.68			
	7	816.66			
			72,352.35	5,957.08	78,309.43
South Dakota				1,117.80	1,117.80
Utah	1	7,749.44			
	2	19,540.37			
	3	31,918.40			
	4	12,081.00			
	5	17,305.53			
	6	18,498.46			
	7	17,679.80			
	8	12,458.61			
			137,231.61		137,231.61

Receipts from Grazing Districts—Continued

	District No.	By districts	By States	Fees and rentals under sec. 15	State total
Washington				$2,187.37	$2,187.37
Wyoming	1	$27,382.85			
	2	18,355.12			
	3	23,092.39			
	4	31,987.49			
	5	6,910.99			
			$107,728.84	65,510.68	173,239.52
Grand total			838,039.33	137,365.13	975,404.46

Distribution of receipts.—Receipts from all sources, aggregating $7,756,288.71, as shown above, are distributed under the law approximately as follows: Reclamation fund, $3,373,636; for range improvements, $243,851; to public-land States and certain counties within such States, $3,003,118; to various Indian tribes, $41,640; and to the general fund of the Treasury, $1,094,044.

Under the provisions of the Taylor Grazing Act, the States within which the lands are situated receive 50 percent of the receipts from public lands and 25 percent of the receipts from ceded Indian lands; 25 percent of the receipts from both public and ceded Indian lands is available, when appropriated by Congress, for range improvements; 50 percent of the receipts from ceded Indian lands is credited to the Indians; and the balance is credited to the general fund in the Treasury.

Five percent of the net proceeds from cash sales of public lands is paid to the public-land States within which such sales were made, and the balance of such receipts from States named in the Reclamation Act is credited to the reclamation fund; the reclamation fund and the States involved receive 90 percent (52½ percent and 37½ percent, respectively) of the receipts under the Mineral Leasing Act and of receipts from potash deposits leased under the act of February 7, 1927; receipts from sales of reclamation townsites and camp sites and from royalties and rentals from potash deposits leased under the act of October 2, 1917, are credited to the reclamation fund; 75 percent of the receipts from the Oregon and California Railroad grant lands is paid to the counties within which the lands are situated and 25 percent is credited to the general fund of the Treasury. Twenty-five percent of the proceeds of land and timber in the forfeited Coos Bay Wagon Road grant will be paid to Coos County, Oreg. The receipts from Indian lands (except 37½ percent of royalties from Red River oil lands which is paid to the State

of Oklahoma in lieu of taxes) are deposited in the Treasury to the credit of the various Indian tribes. All other moneys are deposited in the Treasury to the credit of the general fund.

The following table shows in detail the distribution of the receipts, insofar as is possible before final settlement of all accounts by the General Accounting Office:

	Distribution in the Treasury				
	General fund	Reclamation and range improvement	State and county funds	Trust funds	Total
Sale of public lands	$50, 254. 23	$176, 797. 50	$9, 460. 48		$236, 512. 21
Fees and commissions	19, 848. 54	71, 867. 32			91, 715. 86
Receipts from mineral leases	594, 068. 25	3, 014, 200. 01	2, 153, 000. 00		[1] 5, 761, 268. 26
Receipts from Oregon and California Railroad grant lands	98, 972. 68		296, 918. 02		[2] 395, 890. 70
Receipts from Coos Bay Wagon Road grant lands	19, 042. 53		6, 333. 62		[3] 25, 376. 15
Receipts under Taylor Grazing Act	238, 472. 26	243, 851. 11	482, 323. 37	$10, 757. 72	[4] 975, 404. 46
Potash royalties and rentals	13, 134. 88	105, 740. 78	49, 255. 80		[5] 168, 131. 46
Copying fees	17, 356. 97				17, 356. 97
Power permits	14, 230. 46				14, 230. 46
Reclamation town lots		5, 030. 31			5, 030. 31
Sales and leases of Indian lands			5, 826. 63	30, 882. 55	[6] 36, 709. 18
Miscellaneous (including sales of standing timber, coal leases, and town lots in Alaska, rent of land etc.)	28, 662. 69				28, 662. 69
Total	1, 094, 043. 49	3, 617, 487. 03	3, 003, 117. 92	41, 640. 27	7, 756, 288. 71

[1] First and fifth columns contain $19,934.91 royalties received in Wyoming under the act of June 26, 1926.

[2] 75 percent of the receipts from the Oregon and California Railroad grant lands is paid to the counties in lieu of taxes and 25 percent is covered into the general fund.

[3] 25 percent of the receipts from the Coos Bay Wagon Road grant lands is paid to Coos County, Oreg., in lieu of taxes.

[4] 50 percent of the receipts from public lands and 25 percent of the receipts from ceded Indian lands are paid to the State; 25 percent of the receipts from both public and ceded Indian lands are available, when appropriated by Congress, for range improvements; 25 percent of the receipts from public lands is covered into the general fund of the Treasury; and 50 percent of the receipts from ceded Indian lands is credited to the Indians.

[5] All receipts under the act of Oct. 2, 1917 (a total of $36,782.65), and 52½ percent of the receipts under the act of Feb. 7, 1927 (a total of $131,348.81), are credited to the reclamation fund. 37½ percent of the receipts under the latter act is payable to the States and 10 percent is covered into the general fund.

[6] Included in receipts from Indian lands is $15,537.71 royalties on oil and gas from Kiowa, Comanche, and Apache lands, south half of Red River, Okla., of which the State receives 37½ percent in lieu of taxes.

REPAYMENTS

The act of June 16, 1880 (21 Stat. 287), and the act of March 26, 1908 (35 Stat. 48), as amended by the act of December 11, 1919 (41 Stat. 366), provide for the return of moneys received in connection with the disposal of the public lands and covered into the United States Treasury.

Repayment may be made to the land applicant or his heirs or assigns in all cases where lands have been erroneously sold, where payments have been made in excess of lawful requirement, and where applications, entries and proofs have been rejected, in the absence of fraud or attempted fraud. Under the above cited laws there were stated during the fiscal year 49 accounts allowing repayment of $6,513.19, and 19 claims were denied. The number of claims allowed includes five accounts granting repayment of $715.75 received in connection with sales of Indian reservation lands and repaid from Indian trust funds.

GENERAL STATEMENT

The number of letters and reports received for consideration or answer from all sources was 137,804 and 79,467 letters and decisions were written. The latter figure, an increase of 7,258 over the number of letters and decisions written during the preceding year, does not include letters prepared for signature in the Department.

There were outstanding on June 30, 1939, 5,051 mineral leases, permits, and licenses covering 5,780,701 acres. The number outstanding at the close of the preceding year was 9,350, embracing 12,227,111 acres. The decrease to a large extent is accounted for by the conservation measures which have been put into effect, by reason of which many oil and gas, permits were terminated. There also were outstanding on June 30, 1939, 4,190 leases other than mineral, embracing 6,916,900 acres. The number outstanding at the close of the preceding year was 1,682, for 3,585,977 acres. The increase to a large extent is due to the issuance of additional grazing leases under section 15 of the Taylor Grazing Act.

There were made during the year 686 original entries and selections, covering 301,740 acres. This figure includes 150,748.81 acres selected for the California State park system, under the act of June 29, 1936 (49 Stat. 2026). There also were made 3,948 final entries and selections for 1,198,080 acres. Many of these entries were made prior to the general withdrawal of the public lands from entry, or subsequent thereto but based on rights initiated prior to such withdrawal. Patents and certificates issued for 5,687 entries and selections having a total area of 3,281,224 acres. This amount includes 1,298,790 acres of school section land, patented to the State of Montana under the act of June 21, 1934 (48 Stat. 1185). A total of 1,441,472 acres was patented during the year with a reservation of mineral in some form to the United States. The total area patented, as of the close of the fiscal year, in which mineral in some form was reserved aggregates 45,087,270 acres.

185642—40——3

On June 30, 1939, 5,098,829 acres were embraced in unperfected entries upon which proof of compliance with the law was not due or had not been presented. In addition, there were pending applications for exchange under section 8 of the Taylor Grazing Act involving about 2,476,000 acres of privately owned and state school land and about the same area of public land.

Exchanges of national forest lands required the examination of abstracts of title involving 177,273 acres.

There were furnished during the year 43,744 certified and uncertified copies of papers, plats, field notes, patents, etc., for which there were received amounts aggregating $12,348.25. In addition, there were furnished for official use, by this and other departments and agencies, 27,938 copies of such items.

Five hundred and eighty-three letters were written in connection with pending and proposed suits, applications of attorneys for admission to practice before the Department, and charges preferred against patentees and others.

Thirty-two civil suits were recommended to cancel leases for oil, gas, and coal, to cancel patents issued through fraud, to cancel a right-of-way; and to recover damages for loss of property in connection with timber and grazing trespasses. Twenty-three cases were won and one was lost. Judgments and compromises were obtained in the amount of $73,819.54. Payments in the amount of $30,946.37 were collected.

Twenty applications of attorneys for admission to practice before this Department were received. Favorable recommendations were made in connection with 18, and unfavorable recommendations in connection with 2. Recommendation was made that 1 agent be dropped from the roll.

There were decided on principles of equity and referred to the Board of Equitable Adjudication and confirmed 1,392 homestead entries of public lands, 41 homestead entries of revested and reconveyed lands in Oregon, 39 homestead entries of ceded Indian lands, 19 reclamation homesteads, and 55 desert-land entries.

Reports were submitted on 117 Senate and House bills, and necessary orders and instructions have been prepared or are in course of preparation in connection with bills, public and private, affecting the public lands, which were enacted into law. Reports were made on 7 enrolled bills.

On June 30, 1939, there were 309 permanent employees of the General Land Office in Washington, 76 in the district land offices, 16 in the Oregon and California Administration, 1 in the Range Development Service, and 158 in the Public Survey offices.

RANGE DEVELOPMENT SERVICE

Establishment of Service

The Range Development Service of the General Land Office was established pursuant to the provisions of the Taylor Grazing Act of June 28, 1934 (48 Stat. 1269), as amended by the act of June 26, 1936 (49 Stat. 1976), and as supplemented by the Second Deficiency Appropriation Act, fiscal year 1938 (52 Stat. 1129). The act last cited appropriated $60,000 for this work, with the limitation that the expenditures should not exceed 25 percent of the receipts during the fiscal years 1938 and 1939. The receipts for these years were $185,297.20.

Allocation of Funds

The act which made the funds available does not contain any restriction as to the distribution thereof by States. It is deemed appropriate, however, that the distribution be made in an equitable manner. The funds available from receipts for the fiscal years 1938 and 1939 were apportioned for equal expenditures in the States of Arizona, Montana, and Wyoming, which contributed approximately 79 percent of the receipts. As additional funds become available, it is the intention to make proper proportionate distribution thereof.

Range Program

The range improvement program was put into operation toward the latter part of January 1939 in the State of Arizona. The type of improvement necessary varies with the locality and local conditions. In Arizona, the development of water for stock driveways and the erection of drift fences were the principal types of improvements which were made. As a general rule, range improvements which would benefit several stockmen were given preference and improvements on the public domain inuring to the benefit of individual lessees were secondary in consideration.

Cooperative Agreements

To eliminate maintenance charges of range improvements, cooperative agreements were entered into between the United States and individual lessees, whereby the lessees agreed to contribute toward the construction of the improvements, either in money, labor, or material, or part or all of these items, whenever such agreements were acceptable to the lessees, and the lessees agreed to maintain the improvements. This permitted a more comprehensive program

to be undertaken with the available funds than otherwise would have been possible.

Range Improvements

Between January 17, 1939, the date of approval of the range program by the Secretary of the Interior, and June 30, 1939, 23 range improvements benefiting 437,342 acres were constructed in the State of Arizona, at a total cost of $10,516.84. The United States expended $8,676.11 and the individual lessees contributed $1,840.73.

MINERAL LEASES AND MINING CLAIMS

Oil and gas leases and permits.—At the end of the fiscal year 1938, there were outstanding, 1,070 leases, issued as rewards upon discoveries, area 451,821.81 acres; 167 new leases, embracing 93,324.29 acres, were issued. Exclusive of 22 naval-reserve leases for 9,627.99 acres, there were outstanding on June 30, 1939, 1,237 leases, embracing 545,-146.10 acres. One hundred sixty-eight noncompetitive leases, issued under the amendatory act of August 21, 1935, embracing 184,008.28 acres, and outstanding on June 30, 1938, were increased by the issuance of 235 new leases, area 117,675.91 acres and 723 leases issued through exchanges for oil and gas prospecting permits, on an area of 1,443,-257.12 acres; of the entire total, 10 leases were canceled, involving 4,385.85 acres, leaving on June 30, 1939, 1,116 leases, embracing 1,740,555.46 acres. The 7,370 oil and gas prospecting permits, embracing 11,221,621 acres, and outstanding on June 30, 1938, decreased when 723 permits, embracing 1,443,257.12 acres, were exchanged for noncompetitive leases and 5,386 were canceled and terminated by operation of law on an area of 8,084,427.68 acres, while 16 new permits were issued and 15 were reinstated on a combined area of 57,499.13 acres, leaving outstanding on June 30, 1939, 2,015 permits embracing 3,185,692.45 acres.

Coal, potash, sodium, phosphate, and sulphur, permits and leases, and coal licenses.—On June 30, 1938, 374 coal leases, covering 71,698.44 acres, were outstanding; 27 new leases issued for 4,755.86 acres and 32 were canceled on an area of 7,892.10 acres, thereby decreasing the coal leases to 369, covering 68,552.20 acres. On the date named, 160 coal permits embraced 126,926.13 acres; 21 new permits on 9,243.80 acres were issued and 60 permits embracing 43,602.45 acres were canceled and terminated by operation of law, leaving outstanding 121 permits containing 92,566.48 acres. Also outstanding on June 30, 1938, were 92 coal licenses, embracing 3,599.26 acres, 8 were issued for 717.55 acres and 15 area 1,015.10 acres, were canceled and expired by limitation, leaving 85 licenses embracing 3,301.71 acres.

Potash leases on June 30, 1938, numbered 10 and covered 25,505.49 acres; 6 were issued for 15,377.17 acres, thereby increasing the leases to 16 and the area to 40,882.66 acres. Twenty-three potash permits also outstanding and covering 54,696.47 acres, decreased, when 10 permits expired and 1 was canceled on a combined area of 39,421.98 acres, to 12 permits, embracing 15,274.49 acres. The 7 phosphate leases, embracing 3,292.90 acres, outstanding on June 30, 1938, were not affected by any changes. Two sodium leases, area 801.70 acres, were outstanding on June 30, 1938; 1, involving 390.16 acres, was issued, bringing the total to 3, embracing 1,191.88 acres. On June 30, 1939, there were 47 sodium permits embracing 65,586.36 acres; 21 sodium permits embracing 31,699.29 acres were issued and 25, involving 30,543.28 acres, were canceled or expired by limitation, leaving 43 sodium permits covering 66,742.37 acres. There was no change in the status of the 27 sulphur permits, embracing 17,508.01 acres, which were outstanding on June 30, 1938.

Mineral applications and entries.—One hundred and twenty-one mineral applications were disposed of during the year, leaving on hand 85 for approximately 4,936.80 acres. Five hundred and eighty-one mineral entries were disposed of, of which 152, embracing 8,829.23 acres, were patented, leaving on hand on June 30, 1939, 105 mineral entries embracing approximately 6,098.40 acres.

Mineral contests.—Eighty-two mineral contests were disposed of during the year, leaving 35 contests pending on June 30, 1939.

RIGHTS-OF-WAY

Three hundred and five right-of-way applications were approved and 25 stock-raising reservoir applications were disposed of. In addition, 29 right-of-way applications were rejected, and 39 other actions were taken.

FEDERAL RECLAMATION PROJECTS

There are 45 Federal reclamation projects in 14 western States, 35 of which are operated in whole or in part by the water users. There are, in addition, 5 Indian reclamation projects, the irrigation features of which are under the supervision of the Office of Indian Affairs.

Two hundred and seventy-nine original reclamation homestead entries and 141 assignments of such entries were received; and 185 reclamation entries, containing 17,277.78 acres, were patented.

DESERT-LAND ACT

Ninety-three entries, involving 11,662.50 acres, were patented under the Desert-Land Act.

CAREY ACT

Carey Act segregations amounting to 29,062.76 acres were considered. One application under the act of March 15, 1910 (36 Stat. 237), involving 601,445.20 acres, was rejected.

PITTMAN ACT

Twenty cases were received under the Pittman Acts of October 22, 1919 (41 Stat. 293), and September 22, 1922 (42 Stat. 1012). Action was taken in 19 cases.

SWAMP AND OVERFLOWED LANDS

Under the Swamp-land acts, there were approved and patented to the States 4,205.25 acres and claims for 393.30 acres were finally rejected. New claims were asserted for 1,928.43 acres.

STATE GRANTS AND SELECTIONS

New indemnity school-land selections embracing 25,418.19 acres were received and selections amounting to 226,498.55 acres were approved and title conveyed to the States. Such selections involving 9,558.24 acres were canceled. Pending selections under quantity grants to States, for specific purposes, embracing 28,143.28 acres, were approved and title conveyed to the States.

Applications for patents for granted school sections under the provisions of the act of June 21, 1934 (48 Stat. 1185), were patented during the year to the extent of 1,298,789.83 acres. New applications were received, embracing 972,803.51 acres. Such applications pending at the end of the year embrace 1,486,394.65 acres.

New applications by the various States, under the Taylor Grazing Act, for exchanges of lands were received, embracing 141,227.93 acres. Sixty-two patents were issued, containing 109,269.02 acres, with a reservation of all minerals to the United States, excepting two patents embracing 240 acres. The rejected and relinquished applications involved 163,323.76 acres.

RAILROAD GRANTS AND SELECTIONS

Three new railroad selections were received, embracing 11,969.96 acres, and 2,403.04 acres were certified or patented in lieu of such grants.

ALASKA

On June 30, 1939, there were 34 fur-farm leases outstanding, covering approximately 172,650 acres, the annual rental of which is $1,052.56. Two new leases and 2 renewal leases were issued, 12 renewal leases await execution by the applicants, 1 application for lease awaits

a field report, and 5 applications for new leases await further evidence to be supplied by the applicants.

Twelve grazing leases, covering approximately 884,633 acres, from which the sum of $1,523.65 was received, were outstanding on June 30, 1939. One new lease was issued, two leases were canceled, three applications await field reports, two were suspended, two were held for rejection, and three were rejected.

The sale of 5-acre tracts in Alaska for homesites or headquarters was considered in 132 cases and 7 patents issued for a total of 20.10 acres, from which the sum of $237.95 was received.

AVIATION LEASES

On June 30, 1939, 26 aviation leases covering 13,122.63 acres and five beacon light permits covering 954.84 acres were outstanding. Two leases were canceled, one lease was issued, and five applications for lease await evidence to be supplied by the applicant.

COLOR OF TITLE

General color-of-title claims were considered in 182 instances, and 7 patents issued for a total of 386.32 acres, from which the sum of $1,709.82 was realized. One patent issued for a Texas-New Mexico color-of-title claim involving 16.90 acres, from which the sum of $133.10 was received. One case under a special act involving lands in Utah claimed under color of title awaits the survey of the land involved.

EXCHANGES

The extinguishment of private holdings within various Government reservations is accomplished through the medium of various exchange laws enacted by Congress.

Forest exchanges were considered in 905 instances and 15 patents issued. The Secretary of Agriculture was notified in 72 cases that permits could issue for timber selected in exchange and title to 177,273.22 acres was accepted for inclusion in national forests.

Two applications involving the exchange of privately owned land in forests for public domain land in New Mexico failed of consummation pursuant to a decree of the Court of Appeals for the District of Columbia.

Two applications for exchange in the interest of establishing the Bear River Migratory Bird Refuge in Utah are in the process of consummation, after being involved in the Federal courts for several years.

A total of 247 cases of private exchanges under section 8 of the Taylor Grazing Act have been received and six of these were con-

summated during the year and title on behalf of the United States was accepted to 6,963.63 acres. On June 30, 1939, there were pending 183 applications involving 364,567.03 acres of public land and 371,932.12 acres of privately owned land.

GRAZING LEASES

During the year 2,341 offers of grazing lease were made under section 15 of the Taylor Grazing Act, involving approximately 3,647,130.16 acres of land with an annual rental of $61,259.54. On June 30, 1939, there were 2,106 applications for lease pending, the majority of which await reports from the Division of Investigations. Seventy-one term leases were renewed during the year, in which the acreage totaled 67,271.56 and the rental total was $1,503.95.

INDIAN LANDS AND CLAIMS

Entries and sales of ceded Indian lands were considered in 855 instances and 67 patents issued for 12,032.58 acres, from which the sum of $21,583.96 was realized.

Under the various exchange laws affecting Indian reservations, four exchanges were consummated and 640 acres were added to various Indian reservations.

The matter of fee and trust patents was considered in 750 instances and 48 fee patents issued for 4,918.48 acres and 32 trust patents for 4,499.35 acres. There were 239 reissue patents involving 42,283.45 acres.

Homesteads by Indians were considered in 104 instances and 63 patents issued for 12,543.31 acres.

One contract involving the sale of pine timber on Chippewa Indian lands in Minnesota was canceled and the deposit therewith was forfeited, while the timber on the other two contracts was cut and removed and the contracts completed.

Ninety-one patents embracing 13,291.90 acres were issued on non-Indian claims.

PRIVATE LAND CLAIMS

Private land claims derived under foreign sovereignties were considered in 203 instances and 49 patents issued for a total of 41,207.69 acres.

TIMBER

Sales of dead, down, or damaged timber were considered in 76 instances and the sum of $7,475.55 was received therefrom. Twenty-four actions were taken involving free-use timber permits.

TOWN LOTS

Three hundred and seven actions were taken in town-site cases and 127 town-lot and town-site patents issued, from which was received the sum of $6,404.

TRESPASS

Trespass cases on public lands required actions as follows: Timber 423, the sum of $8,027.68 being accepted in settlement; coal 76, the sum of $101.87 being accepted in settlement; grazing, four; gravel, four; gypsum, six; stone, four.

MISCELLANEOUS

Actions were taken and patents issued as follows: Abandoned military reservations 58, with eight patents issuing; military bounty land warrants 12, with three patents issuing; cash and credit entries 35, with 21 patents issuing; Arkansas drainage 208, with one patent issuing; forest lieu selections 44, with two patents issuing, donation claims one, with one patent issuing; parks six; preemptions 10, with three patents issuing; quitclaims 27, with 12 quitclaim deeds issuing; riparian rights three; scrip 17, with one patent issuing; small holding 16, with seven patents issuing; soldiers' additional homestead entries 288, with 22 patents issuing, and trade and manufacturing sites 32, with one patent issuing.

HOMESTEAD ENTRIES

Actions were taken in homestead cases as follows: On final and commuted homesteads, 5,545, of which 3,734 were patented; on second-entry applications, 100; on applications to amend, 48; on applications for leaves of absence and for extensions of time to establish residence, 563; on original entries, 4,077; and on appeals, 6,906.

PUBLIC SALE AND TIMBER AND STONE APPLICATIONS

Six hundred sixty-five actions were taken on public-sale applications, 139 of which were patented; and 44 actions were taken on timber and stone applications, seven of which were patented.

FILING OF PLATS OF SURVEY

Letters of instruction were issued for the filing of 355 plats of survey for lands in States in which there are district land offices. Fifty plats were directly filed by this office in connection with which 13 public notices were prepared for lands in States in which there are no district land offices.

NATIONAL FOREST HOMESTEAD LANDS

Three thousand seven hundred thirteen acres in national forests which had been listed for homestead entry under the act of June 11, 1906 (34 Stat. 233), were returned to national forests by revocation of the listing orders and 197 acres were restored to homestead entry under the act.

CONTESTS, OTHER THAN MINERAL CONTESTS

Four hundred thirty-one contests, including both Government and private, were considered. Approximately 111 hearings were held in Government cases. At the close of the year about 37 contest cases were pending.

TRACT-BOOK NOTATIONS

More than 100,000 notations were made on the tract books. This includes 13,735 homestead applications and other miscellaneous cases, 2,710 grazing applications, 3,469 final and cash certificates, 2,185 oil and gas lease applications, 118 coal lease applications, 272 original entries and 455 plats.

Withdrawals and classifications.—Six hundred and eleven Executive and other orders were noted. These include withdrawals for stock driveways, national forests, restored lists, power-site reserves and classifications, grazing districts, and mineral and other classifications and revocations thereof.

Relinquishments.—Entries numbering 462 were relinquished and noted.

Status cases.—Status was furnished in 23,932 cases for adjudicating clerks.

Township diagrams.—Diagrams showing disposals and status, in 1,181 townships and fractional townships, were made for this and other bureaus.

WITHDRAWALS AND RESTORATIONS

The area of existing public water reserves was increased by 2,585 acres, the lands classified as valuable for hydro-electric power purposes were increased by 15,135 acres, and the areas in reclamation projects under the act of June 17, 1902, were decreased by 121,360 acres.

The Carlsbad Caverns National Park in New Mexico was enlarged by the addition of 39,488 acres. Five new national monuments were created, four were enlarged and one was reduced in the

public-land States and the Glacier Bay National Monument in Alaska was enlarged, the total increase amounting to 393,177 acres in the States and 1,134,720 acres in Alaska. The area of the national forests was increased by 2,521,351 acres. Fifty-one new wildlife refuges were established and seven were enlarged, while two new cooperative game ranges were created within a grazing district in Arizona, resulting in a total increase of 1,874,184 acres. Withdrawals amounting to 1,560 acres were made for air-navigation sites for the Department of Commerce and 215 acres were released from former withdrawals for such use. Three tracts of public land aggregating 280 acres were sold under the recreation law, two to the State of Oregon and one to the State of Minnesota; one petition was denied in part, one lease was issued, one canceled and one expired, and 200 acres were released from a recreational withdrawal. Two new stock driveways were created and seven enlarged.

All stock driveways within grazing districts in Oregon and Utah and driveway withdrawals within certain grazing districts in Arizona, Colorado, Idaho, Montana, and New Mexico, and other driveways outside of grazing districts were reduced or revoked, resulting in a net decrease of 2,242,275 acres.

All projects of the Resettlement Administration, or the Farm Security Administration have been transferred to the Department of Agriculture for administration under the Bankhead-Jones Farm Tenant Act. A withdrawal of 480 acres was made at the request of that Department for use in connection with a project in New Mexico, and 1,104 acres of purchased lands were transferred by Executive order from its jurisdiction to the jurisdiction of this Department. One withdrawal previously made in aid of such projects was enlarged, two reduced, and one revoked, resulting in a net increase of 738 acres.

A withdrawal of 640 acres in California was made for the use of the Navy Department and a tract of 20 acres was withdrawn for the use of the State of Arkansas in cooperative forest-protection work. Other reservations for various purposes were increased by 59,604 acres. Withdrawals for lighthouse purposes were reduced by 4,239 acres, and a withdrawal for classification and use as a grazing project of all public lands in four counties in South Dakota was reduced as to 32,592 acres reserved for the Badlands National Monument. General withdrawals for classification were reduced by 1,477,790 acres through the placing of the lands involved in withdrawals for specific purposes.

MINERAL LAND WITHDRAWALS AND RESTORATIONS

A summary of the acreage involved in mineral land withdrawals and restorations for the year ended June 30, 1939, is as follows:

Kind	Outstanding withdrawn June 30, 1938	Withdrawn	Restored	Outstanding withdrawn June 30, 1939
Coal	27,545,363		[1] 214,785	27,330,578
Helium	8,420			8,420
Mineral	8,507			8,507
Oil shale	5,989,949			5,989,949
Petroleum	5,563,663		[2] 309,439	5,254,224
Phosphate	2,292,988			2,292,988
Potash	9,414,816			9,414,816
Total	50,823,706		524,224	50,299,482

[1] Lands restored in the State of Montana by Executive Order of May 17, 1939.
[2] Lands restored in the State of Utah by Executive Order of May 27, 1939.

Tables showing in condensed form some of the activities and accomplishments of the General Land Office during the fiscal year are as follows:

Mineral Leases, Permits and Licenses Outstanding on June 30, 1939

Class	Leases		Permits		Licenses	
	Number	Acres	Number	Acres	Number	Acres
Oil and gas	1,237	545,146	2,015	3,185,692		
Oil and Gas Act, Aug. 21, 1935	1,116	1,740,555				
Coal	369	68,552	121	92,566	85	3,301
Potash	16	40,882	12	15,274		
Phosphate	7	3,292				
Sodium	3	1,191	43	66,742		
Sulphur			27	17,508		
Total	2,748	2,399,618	2,218	3,377,782	85	3,301

Summary of Areas on Outstanding Leases, Permits and Licenses as of June 30, 1939

	Number	Acres
Leases	2,748	2,399,618
Permits	2,218	3,377,782
Licenses	85	3,301
Total	5,051	5,780,701

Leases Other Than Mineral, Outstanding on June 30, 1939

Class	Number	Acres	Class	Number	Acres
Term grazing leases under Taylor Grazing Act [1]	4,093	5,830,743	Recreational leases:		
Grazing leases, Alaska	12	884,633	Act June 14, 1926	16	14,655
Fur farm leases, Alaska	34	172,650	Act June 30, 1932	1	20
Aviation leases and permits:			Leases for water wells	2	80
Leases	26	13,123	Total	4,190	6,916,900
Beacon permits	5	956			
Leases for mineral and medicinal springs	1	40			

[1] In addition, there were outstanding on June 30, 1939, 841 offers of term grazing leases covering 1,783,513 acres.

Original Entries

	Public land		Indian land	
	Number	Acres	Number	Acres
Homesteads:				
Stockraising	47	23,690	2	1,273
Enlarged	28	7,631	1	315
Reclamation	59	6,845	4	542
Forest	7	650		
Sec. 2289 et al	237	27,566	25	2,413
Total homesteads	378	66,382	32	4,543
Deserts	25	3,070		
State selections	43	156,027		
Railroad selections	1	7,011		
Applications and filings	154			
Miscellaneous	53	64,707		
Total	654	297,197		
Indian land as above	32	4,543		
Grand total	686	301,740		

Final Entries

	Number	Acres	Number	Acres
Homesteads:				
Stock raising	2,054	966,413	106	49,531
Enlarged	168	40,437	35	7,766
Reclamation	100	9,991	39	3,533
Forest	32	3,197		
Commuted	8	998	29	2,041
Section 2289 et al	719	68,900	55	5,461
Total homesteads	3,081	1,089,936	264	68,332
Deserts	87	11,571	5	586
Public auction	119	14,226	6	1,088
Timber and stone	12	892		
Mineral	127	7,818	13	945
Miscellaneous	212	2,340	22	346
Total	3,638	1,126,783	310	71,297
Indian land as above	310	71,297		
Grand total	3,948	1,198,080		

Patents and Certificates

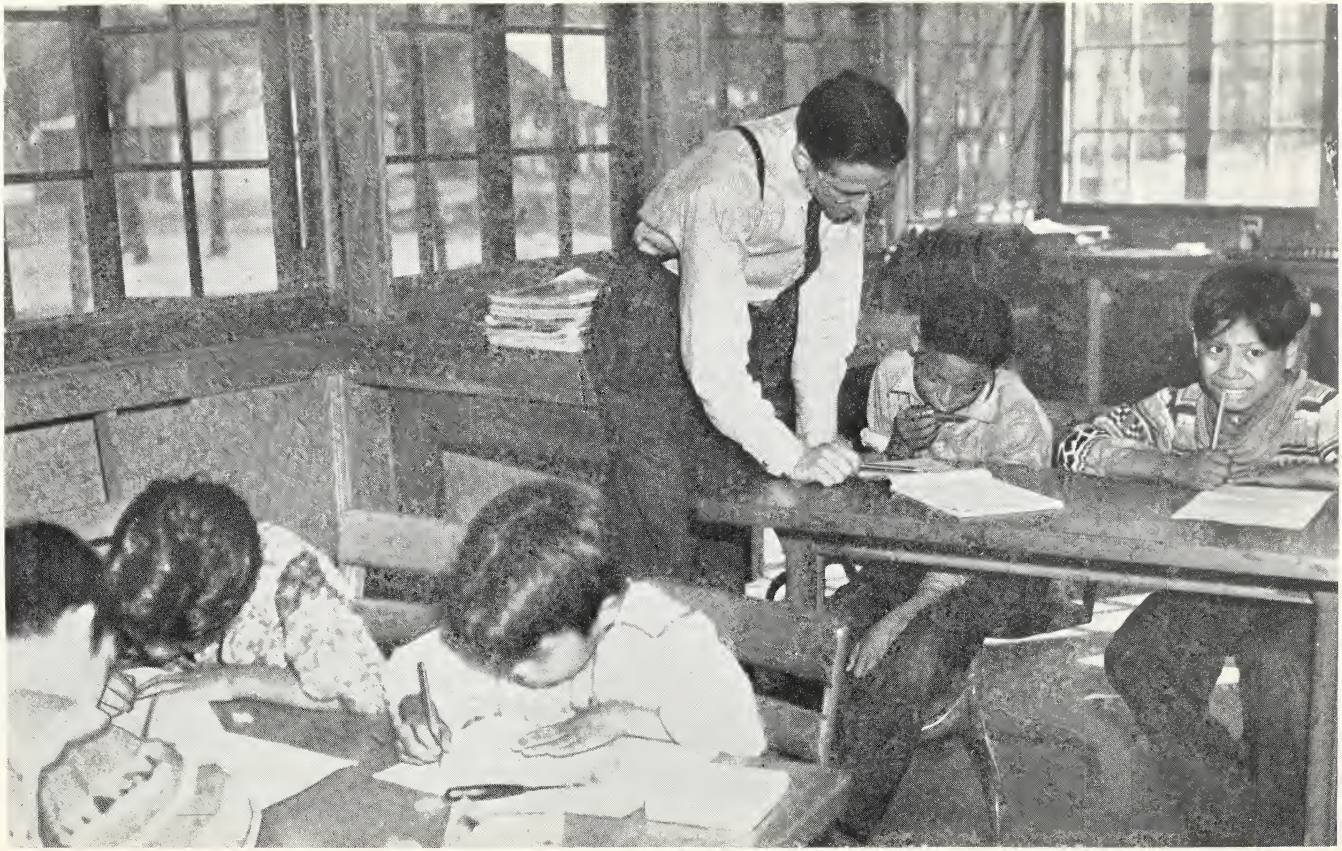
	Number	Acres		Number	Acres
Homesteads:			Mineral	152	8,830
Stockraising	2,558	1,268,213	Railroad	5	2,403
Enlarged	309	76,555	Special acts	192	[1] 1,460,933
Reclamation	185	17,278	Miscellaneous	1,039	85,514
Forest	39	3,610			
Section 2289 et al	967	102,058	Total patents	5,687	3,054,685
			Certified to States		226,539
Total homesteads	4,058	1,467,714			
Deserts	95	11,863	Grand total	5,687	3,281,224
Public auction	139	16,989			
Timber and stone	7	439			

[1] Includes 1,298,790 acres of school section land, patented to the State of Montana under the act of June 21, 1934 (48 Stat. 1185).

LANDS PATENTED WITH MINERAL RESERVATIONS

The following table shows the areas patented during the year and the total areas heretofore patented in which minerals in some form have been reserved to the United States:

	Fiscal year	Total
	Acres	*Acres*
Stockraising act, all minerals reserved	1,268,213	31,709,557
Other acts:		
All minerals reserved	148,672	755,164
Coal only reserved	7,479	10,819,481
Some named minerals reserved	17,108	1,803,068
Total	1,441,472	45,087,270



A New Day Dawns for Seminoles, as Children Attend Indian Schools in Florida.

OFFICE OF INDIAN AFFAIRS

John Collier, *Commissioner*

INTRODUCTION

THE program of Indian Service is, as it has been, to help the Indians, racially and individually, to survive, to support themselves economically, and to determine their own future. This program is not of one uniform pattern. It is manifold and various, because the situation of Indians is extremely various.

Indian life in these recent years has become a rich and intense drama. The striving of the will of individuals and of tribes is the moving force in this drama. Indians have turned from anticipated death to anticipated life, from fatalism to action, from inferiority to healthful pride. Thousands of Indians now are consciously aware that prosperity and greatness can come to them, but only through the things they themselves may do.

Indian lands have ceased to dwindle; they are slowly increasing. Indian natural resources have ceased to disappear through wasteful overuse; instead they are coming back, in some cases very slowly, toward primal efficiency and adequacy. Indians have ceased to be inactive while white men do their work; instead, 4,491, or more than half of the regular employees of the Indian Service, and more than 70 percent of the emergency employees, are Indians. The Indian death rate is no longer menacing the survival of the race; instead, the yearly increase of Indians exceeds that of any other population group. Indians no longer are the solitary element in the country's population existing in a totally unorganized status; instead, political and industrial self-government is being achieved by an overwhelming preponderance of the tribes.

The last fiscal year witnessed a maturing of program, a great quantitative increase of Indian participation, the correction of many errors of detail in organization and procedure, the solidification of that program which holds the future of the Indians. Indian Service and the Indians alike became more consciously the possessors of a new goal, of the technics appropriate to the new goal, and of a spirit of victory. How far off that goal is, how many the shortcomings, how baffling and, indeed, as yet wholly unsolved, are some of the

central problems this report will tell in more or less of detail. But its main message is the true one, that Indians, physically and spiritually, are coming into their own.

INDIAN SELF-GOVERNMENT

Indian self-government has continued to be a major interest of the Indian Service—to restore tribal government where it had become inoperative or ineffective, and to give it a broader basis in law. Functioning self-government is the end we are seeking, whatever we attempt in the Indian Service; and the degree to which the Indians achieve self-government is the measure of success of Indian administration itself.

The problem, then, is service-wide. The Indian Reorganization Act provided machinery for facilitating tribal organization and it gave impetus to the program, but if there had been no Indian Reorganization Act, we would still have been concerned with the development of self-government. We would have been challenged by the situation in which one-third of a million United States citizens found themselves, of having too little voice in the management of their lives and their resources. And after all our effort, however wise and benevolent, we would still have had to put the question to ourselves, how effectively do Indians now manage their affairs?

Indian self-government, if it is effective and if it is all we expect it to be, will not be stereotyped. It may not be as varied as, historically, tribal governments were in their original growth, but it should be at least as varied in form and content as the needs of the Indian people, acted upon by their living traditions, require, and that will permit of considerable range.

Thus far there have been numerous instances in which Indian tribes have written constitutions establishing a representative form of government and have added to the model ideas and methods which derive directly from their own background. Papago, with a council composed of representatives of its historic villages, and with the representatives of those villages directly and immediately accountable to the local electorate, is such a bridging of tradition and modern democratic practice. The Pawnee Indians in Oklahoma achieved a similar coupling of old and new by setting up in their tribal organization two councils, one a council of old headmen, who were given full authority to act within certain areas of tribal interest, while a representative business committee was set up to carry on the routine business of government. The Sioux Indians of the Rosebud Reservation have endeavored to bring to the surface of everyday affairs

the half-buried and half-forgotten tiospaye, which in the past was a natural unit of social action.

Those are cases in which native pattern added to modern representative government has made the modern type of government effective. There are other instances in which representative government has kept a native form from collapse and distintegration. At Santa Clara Pueblo, for example, a 50 years' history of factionalism had reduced the Pueblo to a state of dangerous inaction. In the circumstances, a written constitution was perhaps the only method by which the factional stand-off could be ended and control of community affairs restored to the people. At Hopi, likewise, a written constitution was the beginning of bridging chasms of jealous separatism which had been growing between the nine villages over years and centuries.

As against these instances, there are groups whose native pattern, archaic though it be, is self-contained and capable of adjusting the needs of its people to the pressures of today. The Pueblo of Acoma exists under an archaic political form, which yet is resilient enough to carry through on schedule an involved program of stock-reduction, involving sacrifices to individual members of the Pueblo.

SELF-GOVERNMENT AND THE INDIAN REORGANIZATION ACT

The actual process of organizing Indian tribes, of drafting and voting on constitutions and charters, went at a slower pace this last fiscal year, as compared with other years. This statement does not apply to Alaska, as will be pointed out later. Betweeen July 1, 1938, and June 30, 1939, a total of 12 tribes, including 5 Oklahoma tribes, adopted constitutions and bylaws, and in the same period 8 tribes, including 4 Oklahoma tribes, incorporated. At the close of the fiscal year 93 tribes (including 17 Oklahoma tribes) had constitutions, and 64 (including 8 Oklahoma tribes) had charters of incorporation.

The Alaska amendment to the Indian Reorganization Act permits native groups "not heretofore recognized as tribes or bands" to organize on the basis of a community of interest, whether of residence, association, or occupation. This means that native villages in Alaska may organize. The Indian Service maintains schools in about 100 villages, and it is possible to count on organizing about that number. The task of initiating the Alaska work has been slow and time-consuming, but it is expected that another fiscal year will show a rapid rise in accomplishment. On June 30, 1939, 7 villages had drafted constitutions and charters and on the same date at least 35 villages were waiting to hold elections as quickly as our field personnel could

get to them. The volume of organization work in Alaska should be increasing for several years.

The mere drafting and adopting of organization documents is only a preliminary to a much larger task of getting Indians acquainted with the possibilities opened up to them and of getting Indians to take full advantage of these opportunities. Therefore, it is most emphatically true to say that the work of organizing Indian tribes is hardly started, and that the amount of persistent and patient effort required is greater today than it was two years ago, when, in one year, 56 tribal elections were held in connection with the ratification of constitutions and charters (fiscal year 1937). The emphasis now is directed to the effective Indian use of the organization tools, to the drafting of law and order codes, the correction of census rolls, the enactment of land-management laws, the development of systems of tribal revenue, including the making of budgets, and the enactment of numerous miscellaneous ordinances and resolutions covering hunting and fishing, the adoption of new members, the leasing of tribal lands, the protection of public safety and morals—responsibilities which fall upon any people which assumes powers of municipal government.

It is apparent also that as the Indian tribes begin to function under their constitutions and charters, they will discover deficiencies in constitutional provisions. A number of elections on constitutional amendments have already been called, and it may be expected that elections of this sort will increase in the future.

Formal tribal organization has brought to the surface many of the grievances and maladjustments which have existed in past years but which have been only imperfectly expressed. Factions have existed for many years on some reservations, without coming seriously to the fore. With the establishment of tribal governments, this factionalism has burst forth rather vociferously at times. Some of the critics of tribal government have pointed to this fact as damning evidence of the failure of the whole plan of reorganization. Such criticism hardly merits comment, since it is based on a rather shallow conception of Indian character. Indians, it assumes, are incapable of managing wisely and, when given an opportunity to manage, make a muddle of their affairs. The fact is that responsibility cannot be learned without assuming responsibility. Progress is never made without facing a good chance for failure. The Indians, for the first time, have the opportunity either of failing or of succeeding, and, in any case, of learning to succeed through failing.

There is a widespread conviction throughout the Service that the economic rehabilitation of the Indian and his future welfare depends more largely upon the ability of the personnel of the Indian Service and the Indians themselves to engender indigenous leadership and machinery for an efficient and orderly self-government than upon any other factor.

INDIAN INCOME

Ten years ago the Meriam report [1] on Indians and Indian administration stated that "an overwhelming majority of the Indians are poor, even extremely poor." Today Indians are still poor, and many of them live just above the minimum of subsistence. A very few are wealthy; many are in great poverty.

It is always difficult to obtain accurate data on income of individuals and families even of white people living largely on earned cash income. It is particularly difficult, therefore, to secure reliable data on the money value of the income of Indians, much of whose support takes the form of goods and services obtained without a direct expenditure of cash, and whose money receipts come from a variety of sources, both earned and unearned. Accordingly, efforts to obtain such information for Indians living on reservations have been only partly successful, and the results up to the present time are not deemed of sufficient accuracy to warrant their presentation in detail.

A few generalizations can be made, however, concerning the relative importance of the various sources of Indian income, and their significance in relation to the stability of Indian economy.

Over one-fifth of all Indian income is unearned income from nonrelief sources, such as leases, rentals, and royalties. More than another fifth of their entire income during the calendar year 1938 was from relief sources, indicating that Indian income depends to a considerable extent on the uncertain availability of funds from emergency governmental agencies. Less than a third of the total income was obtained by the Indians through their own individual operations, primarily agricultural pursuits, which constitute about 22 percent of total income. Indian economy is, in general, still very insecure, and still largely dependent upon sources other than the Indians' own efforts.

The major task of the Indian Service for many years must be to increase, and especially through education in land use and the pro-

[1] Meriam and Associates, The Problem of Indian Administration, Baltimore, Johns Hopkins Press, 1928, p. 1.

viding of opportunities for further economic development by their own labor, the Indians' income and to improve their living conditions. Many of them are located in areas where the natural resources are meager. Somehow these resources must be augmented. Additional lands must be provided, overgrazed ranges must be restored, flocks and herds must be improved, and arts and crafts and other sources of supplemental income must be developed. Irrigation projects must reclaim desert lands, and Indians must be taught to make more effective use of all existing resources.

INDIAN ECONOMIC REHABILITATION

Rehabilitation in its broadest sense of reestablishment on a firm basis has made a steady advance during the past fiscal year. Appraisal of the records in the field indicates substantial and heartening progress.

Over 54,800,000 acres of farming and grazing land are the main assets of a people whose inherent love for land is unquestioned. The Extension Division by its carefully planned programs has demonstrated the possibility of translating these acres into cattle, sheep, and other livestock which will provide the necessities for a livelihood. This involves, of course, in addition to material and practical assistance, the awakening of the individual and tribal consciousness to the potentialities of their present resources, the future results predicated by consistent and honest labor and the obligation for loan repayments. Patience, kindliness, tolerance, and appreciation of racial characteristics, are part of the equipment of the successful Indian Service worker.

At the close of the fiscal year 1939, loans totaling $4,938,365.20 had been granted to chartered corporations, credit associations, cooperatives, and individual Indians, from the revolving credit fund established by the Indian Reorganization Act. Of this amount, $2,656,869 had actually been advanced for use of Indians to aid them in their various business enterprises. In addition, allotments amounting to $150,068 were made on 22 reservations not operating under the Reorganization Act, from gratuity funds appropriated by Congress. Also, there was allotted $465,207.71 from tribal funds to 31 reservations.

In the local administration of revolving credit funds a superintendent, in a recent report, states his belief that Indians have actually learned more about credit and doing business on a business basis during the last 2 years than in any 25 years hitherto. Cooperative associations of many types, such as lumber mills, livestock associa-

tions, fisheries, etc., which have gained in number and members during the last 3 years are exercising a marked influence not only on the reservations immediately served but on others which have kept a most observant eye on their economic progress. Due to the particular trust status of Indian resources and the consequent inability to offer these as security to regular credit agencies, the revolving credit fund affords the only means by which many sound enterprises may be developed over such widely separated sections as the Lakes States, the Plains, the Pacific Northwest, southeast Alaska, and several of the Southern States. Outside of Oklahoma and Alaska, loans from the revolving fund are made only to chartered tribal corporations whose loan applications must be accompanied by a statement of a sound economic program, including security or other guarantees of repayment, terms of repayment, and plans for managing the credit business of the tribe. The tribes in turn re-lend to individual Indians.

In Oklahoma the Government makes direct loans to cooperatives, to credit associations, to individuals, as well as to chartered tribal corporations.

As an example of improvement in economic conditions made possible by use of credit, the following is quoted from a report of the Extension Agent of the Mescalero Reservation:

> * * * The general attitude on the part of the Indians has improved and the Apaches are well on the road to permanent economic stability. Health conditions have improved greatly and there has been a 25-percent reduction in hospital cases on the reservation. This improved morale can be traced at least in part to the fact that the earned income per family rose from $450 in 1935, to $1,056 in 1937, indicating something of the achievement of a people who have gained confidence in their ability to do something for themselves.

Again, in 1920, over 1,000,000 acres of the total of 1,610,000 acres which constitute the San Carlos Reservation were leased to white cattlemen. The San Carlos Indians owned very few cattle, and by 1925 their inventory was 1,995 cows with a branding of 775 calves. The culling of this small herd, introduction of purebred sires, controlled breeding, improved range practices and the withdrawal of the range from white permittees has made possible the expansion of the cattle industry. The entire reservation is now stocked with Indian-owned cattle. At the close of the calendar year 1938, the Indians owned 32,018 head of beef cattle of excellent grade and quality. During 1938 the Indians sold 11,620 head of live animals and 210,540 pounds of dressed meat which brought a total of $356,000, while the Indians themselves consumed more than 105,400 pounds of dressed meat.

The San Carlos reservation has 15 grazing districts, eight of which are now under the management of an Indian cattle growers' asso-

ciation. The other districts are to be consolidated with those under association management or reserved for breeding purposes and maintenance of the tribal herds. The tribe itself maintains two herds. One of these consists of some twelve hundred head of registered Herefords. Each year Indians of good character desirous of entering the cattle business are permitted by the tribal council to purchase choice yearling heifers from this herd for which they are given ample time to repay.

The cooperative livestock associations have encouraged individual initiative and participation and as a result, the Indians, through these associations, are managing the round-ups, sales, introducing improved range practices, and other matters affecting their livestock enterprises. Management and other necessary expenses are met by assessing a grazing fee of $5 per head for each animal sold.

Isleta Pueblo in New Mexico has furnished another example. Four years ago the Pueblo's range was largely leased to whites. Drought-relief cattle were supplied the Isletas. In the spring of 1936, 864 grade Hereford cows, 65 registered Hereford bulls, and 247 heifer calves were turned over to the Pueblo of Isleta under a trust agreement which provided for the operation of the herd by a board of trustees. This agreement also provided for repayment to the United States for these animals within 3 years of one yearling heifer of like quality for each of the 864 cows and 65 bulls turned over to the Pueblo.

A board of trustees, composed of three Isleta Indians, handled this enterprise from the start and began making repayments in 1936. Payment for the entire herd was completed in accordance with the terms of the trust agreement in November 1938. According to the report of the board of trustees as of March 1, 1939, the Pueblo had a total of 598 cows, 62 bulls, 136 yearling heifers, 6 yearling steers, and 38 calves, valued at approximately $40,960 and a cash bank balance of $10,322.03. In other words, these Indians fulfilled their contract within the time specified and still retained about two-thirds of the number of the basic herd, had all debts paid and had a cash balance of $10,322.03.

The cattle trusteeship has been extended and at the present time the management of the entire range of Isleta is in process of being vested in the trustees by the Pueblo. Conservative management is assured, and each year a part of the net earnings of the cattle business will go into the Pueblo's capital fund.

Other types of cooperatives are also being undertaken by the Indians, one of which is the Lyons Cooperative Association in Oklahoma. A number of full-blood Cherokee Indians living in the hilly eastern part of Oklahoma, where the land is ill adapted to general agriculture, decided to band together for the production of straw-

berries which can be grown in their section. An Indian was chosen to supervise the work and a loan of $2,800 was made to the organization to enable the members to clear land and purchase the necessary plants. The members have now worked together for 2 years and their first crop was sold this past spring for over $1,200. A payment was made on the loan and the balance distributed to members on the basis of their participation in the activity.

Another type of economic enterprise being generally undertaken is that known as a "corporate enterprise." Such enterprises are those which the tribe, as a corporation, can best undertake and perform. Commitments totaling $769,756.30 had been made to such enterprises as of June 30.

The purposes of these enterprises are varied. A salmon cannery has been built in Alaska, a tourist-cabin enterprise is being operated in Wisconsin, a community dairy and farm are being conducted in California, an oyster culture enterprise in Washington, and a municipal water project in the Pacific Northwest. Several Indian tribal corporations are producing hay on tribal lands. An example of such a corporation haying enterprise is that being conducted by the Fort McDermitt Paiute and Shoshone Indians in Nevada. Hay land, which was purchased with funds provided under the Indian Reorganization Act, is being operated on a community basis, every family sharing in the proceeds in proportion to the services rendered to the project. This enterprise has now been operated successfully for 3 years. Individually owned cattle on this reservation increased from 200 head in 1935 to 1,200 head on January 1, 1939.

Another illustration of tribal corporate enterprise is a store being conducted by the Jicarilla Indians in New Mexico, where $85,000 was loaned to this tribe for the purchase and operation of the store. The economic life of these Indians centers around sheep. The store supplies credit to carry the members through the year and markets the lambs and wool for them. The store has been in operation since November 1, 1937, and to December 31, 1938, sales of over $135,000 had been made. The enterprise was operated very conservatively, overhead expenses being kept down to 6.7 percent and the stock turned approximately 5.4 times. A per capita distribution of profits of over $2,500 and a patronage distribution of over $2,500 were made to members of the corporation. A payment on the loan of $8,500 plus carrying charges was made to the United States.

Of equal importance in the task of economic rehabilitation has been the aid extended in recent years by the purchase of additional lands. Under the Reorganization Act, Congress has appropriated $3,450,000 for the purchase of lands for those Indians who have little

or none. With this money, there has been acquired to date a total of 228,517.16 acres at a cost of $2,774,625.06.

In addition to the lands purchased under the Indian Reorganization Act, a number of purchases have been made under special legislation, and several with tribal funds.

Under the Arizona-Navajo Boundary Act of June 14, 1934, 480 acres were purchased during the fiscal year bringing the total of lands purchased under this act to 318,615.46 acres at a cost of $462,615.22.

Under another specific act the Indian Office is completing a purchase program for the Goshute Indians of Nevada which will provide approximately 4,400 acres and which will automatically reserve for their use 65,000 acres of surrounding public-domain lands.

Other important land purchases during the year under specific legislation included 91 acres on the Wind River Reservation, 3,200 acres within the boundaries of the Navajo Reservation, 2,639 acres for the various Pueblos in New Mexico from tribal funds awarded pursuant to the Pueblo Lands Board Act, and approximately 5,000 acres for various tribes from their own tribal funds.

IRRIGATION PROJECTS

The irrigation projects operated by the Indian Office vary in size from a few acres, such as purely subsistence garden tracts, to projects containing 140,000 acres. Irrigation construction projects vary in magnitude from the construction of small diversion dams and ditches and installation of small pumps to the building of large dams, extensive distribution systems, and power plants. During the past several years, the use of irrigated lands by Indians has increased greatly and the Indians as tribes and individuals are showing a constantly growing interest in the development of their land resources. In addition to its regular operating and construction activities, the Irrigation Division has provided very essential support to the protection for Indian water rights.

Among the outstanding achievements of this Division during the past year have been the 70 projects on the Navajo Reservation where hundreds of Navajos are working with Government engineers to bring water to parched desert lands where the livestock industry can no longer support one of the fastest growing population groups in the Nation. The Navajos are not only working but donating labor to such an extent that on many projects only supervision and materials are furnished by the Government.

From reservation irrigation projects during 1937, the Navajos realized a crop income of $270,661. A total of 1,142 families took

part in farming operations. Alfalfa and corn were the chief crops produced.

The importance of these figures lies in the fact that the Navajos spent $1,400,000 for food last year which indicated that they are dependent to a great extent on commercial items in their diet. It opens up the possibility of supplementing their present production by increasing their farm acreage to supply the hay, grain, vegetables, and fruit which they now must buy.

It is estimated that an additional 5,500 acres under cultivation will produce all unprocessed agricultural products now imported. This would be equal in value to the $225,000 worth of such products now purchased each year. An additional 14,000 acres would produce enough wheat to supply the $325,000 worth of flour which Navajos now buy every year.

A significant forward step in the advancement of the Indian rehabilitation program was taken when the Bureau of the Budget and Congress approved the recommendation of the Indian Office that hereafter rehabilitation funds be made directly available to the Office of Indian Affairs. By this direct appropriation, there is assured a more positive measure of administrative control and expeditious handling of allotments. Such allotments by supplementing the activities of land acquisition, irrigation, extension, forestry, and education have enabled the Service to concentrate upon the integration of all activities, personnel, and allocated funds, and have thus consummated a more complete use of Indian resources. The major projects have involved the construction and repair of Indian homes and auxiliary farm buildings, and the construction of community buildings to house self-help activities. Successful settlement of Indian families on the land included not only the construction of buildings but water development, fencing, and other types of land improvement. Other projects included enterprises for canning, sewing, arts and crafts, and community and individual gardens. In these gardens, many thousands of pounds of foodstuffs were raised for immediate consumption and for preserving and drying.

The following report furnishes definite proof of the desire of Indian women to provide a normal mother's care for their families.

During the year 1938 a total of 10,871 meetings was held by Indian Service home-economics workers with Indian women, on canning, drying, clothing, home improvement, nutrition, child care, and other subjects. Objective progress over the previous year is shown in the following figures:

	1936	1937	1938
Number of quarts of fruits, vegetables, and meats canned	765,051	1,898,579	1,673,124
Number of pieces of clothing made under auspices of home extension groups	142,710	182,415	139,128

CIVILIAN CONSERVATION CORPS

The Civilian Conservation Corps has not only maintained its excellent work of the preceding years, but has perhaps surpassed it through the force of the momentum gained by past experience and the growing appreciation of all who were its beneficiaries. The work of the enrollees operating at 71 agencies is followed with the keenest interest by the Indian people.

Improved transportation, communication, and detection for forest-fire suppression, by the construction of truck trails, telephone lines, lookout towers, protection of timber stands, development of stock water facilities, fence construction to define range boundaries, and erosion-control projects are of far-reaching value. Indian leadership is encouraged. The enrollee training courses are worked out locally at each agency and embrace a wide variety of subjects. The training offered has been of such high character as to enable many enrollees to secure and hold remunerative positions in the business field.

SEMINOLE INDIANS

In no section of the country has the attitude of Indian wards become more responsive than among the Seminoles, who have steadfastly resisted all attempts at assimilation, and until very recently have even refused to permit their children to attend schools. During the past 3 years, 45,000 acres of fine grazing land have been acquired and are now in productive use, improved methods of agriculture have been established, 1,000 head of high-grade cattle have been added to the livestock inventory of the tribe, and a school has been opened where there is the heartiest response to the Government's educational program. Today the descendants of the great Osceola are utilizing their new lands to the fullest extent, roads in the Big Cypress country are being built largely by means of Indian labor, fences are being erected to take care of cattle and hogs, citrus orchards have been planted, and more than 1,000 palmetto houses have been built for them in the past 2 years. These measures are at last meeting with the most enthusiastic cooperation from those Seminoles, about one-half of the tribe, who have established themselves on the two new reservations.

CONSERVATION OF INDIAN RESOURCES

INDIAN LAND PROBLEMS

Indians have always been a rural people. In spite of efforts to urbanize large numbers of Indians and to assimilate them into white

city and town life, the great majority of Indians remain in home communities. The Indian's land is his greatest economic asset and his most precious heritage. His land problems must be solved, or the Indian will go down to extinction.

Using the Land on the Unallotted Reservations

The allotment of Indian lands met with sturdy resistance. The Menominees in Wisconsin kept their 200,000 acres, richly forested, in tribal ownership, as did the Red Lake Chippewas in Minnesota, with over 400,000 acres. A good many reservations, such as the Wind River in Wyoming and the Klamath in Oregon were only in part allotted, and the surplus, or a portion of the surplus, saved in tribal ownership. Only in the Southwest, in Arizona and New Mexico, did the Indians generally escape the march of allotment, though the irrigable lands of a few tribes were allotted. Today, the New Mexico Pueblos still retain their unallotted Spanish grants along the Rio Grande; the Mescalero Apaches in New Mexico, their 470,000 acres; the Fort Apache and San Carlos Apaches in Arizona, their 3,200,000 acres; the Hualpai in Arizona, their 900,000 acres; the Papago, their 2,600,000 acres; and the Navajos, their 16,000,000 acres.

On the unallotted reservations problems of land conservation are often acute. Already, overgrazing and misuse have seriously deteriorated the ranges and agricultural lands of Indians. The problems of conservation are further complicated by two basic factors affecting the present and future fate of Indians: (1) Rapidly increasing populations, and (2) fixed boundary limits, within which there is a steadily diminishing productivity of the land base.

The operation of these two factors can be illustrated by the situation to be found on the large unallotted reservation of the Papago Tribe in southern Arizona. The early habitat of the Papago was in southern Arizona, stretching from the city of Tucson across the Mexican border into the State of Sonora. On the reservation in the United States, around 6,200 Papago are now living. Originally they resided in 10 or 12 villages, but today, with their expansion helped by water developments throughout the reservation, they have 55 permanent and 34 seasonal villages. Originally, the reservation area was one of well-vegetated ranges, perennial grasses, desert shrubs, cacti and desert trees. Due to overgrazing, the ground cover has been depleted and accelerated erosion is active on most of the range. The digging of deep wells and construction of other water developments have enabled the population to spread out over the entire area, putting greater pressure everywhere. It is not known just how many head of livestock the Papago own; estimates run from

12,000 to 25,000, while the Soil Conservation Service has, after careful study, estimated the carrying capacity of the range at 9,675 cows year long.

The economy of the Papago today involves three elements: agriculture, livestock raising, and earned wages. As with the numbers of livestock, accurate figures of the relative proportion of these three sources of income are lacking. Studies made in 1936 would indicate that there was in that year an average family income of about $530. Of a total income, $775,000, about 16 percent came from domestic crops and wild food gathering and 24 percent from livestock, sold and consumed; in other words, less than half of the income came from the land. On the other hand, 52 percent of the total income was attributed to wage work (17 percent from Government wages in CCC–ID, 9 percent from private wages, and 18 percent from wages earned in the copper mines at Ajo, Ariz., located just off the reservation).

For the Papago and for all other Indians confronted with a like problem of resource conservation, the Government has the difficult task of education in sound land-use practices, and also of inaugurating practical conservation programs to save the soil from further exhaustion, to build it up, and to stabilize it on a permanent utilization basis. The problem takes in the whole complex of anthropology, sociology, economics, administration, and the technical disciplines related to soils science, agronomy, range vegetation, livestock management, and agricultural engineering.

The Problem of the Allotted Reservations

Whereas there is real hope and expectation that the resource problems of the unallotted lands can and will be solved, there is no such optimism in the United States that the tenure problem of the allotted reservations can or will be solved in time to rescue the land base for these Indians. To the tenure problem on such reservations are added acute problems of land use and conservation as well, making the total problem indescribably difficult. Since 1933, a deceptive economic recovery has been realized through the expenditure of large amounts of Government relief funds, evidenced to the Indians in wages, but aside from the construction of numerous conservation and other projects of great importance and value, the basic land use situation remains acute.

The inheritance and reinheritance of the original allotments has fractionated the interests of the heirs into smaller and smaller equities. As physical partition of an average trust allotment of 160 acres

into legal shares is impractical in most cases, the heirs have naturally preferred to secure the benefit of their equities in lease moneys. The Government has had to face increasingly the alternative of selling the land and dividing the proceeds among the heirs, or of retaining it in trust status—and going into the real estate leasing business.

In 1937 a study of the land pattern at the Lower Brule Reservation (South Dakota) showed that of an original area of 234,850 acres, 40 percent (94,000 acres) had been alienated to whites through the sale of fee-patented land; only 1 percent (1,450 acres) remained fee-patented in Indian ownership. Twenty-three percent (52,500 acres) of the total acreage was in "original" allotments and 25 percent (59,000 acres) in "heirship" status. The remainder was made up of one-tenth of 1 percent (240 acres) in tribal status; four-tenths of 1 percent (1,200 acres) set aside for agency and administrative purposes; and 10 percent (26,800 acres) of alienated fee-patent land repurchased for the Indians by the Government since 1934.

INDIAN FORESTS

Of the land in Indian ownership approximately 16,000,000 acres, or somewhat less than one-third, is forest land. Indian forests not only contribute millions of dollars annually to the Indians' income, but also serve a valuable protective function in regulating run-off, preventing erosion, and conserving water supplies.

The income from the forests constitutes the principal income for several thousand Indians.

Distribution of Indian Forest Volumes by States

State	Total volume (m. b. m.)	Commercial volume (m. b. m.)	Commercial cut-over volume (m. b. m.)	Noncommercial volume (m. b. m.)
Arizona	10,901,416	6,253,121	118,017	4,530,278
California	583,800	359,700		224,100
Colorado	372,569	240		372,329
Idaho	152,282	120,237	7,416	24,629
Iowa	8,136		8,136	
Michigan	16,336	8,152	8,184	
Minnesota	316,178	241,529	68,650	5,999
Montana	1,540,937	1,314,055	21,206	205,676
Nebraska	21,719		21,519	200
Nevada	46,543		43,200	3,343
New Mexico	2,722,731	1,269,548	189,981	1,263,202
North Carolina	160,278	93,000	67,278	
North Dakota	96,508			96,508
Oregon	6,651,467	6,064,512	457,895	129,060
South Dakota	106,831		5,234	101,597
Utah	482,830	288,440	1,950	192,440
Washington	9,660,132	9,272,655	174,222	213,255
Wisconsin	613,014	506,406	106,608	
Wyoming	854,700	746,880	3,160	104,660
Total	35,308,407	26,538,475	1,302,656	7,467,276
Percent	100.0	75.2	3.7	21.1

On the basis of these estimates of volume the total stumpage value of the timber in Indian ownership amounts to $87,462,597. The commercial timber represents about 82 percent of this amount while the reserve timber on the cut-over lands and the noncommercial timber represent 4 percent and 14 percent, respectively, of the balance. The values are distributed as follows:

		Percent
Commercial timber	$71,917,909	82.2
Commercial timber, reserve stands	3,349,301	3.8
Noncommercial timber	12,195,387	14.0
Total	87,462,597	100.0

Although in most respects the management of the Indian forests is directed toward the same objectives sought in the management of a public forest, there are certain fundamental differences which give rise to radically different management problems. Indian lands are private property held in trust for the Indians by the United States and must be managed for the best benefit of the Indian owners and in accordance with specific statutes laid down by Congress. Moreover, by reason of the fact that the Indian forest property is so closely involved with the welfare of the Indian people, any plan of forest management which may be devised must take cognizance of the general Indian problem and be coordinated with the whole Indian Service program of social and economic betterment. This necessitates a far greater flexibility in long-term forest management plans than is ordinarily required or considered ideal from a purely technical standpoint. Constant adjustments must be made to meet the immediate pecuniary needs of individual Indians or to facilitate the educational and industrial advancement of the tribes.

Management and Development

The management of Indian forests has always been conducted well within income. In fact, the record discloses that during the past 29 years, namely from 1910 to 1938, inclusive, a cash return of $44,169,940 was realized. The cost of administration during the same period totaled $7,105,690, approximately 40 percent of which was borne by the Indians and the balance from Treasury funds. The total income includes $5,346,108 received from the sale of grazing privileges for the fiscal years 1931 to 1938, inclusive, but does not include several million dollars of free-use grazing enjoyed by the Indians during this period. A consideration of the foregoing results reflects the following significant relationships, namely:

1. That the practice of conservation on Indian lands for the period 1910 to 1938, inclusive, reflects a ratio of costs to income of approximately 16 percent.

2. That the average annual cost of administration when compared with the area under management reflects a cost per acre of about 1 cent.

3. That the average annual income when considered with the capital value of the property under management reflects a ratio of income to capital value of about 2 percent per annum.

During the fiscal year just ended the Indians realized a cash income of $1,168,235 from their forests in addition to their own free-use valued at $273,610, thereby reflecting a grand total income from timber of $1,441,845. Grazing resources during the same period produced a cash revenue of $678,720 plus free grazing by the Indians valued at $794,680 or a total return from grazing resources of $1,473,400. These receipts from grazing when considered with the income from timber show a total gross revenue from forest and range resources of $2,915,245. The total cost of administration for the fiscal year 1939 was $442,480 distributed to the various funds as follows:

Administration of Indian forests	$319,365
Expenses, sale of timber (reimbursable)	110,551
Suppressing forest fires on Indian reservations—Gratuity	11,122
Suppressing forest fires on Indian reservations—Tribal	1,443
Total	442,479

Of this total cost of administration $111,993 was paid from Indian funds and the balance from Treasury funds, thereby indicating a net cost to the Government of $330,487 for the practice of conservation on 46,000,000 acres of Indian land under management in the continental United States, or somewhat less than 1 cent per acre.

Generally speaking the forest and range business of the Indian Service during 1939 exceeded that of the preceding year. A comparatively large number of small timber sales were approved and completed. The degree of Indian participation in forest development increased somewhat, especially on the Quinault Indian Reservation and the Mescalero Indian Reservation. The use of the ranges by Indian stockmen increased substantially in practically all of the western range States.

Five new major timber sale contracts were approved during the year covering the sale of timber on the Colville and Klamath Indian Reservations. These sales involve a total volume of 152,609,000 feet board measure and have an estimated stumpage value of $503,370.

The average price received for the timber was $3.30 per thousand. Two major timber sales were completed during 1939 and 13 others are due to terminate in 1940. Hence the new sales approved will replace to some extent those which have expired and which will expire during the coming year.

Indian Sawmills

For many years sawmills on Indian reservations have furnished employment and building materials to the Indians. In a treaty of December 2, 1797, with the Oneida, Tuscarora, and Stockbridge Indians, residing in New York State, the United States agreed to erect a complete gristmill and sawmill to serve those nations and, if one convenient location could not be found, to erect two such sawmills. It was further agreed that the United States would provide, during 3 years after the mills were completed, one or more suitable persons to manage the mills, keep them in repair, instruct some of the young men of the three nations in the arts of miller and sawyer, and provide teams and utensils for carrying on the work of the mills. A treaty of September 29, 1817, with the Wyandot and six other tribes, provided for the erection of a sawmill and gristmill on the Wyandot Reservation, and the treaty of October 6, 1818, with the Miami contained a similar provision. Many subsequent treaties made like provisions for sawmills and gristmills and small sawmills were constructed on practically all reservations having forests suitable for saw timber. In subsequent years sawmills were provided under special appropriations or by special departmental action.

Most of the Indian sawmills constructed during the earlier periods were operated mainly to produce building materials for the Indians rather than as commercial enterprises. However, in two notable instances, namely, the Menominee Reservation sawmill at Neopit, Wis., and the Red Lake Reservation sawmill at Redby, Minn., commercial logging and milling operations were initiated for the purpose of furnishing the Indians with employment.

The Menominee Indian Mills were authorized by the act of March 28, 1908; a large double-band sawmill with an annual capacity of 20,000,000 board feet was established; the plant was destroyed by fire in 1925 but was rebuilt and has continued to operate through the years. The mills have produced a substantial profit since the beginning of operations and have provided the Menominee Indians with self-sustaining labor and the means of a healthful livelihood.

The Red Lake Indian sawmill was authorized by the Appropriation Act of June 5, 1924. This is a single-band sawmill with an

annual capacity of between 4,000,000 and 5,000,000 feet board measure. It furnishes the Red Lake Indians considerable employment each year and provides them with cheap building materials.

Several other sawmills operated by the Indian Service gave employment and training to a large number of Indians during 1939. Notable among these smaller units is the sawmill on the Navajo Indian Reservation. Production at this plant is still comparatively limited. However, profits have been reasonable, the operations of the unit have been effectively conducted, and the enterprise bids fair to assist the Navajo Indians materially in establishing themselves on a self-sustaining basis.

Fire Protection

Consistent with its declared policy of conservation covering the management of Indian forest and range resources, the Indian Service seeks a high degree of protection against the ravages of fire, insects, and disease. Fire still constitutes the principal problem on Indian lands, and although major forward steps have been taken toward its solution during recent years, losses continue to occur annually.

The protection organization of the Indian Service was reorganized during the year and revised regulations were issued in a handbook of fire control. This new set-up definitely fixes the responsibility of field officers and has materially increased the efficiency of the organization. Considerable improvement in the fire record has taken place as a result, and although 145,000 acres of forest and range land of the total 46,000,000 acres under protection was burned over during 1939, two-thirds of the area burned was confined to a single reservation, namely, the Warm Springs Reservation of Oregon which sustained a serious loss because a large number of fires caused by lightning occurred at one time. With the exception of this reservation, the fire record of the Indian Service for the year 1939 was outstanding, the damage comparatively reasonable and the cost of suppression low. The damage has been estimated at approximately $100,000 and the cost of suppression at $62,000, or a unit cost of controlling the area burned of 6.2 cents per acre.

INDIAN RANGE RESOURCES

The range lands in Indian ownership, including the forested area suitable for grazing, aggregate about 42,000,000 acres and constitute approximately 80 percent of the total Indian land resource. These

lands are distributed in varying amounts to some 90 reservations and 14 separate States, but the large proportion of the economically important grazing lands are confined to the western range country. Within the well-known livestock producing regions of these western range states, Indian range lands form an important part of the total national range resource and exert a considerable influence upon the livestock industry generally.

The importance of Indian grazing lands to the Indians in particular and to the livestock industry generally is revealed in the fact that a total of 988,194 Indian-owned sheep and goats, 262,630 Indian-owned beef cattle, and 124,719 Indian-owned horses and mules were grazed on Indian lands during the fiscal year 1939. A large number of livestock owned by whites also grazed on Indian lands. The use of Indian ranges by Indian livestock owners has increased materially during recent years and it is the aim of the Indian Service that all livestock grazed on Indian reservations will ultimately be in Indian ownership.

Considerable progress has been made in the conservation of Indian range resources during recent years, although much remains to be accomplished. The ranges have been placed under comparatively effective control, a large number of range improvements have been constructed, and the ranges are maintained in a reasonable state of production.

The Indian Service has always been faced with several difficult problems in connection with grazing management which are peculiar to Indian lands. Principal among these are the involvements arising out of the broken and uncertain status of Indian lands, the problem of wild horses, and the overgrazed condition of reservations in the Southwest.

A large part of the range lands on the reservations of North and South Dakota, Idaho, and to a lesser degree in the states farther west, were allotted in areas of 120 to 320 or more acres. Obviously, it is impossible for anyone, white or Indian, to engage in the livestock business on so small an area or even several times that amount. The result is that a number of Indian allotments, with probably some tribal lands, must be consolidated in order to make economic range units. This condition often prevents the Indians from utilizing effectively their ranges for their own livestock and demands a high degree of cooperation between all persons involved, if the ranges are to be placed under proper management.

Indian wild horses have always been a difficult problem by reason of their considerable numbers and the difficulty of exercising ade-

quate control over their use of the ranges. For many years the Indians were extremely reluctant to dispose of these worthless animals and inasmuch as most of the lands were unfenced, much damage was done to the ranges which they frequented. During recent years the Indians have consented to the sale of the unbranded horses and thousands have been disposed of. Although the problem is not as acute as formerly, much remains to be accomplished in this field before the Indian tradition, that wealth and position are measured by the number of horses owned, can be sufficiently adapted and modified so that the wildhorse pest can be wholly eliminated from Indian lands.

THE NAVAJO GRAZING PROBLEM

The grazing situation in the Navajo country of the Southwest has long been, and still is, critical. The Navajo, Hopi, and other Indian lands, amounting to over 18,000,000 acres in the aggregate, are extremely arid, have little rainfall, and are not only incapable of supporting a heavy growth of forage but are extremely susceptible to erosion. Here, because there is little opportunity for farming or other industrial development, the Indians have been forced to gain their livelihood through the raising of sheep, goats, horses, and cattle. The lands are too arid adequately to support the herds necessary to a reasonable standard of living for the large number of Indian people dependent thereon. As a result these lands have been heavily overstocked and overgrazed. Much study has been given to the problem by both the Indian Service and the Soil Conservation Service of the Department of Agriculture, and major forward steps have been taken in the improvement of conditions. The basic necessity is, of course, to reduce the livestock numbers to a sufficient point to permit the rehabilitation of the range—a fundamental requirement which has proven extremely difficult to place before the Indians in a manner fully understandable by them.

The steady purpose of the Indian Service has been to achieve both stock reduction and range management through consent and cooperation rather than through coercion. In the Pueblo area this purpose has been fully accomplished to the present date, and the handling, by Acoma and Laguna Pueblos especially, of their heavy and perplexing burdens has furnished an example to communities everywhere. On the Navajo, at every stage, the tribal council has moved with the Government in the program; but individual resistances presented themselves, important and stubborn enough to call for the invocation of legal authority. This authority has been fully supported by the Federal district court and has been useful in reinforc-

ing the community pressure and influence which the Navajo Council, and the Navajo leaders generally, have supplied.

A long-range and objective view cannot yet give perfect assurance that these essential ranges, and the human life dependent on them, will be saved because the battle to save them was started so late—years after erosion had reached the critical phase.

INDIAN ARTS AND CRAFTS

Indians, declare competent authorities, are craftsmen as good as the best among the artisans of Europe and Asia. Heretofore, they have lacked the opportunity to present their work to the right public. To make up for this lack, the Indian Arts and Crafts Board was established 3 years ago to promote the economic welfare of the Indians through the development of their arts and crafts and the expansion of the market for the products of their craftsmanship. Since the Board's inception, it has been diligent in its efforts to find wider markets for Indian products, to provide standards, and to interest the public in well made authentic products. The Board has worked with the producer for improvement of production, has established standards and government labels to protect the genuine, and has conducted exhibits, displays, and prepared publications for creating public appreciation of the beauty and usefulness of Indian art objects.

The Indian presentation at the Golden Gate International Exposition, San Francisco, gave the Board an opportunity to give a representative picture of the Indian civilizations of the United States and Alaska, to show both past and present achievements of these civilizations, and to open new vistas for their future.

In cooperation with a chartered Indian community of the Round Valley Reservation in California, a market for the arts and crafts products of various Indian tribal groups from all sections of the country was established as a part of the exhibit. This enterprise served as a Nation-wide advertising medium for Indian arts and crafts and created a better understanding of and a wider market for Indian products; it served as a stimulus for arts and crafts production and presented a testing ground for the commercial value of various products from different parts of the country. The increase in sales on the market from the opening of the Fair to the end of the fiscal year indicates the importance of careful presentation of Indian products in creating a demand even in cities where Indian goods are not well known.

Less extensive exhibits were those at the Intertribal Indian Ceremonial, Gallup, N. Mex., in August, and at the Indian Exposition, Tulsa, Okla., in October 1938.

A mark of genuineness to distinguish all hand-made Alaskan Indian and Eskimo work from imitations made abroad and in the United States proper has been created by the Board. Marks of genuineness and quality have previously been established for Navajo, Pueblo, and Hopi silver; and certificates of genuineness for Navajo all-wool woven fabrics.

The Choctaw spinning project in eastern Oklahoma has been reorganized to effect more efficient production and increase the earnings of the individual spinners. This project, initiated the previous year, now has 78 spinners.

Intensive development work has been carried on in Oklahoma, in the Sioux area, and in southern Arizona; and, in cooperation with private persons, among the Coeur d'Alene Indians, at De Smet, Idaho. Markets for the production stimulated by these activities have been provided through the Indian market at the San Francisco Exposition. On many reservations, preparations for the market in San Francisco have increased the sale of products locally. The reputation of the exhibit, too, has proved beneficial in many places for the sale of Indian goods, as several business enterprises who previously had not carried Indian goods have now included them in stock and others plan to do so next year.

Plans are under way for revision of the preliminary edition of a bibliography of articles and papers on North American Indian art, issued last year, and for the printing of a final edition with provision for issuance of supplements from time to time to keep the publication up to date.

A book on the arts and crafts of the North American Indian, sponsored by the Board, has been prepared by the American Museum of Natural History, under a grant from the General Education Board.

The demand for a small publication, giving a survey of Indian cultures in the United States and Alaska, with special emphasis on artistic production, has led to the preparation of a booklet, based on material taken from the Indian exhibit at the San Francisco Fair.

While it is not anticipated that increased arts and crafts production will by itself ever solve the entire economic problem for the Indians, it will, however, enable many of them to become self-supporting through their craft work, and will supplement the income of a still larger number. According to an income survey made by the Indian Service for the calendar year 1938, the average income from arts and crafts aggregated only about 2⅙ percent of the total income earned by Indians. A total income of $863,267 from arts and crafts production, as revealed by the survey, is distributed among the various crafts, as follows: blankets and rugs, $467,873; silver

work and jewelry, $108,718; bead and leather work, $143,618; basketry, $60,291; pottery, $25,928; woodwork, $14,496; other crafts, including clothing and household articles, dolls, drums, and other miscellaneous items, $42,343.

SERVICES TO FAMILY, COMMUNITY, AND CULTURAL LIFE

Indian Service policies, funds, and personnel focus in the ultimate upon the family, and community life of the Indians. To improve their standards of living, to combat sickness and disease, to provide cultural expression, to increase the social satisfactions of home and community life, these are the fundamental objectives of the Indian Service. Basic, of course, is the program of economic rehabilitation paralleling that of conserving and making efficient use of natural resources. Closely related to these are the community services of hospitals and nursing, education, development of arts and crafts, and the enforcement of law and order.

HEALTH

The death rate of Indians has fallen steadily during the past years. In 1931 there were 16.0 deaths per thousand, in 1938 the rate was 14 9, and for the year 1939 the rate fell to 13 per thousand.

The birth rate has fallen also, but in no such proportion. In 1931 the birth rate (live births) was 21.5 per thousand, in 1938, 22.9, and in 1939, 22.7 per thousand. This gives an increase for Indians of births over deaths of 9.7 for the last year which is an increase of 1.7 over the previous year.

The general disease rate has been about the same as in preceding years, with some few exceptions. There has been a marked increase in the incidence of influenza, measles, and mumps. While records show that malaria also has increased this is probably due primarily to intensive surveys which are bringing to light more cases. In spite of the fact that 1,576 more Indians were vaccinated against smallpox than during the preceding year, the number of cases reported for this year was 60, as compared with 48 for the year before. This indicates that a universal vaccination program against smallpox must always be an important part of any health program on the reservations.

The Indian Medical Service continues to make progress in its fight against trachoma, the eye disease so prevalent among Indians. Formerly operations were resorted to, 2,587 of them being performed in 1929. This year only 92 trachoma patients were operated on. Experimentation with sulfanilamide therapy, the beginning of which

was reported last year, has gone on intensively in a few centers, and results have exceeded the most optimistic expectations. At 11 of these centers, 959 started treatment; 901 completed it. After an average of about three weeks' treatment, 460 cases, or 51 percent, have been reported as arrested, and after more continued treatment an additional 432, or 47.8 percent, showed improvement. Another series of cases were studied at the Trachoma School, Fort Apache, Ariz. At this school during the past fiscal year, 167 were given sulfanilamide treatment for 21 days. After 30 days' observation, 125, or 75 percent, were reported arrested, while 42 others showed improvement and became arrested after an additional three weeks' treatment.

Trachoma research continued through the year at Fort Apache under the general direction of Dr. Phillips Thygeson, but the center was closed June 30, 1939, having completed a remarkable program of research for the benefit, not only of the Indians, but for all mankind.

Tuberculosis.—In the tuberculosis field, emphasis this year was placed on health education, especially in connection with surveys. An outstanding survey is now in progress at the Pine Ridge Reservation, where from July 1937 to June 1939, 5,251 X-rays were taken covering perhaps half of the 8,000 Indians of the reservation. Intensive tuberculosis surveys are also in progress at the Rosebud Reservation and among all of the Indians of Wisconsin. This latter program is with the help and cooperation of the State Board of Health.

The Phipps Institute, continues to give the Service valuable help and advice in the training of personnel, the interpretation of X-rays, and in the B. C. G. or vaccination program. During the year it was reported that 1,565 had been vaccinated and 1,460 had been observed as controls. Since this work started, there was only one death from tuberculosis among the vaccinated group and 17 among the control group, an obvious difference in favor of the vaccinated group. Deaths from causes other than tuberculosis were reported as about equal.

A tuberculosis institute was conducted at Shawnee, Oklahoma, during the spring of 1939 by Dr. H. W. Hetherington and Miss Fannie Eshleman, of the Phipps Institute. About 80 doctors and nurses from the Oklahoma area attended.

Hospitals.—New hospitals were opened during the year at Tahlequah, Okla., with 75 beds, and at Talihina, Okla., with 150 tuberculosis beds, and 75 beds for general cases. There are now 80 general hospitals with 3,053 beds and 14 tuberculosis sanitoria with 1,494 beds.

The general hospitals treated 55,460 patients during the year, including 2,143 tuberculosis cases, at a cost of $3.31 a day.

The 14 tuberculosis sanatoria treated 4,192 cases of which 2,195 were tuberculosis cases and 1,997 other than tuberculosis. This larger number of general cases is influenced by the large number treated at the Talihina Sanatorium and the Tacoma Sanatorium, both of which do a large general service.

Dental.—Dental treatment was given to 26,508 patients by full-time dentists and to 6,741 patients by part-time dentists and 69,466 treatments were given. A new position has been created of dentist in charge of dental hygiene education for special work in the oral hygiene phase of dental care. This service was started just at the close of the year and no data are yet available.

Public Health nursing.—Indian Service nurses in the United States made 90,000 home visits during the year and interviewed or treated an additional 30,000 people in their offices. The nurses also assisted at various clinics to which some 60,000 people came.

Experience center for Public Health nurses.—In an effort to get sufficient public-health nurses to fill our vacancies, a new Civil Service position was established, namely junior public-health nurse. There is no experience prerequisite for this position but nurses are assigned to an experience center within the Indian Service. This center comprises 10 field positions in the Five Tribes area and 5 in Kiowa.

Nurses work in this area for 6 months under close supervision, after which they are sent to fill the existing vacancies throughout the Service and will work under less close supervision.

Cooperative relations.—Close affiliations with State and local boards of health were maintained and strengthened. The cooperative health work in operation at the beginning of this fiscal year was satisfactorily maintained and in addition, agreements were made with the State Board of Health of Utah for the placing on duty of a full-time field nurse for a widely scattered area along the Nevada-Utah line. The salary of this nurse is shared equally by the State and the Indian Office.

Attention has been focused through the venereal disease legislation on more aggressive programs by State boards of health in venereal disease control among Indians. State health officers have been personally interviewed and certain agreements received as to just what the States could do. Their replies have been most gratifying.

Sanitary Engineering.—The Public Health Service through its engineer corps, made possible a sanitary engineering service which has been in effect now in the Indian Service for some years. One hundred agencies and Indian institutions were visited and surveyed.

Sixty-four reports on surveys were submitted, 64 conferences attended, 8 water-treatment plans prepared, 12 sewage-treatment plans prepared, and 74 Indian Service sanitary plans reviewed.

Personnel.—The personnel at the close of the fiscal year included 10 administrative and supervisory physicians, a supervising dentist, 8 supervisory nurses, 162 whole-time and 99 part-time field physicians, a special expert in tuberculosis, 4 special physicians for tuberculosis, 12 special physicians for trachoma, 25 consultants, 17 whole-time and 11 part-time dentists, 114 field nurses, 458 hospital nurses, 16 nurses at large working with special physicians, 10 assistant medical technicians, and over 900 other employees, a total of about 1,950. This is an increase of about 100 over the preceding fiscal year.

An associate consultant in hospital nursing has been added to the administrative staff, a field nurse supervisor is to be in charge of the experience center for public health nurses stationed in Oklahoma, and an assistant supervisor has also been assigned to the experience center.

ALASKA

The medical care of the 30,000 natives of Alaska, the prevention of disease among them, and the extension of public-health practices in their communities has been the responsibility of the Indian Service since 1912. The work is administered by a medical director, a supervisor of nurses, and a dental supervisor, all of whom make periodic visits to the field.

Facilities maintained for this purpose include 7 hospitals, each with a physician, and an aggregate of 26 nurses and 52 other employees. A field staff of 30 nurses carry on public-health nursing activities and initiate emergency measures for medical relief in the absence of physicians, and 4 physicians devote full time to medical services for these people. Other facilities utilized are 12 private hospitals, including 1 outside of the Territory, which care for patients on a contract basis; 2 Government-owned hospitals within the Territory, and 2 Indian Service hospitals in the States. Indian Service hospitals admitted 1,440 patients for a total of 48,601 days of care during the year.

A traveling physician, appointed during the year, visited 7 localities, providing medical attention for 1,993 people who formerly had not had access to this service.

Several additional field nurses were appointed during the year, extending considerably the service to villages in more isolated sections, particularly in the Yukon and Kuskokwim River areas. Field nurs-

ing activities were extended to two localities—the Bristol Bay area and the Cook Inlet region, where services previously had not existed. A field nurse was assigned to travel on the *North Star* and, under a cooperative agreement with the Territory, full-time nursing services are provided at Wrangell and Petersburg, subsidized in part by the Office of Indian Affairs. Public-health nurses visited new localities, reaching 4,979 people not provided for previously.

The tuberculosis problem persists and the need for additional hospital facilities is becoming acute. Field nurses are teaching the isolation of patients and the segregation of the tuberculous in homes apart from children and those not infected with the disease, but this can be only a temporary measure in the total program of tuberculosis control. Another emphasis in the field-nursing program is on maternal and child care. In many instances nurses hold classes in midwifery for the native women. Two vocational schools maintained by the Office of Indian Affairs are stressing both tuberculosis control and child care in their health-education programs, and providing carefully planned programs which include bed rest when indicated for certain students suffering various handicaps, including tuberculosis in noninfectious stages.

Cooperation has been extended to the Territorial Department of Health in its program of tuberculin testing and X-ray survey, and this service is of inestimable value in indicating areas for special projects. In certain villages in southeastern Alaska a program of B. C. G. vaccinations for control of tuberculosis was started in the fall of 1937 and has been followed through during the present year. Five hundred and twelve have been vaccinated and 466 studied as controls. Only 2 cases of tuberculosis have developed among the vaccinated group, while 10 have developed among the controls.

During the summer of 1938 a study was undertaken to ascertain the cause of the frequent outbreaks of meningitis on the lower Kuskokwim. The Territorial Department of Health cooperated in this investigation.

Diphtheria appeared at Matlakatla, but the Indian Service physician, with the assistance of a laboratory technician sent down from the Territorial Department of Health, controlled it promptly. There were only 9 cases and no deaths. There was a whooping-cough epidemic of much severity in the lower Kuskokwim region, resulting in approximately 40 deaths among young children. Whooping cough was also prevalent in many other areas, but at no other place was it reported to be very severe. Influenza was unusually prevalent throughout the Territory, but was reported to be severe only among the natives

in the Cook Inlet region. At Tyonek there were several deaths among small children. A few mild cases of scarlet fever were reported at Mountain Village and other points on the lower Yukon. It was also reported at Wales. Late in the spring there was a considerable epidemic of measles at Eklutna but the cases were not severe. There was one case of typhoid fever at Saxman.

Dental care is provided by a plan under which local dentists administer to needs of natives in their respective localities. These dentists frequently visit villages tributary to their headquarters, thereby serving a large number of natives. A dental supervisor visits areas not otherwise reached by the profession. Provisions for more adequate dental service to natives in the vicinity of Juneau was made by the installation of a complete and up-to-date dental unit at the Government hospital.

The study of dental conditions on the lower Kuskokwim which has been carried on over a period of several years by Drs. L. M. Waugh and Donald Waugh, of Columbia University, was continued into the first part of the present year.

The United States Coast Guard cutters continued to render valuable assistance to natives of Alaska in localities where medical service is not otherwise available, and provided transportation of patients in many localities where other means are lacking, particularly in the Aleutian Islands.

Transportation.—One of the most serious problems continues to be the difficulty of transporting patients from outlying villages to the hospitals. Principal dependence has to be placed on airplanes, which of course, are very expensive, but in the interior there is practically no other means of travel in the summer, although dog teams are much used in the winter. Even on the coast and on the rivers, boats are infrequent, and in the winter cannot be used at all except in the south. On numerous occasions the Coast Guard has been called on to transport emergency patients and has responded willingly whenever possible. Their physicians and dentists have treated patients in all villages which they have visited, and on numerous occasions vessels have made special trips and remained at villages for several days while the medical officers worked among the natives.

The cooperation between the Territorial Department of Health and the Alaska Medical Service has continued and increased through the year. In all public-health activities the two organizations are working closely together, although the Health Department takes no part in the medical relief which forms so large a proportion of the Indian Service work.

EDUCATION

During the fiscal year, the 4-year-old in-service training program of the Education Division began to bear fruit. A clearer understanding was gained of the unique educational problem presented by our Indian pupils who, alien to our culture and handicapped by lack of knowledge of the language, have had difficulty in understanding their white associates despite contact between the races for more than 200 years.

The Indian Service in all its divisions is forced to depend in large measure upon the average white citizenry in recruiting new personnel for its work. Teachers drawn from the average American teachers college or university are usually unfamiliar with the peculiar cultural background of Indians and in large measure they have been trained for service in urban areas. Seldom do they understand the manifold problems of a rural population primarily dependent upon wise land utilization for its economic self-sufficiency. To repair this deficiency the Indian Service undertook, in the summer of 1936, to organize a series of summer schools in Indian residential schools adjacent to or part of reservations where the program of instruction could be closely integrated with a study of the economic and social problems existing within the reservation. Instruction was offered in anthropology, various studies of land utilization, soil conservation, and other factors of importance leading to economic self-sufficiency. Studies in educational technique, work in presentation of English to non-English-speaking students, instruction in arts and crafts of the several native groups, were supplemented by seminars in a variety of other problems dealing with the work of student advisers, matrons, steam power plant engineers, and maintenance men. Instruction in health education was given, with demonstration work in the control and treatment of trachoma with a view to providing increased cooperation in the continuing treatment of this disease through the day schools as well as the boarding schools.

Two schools were held during the summer of 1936, one at Pine Ridge, S. Dak., the other at Wingate, N. Mex. The following summer four schools were held, adding Chilocco and Sequoyah, Okla., to the two operated the preceding summer.

The third summer (1938) schools were held at Sherman Institute in California and Chemawa, Oreg. Special emphasis in the Chemawa program was placed upon the problems of Alaska, and some employees of the Alaska Service enrolled.

At Sherman Institute particular emphasis was placed upon a program of courses introducing new employees to the problems of the Indian Service.

During 1939 summer schools were returned to Pine Ridge and Wingate.

In addition to the summer-school work outlined above, further work in in-service training was offered in the fall of 1936 by the inauguration of a field letter by the Education Division addressed individually to all employees. This field letter presented matters of educational policy, methods of instruction, discussed reasons for reviving Indian arts and crafts, reviewed problems in Indian health, emphasized the importance of safety measures as a general policy throughout the service, and in many other ways carried on a fortnightly presentation of measures deemed helpful in the promotion of greater understanding of needs of specific reservations and individual Indians.

During the same period of time the Education Division has been increasing the unity between its own program and that of other divisions of the Service. Community day school teachers throughout the Indian Service have cooperated closely with the Extension Division in carrying on programs of community activity. Hundreds of community gardens organized and developed by the teachers and school children have encouraged cooperation by the adult group in the community to make extenison services more productive. The Education Division has also cooperated with the Medical Division in its attack on trachoma by the operation of special trachoma boarding schools at Fort Apache and on the Navajo reservation. Teachers and housekeepers in Indian day schools have worked with the doctors and field nurses in the administration of daily treatments for the control of trachoma among the day-school population. The Division has cooperated with the Medical Division in the operation of instructional units in the tuberculosis sanitaria. The transportation services of the Education Division have been made available to the Medical Division on several reservations.

An increasing program of adult education has been growing up primarily through the work of the community day schools. In some areas this takes the form of classes in English, for older Indians, in others of civic discussions related to the new functions growing out of new tribal powers made possible by the Indian Organization Act. Short courses dealing with improved methods of agriculture, irrigation work, and handling of livestock have been held in conjunction with several of the reservation boarding schools.

Cooperation between the Education Division and the Indian Arts and Crafts Board has been continually increasing, and Indian high schools are emphasizing production training in many of the crafts which offer prospect of economic advantage to the Indian. Repre-

sentatives of the schools and the Arts and Crafts Board encourage these trained craftsmen and women to maintain their skills after leaving school by facilitating the marketing of their products. This collaboration between the two divisions in Alaska has resulted in substantial increases in cash returns to the natives. The income from arts and crafts to these peoples now approximates $100,000 a year. At present the major points of cooperative activity are among the Five Tribes in eastern Oklahoma where a hand spinning and weaving project is being sponsored jointly; in the Pine Ridge, S. Dak., area where a revival of quill and bead work is making progress; in the Papago area where the quality of basketry is being improved, and throughout the Navajo area where the quality of blankets and of silver jewelry have both shown distinct improvements.

The Education Division is working with the Irrigation Division to develop plans for land colonization on the Pima Reservation and the Colorado River reservation where large blocks of Indian-owned land are being placed under irrigation.

Representatives of the Education Division are experimenting in the use of native materials for home improvement. At the Pine Ridge reservation in South Dakota a great deal of progress has been made in the adaptation of rammed earth to such a use. Experimentation with rammed earth blocks has been carried on at Pine Ridge in South Dakota and on the Navajo Reservation.

Experimentation is also being carried on in the use of improved adobe construction in the Southwest, and the Education Division is collaborating with the rehabilitation program in the production of low-cost housing.

Much emphasis has been placed upon improved safety practices throughout the Indian Service. The Education Division has undertaken the training of automobile drivers, is training and licensing bus drivers, and has provided a series of tests worked out in collaboration with the American Automobile Association for the issuance of an Indian Service driver's license to be required of all persons operating Government automotive equipment. The safety program is being extended to the inspection of shops, buildings, roads, and other areas where safety practices are of importance.

SPECIAL EDUCATIONAL ACTIVITIES

In order to suit the program of Indian secondary schools to the vocational opportunities of the various areas, a continuing vocational survey was inaugurated in 1938. This included an exhaustive study of the conditions on the Pine Ridge and Rosebud Reservations and the success with which high-school graduates from these schools

found employment. A survey has been further extended to graduates of Sherman Institute in California and graduates of the Phoenix Indian School in Arizona. The Phoenix study also included an examination of the vocational program of the reservation high schools on the several Arizona reservations. These studies have resulted in a replanning of the school curriculum in the specific areas studied.

Under authority contained in the Appropriation Act of 1939, permitting the Education Division to publish experimental text materials for use in Indian schools, the preparation of a variety of useful materials has been begun. This includes a pamphlet series on the cultural background of various prominent Indian tribes, another pamphlet series discussing methods in Indian arts and crafts, a series of Indian life readers published in both English and in some cases the native Indian tongue; lastly, a series of miscellaneous publications covering materials on soil conservation, Indian cooperatives, etc. These publications are being prepared by employees of the Indian Service, are being illustrated in large part by Indian artists, and published in Indian school print shops.

During 1939 the Indian Service received a small grant of money from the Carnegie Corporation for experimental work in mural and fresco art. This sum was used to employ the services of Mr. Olof Nordmark, one of the foremost authorities in wall-painting techniques in the United States. Mr. Nordmark spent about a year stimulating mural work at the Riverside and Fort Sill schools in Oklahoma, at Phoenix Indian School in Arizona, and will devote some time to similar work at Pine Ridge, S. Dak. Several of the students who have worked with Mr. Nordmark have received contracts for the mural decoration of Federal buildings. Their own work during instruction periods has resulted in the beautification of school, gymnasium, and dormitory structures at the institutions where classes have been held.

LAW AND ORDER

The great majority of Indians in the United States are law abiding. Indian offenses are usually minor ones. Organized crime, gangsterism, and other evidences of professional crime are almost unknown. Drunkenness is perhaps the most frequent predisposing factor toward criminal activities.

Several factors tend to create problems of law and order among Indians. In the first place, especially in the allotted areas, the coming of the white man and white concepts have tended to destroy the native social organization and to break down the disciplines and social controls which were inherent in this community organization.

In the second place, many groups have suffered from a serious dislocation or complete destruction of their native economy. In an archaic culture the economy is usually a central factor about which religion, morals, and other aspects of behavior revolve. The destruction, therefore, of the native economy has removed the very core of social organization with its controls and disciplines. In the third place, many Indian groups have been reduced to economic dependency by events of the past generation, and perhaps in order to maintain their own self-esteem have resorted to drinking and other forms of escape which immediately bring about a problem of law and order. Finally, the Indians are affected by the tendency of the general public toward lawlessness.

These basic causes are further complicated by legal machinery stemming from the concept of Federal guardianship over Indians which exempts Indians living within reservations from most of the laws and law-enforcement machinery of the States and localities in which they live, and which creates confusion with regard to the jurisdiction of the several courts.

Improvements in the administration of law and order will have to take into account these basic economic and psychological causes, but this will not be enough. There must also be a strengthening of the actual machinery for enforcement.

Rather generally, State courts have declared they are without jurisdiction over offenses committed by Indians on Indian reservations, it having been held in numerous cases that an Indian tribe is a distinct political society responsible for the management of its own affairs and its own government. When an offense is committed on land that is not Government land, nor within the boundaries of a reservation, the State most certainly has power to punish. Such jurisdiction has never been denied by Federal statute. When the crime is committed on a reservation, however, the question of jurisdiction is not always clear.

The situation resolves itself to this: The United States courts have jurisdiction only with respect to 10 major crimes which have been specifically designated by Congress. The State courts have jurisdiction only with respect to crimes committed off reservations. All other crimes and misdemeanors, if punishable at all, are under the jurisdiction of special courts of Indian offenses which have been established in a large number of reservations. They follow either the code promulgated by the Secretary of the Interior or ones which have been devised by their own tribal councils acting under authority of their own constitutions adopted under provisions of the Indian Reorganization Act of 1934. An opinion of the Solicitor for the

Department, dated April 27, 1939, greatly strengthens the position and authority of the Indian courts in dealing with matters pertaining to Indian reservations.

These special courts of Indian offenses function rather satisfactorily in closed reservations, but in only a few of the broken or allotted areas have they proved effective. These courts seem to depend for their effectiveness upon the extent to which the social organization and social disciplines within the tribe remain intact. In the broken areas the State courts have occasionally assumed jurisdiction over restricted Indians, but generally they have withdrawn immediately when the jurisdiction has been challenged. These jurisdictional difficulties undoubtedly result in many misdemeanors going unpunished because of the absence of any duly constituted authority of law and order.

There is no single solution to this problem. The same solution may not work satisfactorily throughout a single State. Some groups might with profit be made subject to State laws and treated in the same manner as the white citizens of the State with whom they are interspersed. Others, however, who live within a compact, closely knit, closed reservation are in a much better position to administer effectively a program of law and order, through their own court of Indian offenses and their own Indian police.

In the Southwest, many groups would be placed at a distinct disadvantage if made subject to the laws of the State and the jurisdiction of the State courts. Most of these groups administer their own sensible laws with a temperateness and effectiveness not always found in white communities. On the negative side, it is doubtful if they would be treated justly before the local white courts—not that there is discrimination on the part of the courts, but the Indians themselves simply are not accustomed to the procedures of our white courts and have a concept of law enforcement wholly at variance with those of our white culture.

In many cases it would be impossible for State courts to attempt to exercise jurisdiction. In many of the isolated reservations there is no organized county government nor any other instrument of State, county, or municipal government within easy reach of the Indian communities. The expense of establishing instrumentalities of State law enforcement within these communities would be prohibitive.

In the State of California, however, the Indians are interspersed with the whites throughout the State with the exception of one small reservation in the northern part. They live either in small groups on rancherias, or as individual farmers on allotments in the

midst of white farmers, or as migratory agricultural workers. There are strong arguments for placing these Indians, so far as their relationship to law is concerned, on the same basis as the whites of the State. Similar situations prevail in several other States.

What is the attitude of the Indians themselves? The tribal councils of several reservations have gone on record as favoring the turning over of the entire administration of law and order to the State, with the Federal Government bearing a portion of the additional expense to which the State would be put. As opposed to that, the Indians of another State have openly declared they will resist any effort to make them subject to State laws, that they recognize only the jurisdiction of the Federal Government.

It should not be understood that a simple change in the legislation of Congress, placing the Indian population under State jurisdiction, or the placing of some and the exemption of others, or any other procedural device will solve the problem of vice and crime, and delinquency among Indians. The causes of crime are to be found in the economic and social lives of the offenders. In the long run, the ability of the Indians, aided by intelligent guidance, to work out an adjustment to the demands of a constantly impinging alien culture and to develop social and economic self-sufficiency, will determine the extent to which they will become or remain law abiding and productive citizens.

BUILDING CONSTRUCTION

The construction work carried on at many of the Indian Service schools and agencies since the beginning of the first Public Works program in 1933 has provided employment for a large number of Indians, and, at the same time, has resulted in much needed improvements in the housing, hospital, school, and other facilities.

In the prosecution of the building program, special effort has been made to anticipate the future needs of the Service and, to that end, plot plans have been prepared for many of the jurisdictions showing the proposed ultimate development of the plants.

The 1939 appropriation for construction and repairs of buildings and utilities in the Indian Service, including the 1938 deficiency appropriation, was $2,061,000. In addition to this, there was allocated $2,998,000 from the appropriation for the construction of public works (act of 1938).

The following tabulation gives the number and types of projects undertaken with funds provided under the 1938 Public Works program and the 1939 Interior Department Appropriation Act:

	1938, P.W.A.	1939, regular		1938, P.W.A.	1939, regular
School buildings	31	6	Horse barns		2
Remodeling schools	3		Shop buildings		1
Dormitories	5	4	Warehouses	1	1
Remodeling hospitals	1	4	Community building	1	
Nurses' quarters	3	7	Agricultural building		1
Employees' buildings	14	5	Central heating plants		2
Remodeling employees' buildings	1		Repairs to heating plants	8	7
Cottages	22	21	Improvements to heating distribution lines	7	7
General repairs	3	8	Improvements to sewer lines	12	11
Office buildings	3	2	Improvements to electric lines	10	8
Remodeling office buildings	1	3	Improvements to water development	13	13
Infirmaries or dispensary	6	1			
Elevator installations		1			
Jails	3	3	Total	148	119
Dairy barns		1			

At the close of the fiscal year, June 30, 1939, the Indian Service Public Works projects had been substantially completed. Thirty-six projects, totaling $1,877,800, were under construction by general contract, and 42 projects, totaling $1,120,200, by force account.

Of the projects authorized in the 1939 Appropriation Act, practically all are now under contract or have been authorized for force account procedure. Twenty-three projects, representing a total value of $815,500, will be constructed by general contract, and 52 projects, representing a total value of $1,041,500, by force account. Of the 1939 appropriation, $250,000 is allocated for work in Alaska. Of this sum, $160,000 will provide health facilities including a hospital at Kanakanak, dispensary and quarters at Tetlin, and a dispensary at Hydaburg. The remaining $90,000 allocated for construction work in Alaska is for school projects.

Field-construction offices are maintained at Albuquerque, N. Mex.; Billings, Mont.; Muskogee, Okla.; and Juneau, Alaska.

TRIBAL CLAIMS AGAINST THE UNITED STATES

Indian tribal claims.—Legislation making possible the equitable, reasonably prompt, and morally as well as legally final, settlement of Indian tribal claims, has not been enacted, although conferences between the Departments of Interior and Justice resulted in substantial agreement upon the text of a bill designed to this end.

The continuing system, affecting Indian tribal claims, is wasteful of government money, deplorable in its effect upon the morale of numerous tribes, and fundamentally, glaringly unjust.

Klamath et al. Tribes.—On April 25, 1938, the Klamath and Modoc Tribes and the Yahooskin Band of Snake Indians obtained a final judgment against the United States amounting to $5,313,347.32, with interest, as a result of the taking by the United States of 87,000 acres of land without adequate compensation.

The funds in satisfaction of the judgment were appropriated by the act of June 25, 1938, and were authorized to be distributed by the act of August 7, 1939. Under the provisions of the latter act, each enrolled member of the tribes will receive $2,000. Of this amount, each adult will be paid immedately $100 for his unrestricted use, while a like sum will be placed in the individual Indian money account of each minor and incompetent adult Indian for expenditure under the general individual Indian money regulations. The remaining $1,900 of the share of each adult and $1,400 of the share of each minor will be placed to their credit for expenditure under rules and regulations prescribed by the Secretary of the Interior for the purchase of land, erection and improvement of homes, industrial purposes, education, etc. The remaining $500 of the share of each minor is to be retained in the Treasury until he becomes an adult as defined in the act.

After the segregation outlined above has been made, $300,000 are to be transferred and added to the loan fund of the tribes; $375,000, or so much thereof as may be necessary, are to be used to pay immediately certain adult unallotted Indians $1,500 each in lieu of allotments of land, and the remainder of the principal is to be transferred to and become a part of the capital reserve fund of the tribes which was created by section 1 of the act of August 28, 1937.

Shoshone Tribe.—The judgment of the Shoshone Tribe of the Wind River Reservation—$4,408,444.23, with interest—also became final on April 25, 1938. This judgment was awarded because the United States had taken half of the Shoshone or Wind River Reservation and had placed the Northern Arapaho Tribe on that reservation without the consent of the Shoshone Tribe as required by the treaty under which the reservation was established.

The funds in satisfaction of the Shoshone judgment were appropriated by the Congress on June 25, 1938, and authority to distribute them was granted on July 27, 1939. This provides that each enrolled living member of the tribe shall receive $2,450. Of this sum, each competent adult shall receive $100 immediately. A like sum shall be deposited in the account of each minor and incompetent adult Indian for expenditure under the general individual Indian money regulations. The expenditure of the sum of $1,350 of the share of each adult and the sum of $500 of the share of each minor is restricted to the purchase and improvement of lands, erection and improvement of homes, industrial purposes, education, etc. The remaining $1,000 of the share of each adult is to be available for expenditure under rules and regulations to be prescribed by the Secretary of the Interior and the remainder of the share of each

minor amounting to $1,850 is to be retained in the Treasury until he becomes an adult as defined in the act.

The act of July 27, 1939, also authorizes the expenditure of not to exceed $1,000,000, upon the request of the Shoshone Tribe and with the approval of the Secretary of the Interior, for the purchase of lands. In addition, $125,000, at the request of the tribe and with the approval of the Secretary of the Interior, is to be set aside as a loan fund for making loans to individual members, or groups of members, of the tribe. The remainder of the judgment fund is to be available for appropriation with the consent of the tribe for purposes of benefit to the tribe, including the establishment and administration of productive enterprises, the income therefrom to be credited to the Shoshone tribal judgment fund.

THE SERVICE OF INFORMATION

On probably no subject in the history of the United States has there persisted a more dramatic and more flagrant atmosphere of error than on matters surrounding the American Indian and his affairs. From the heroic distortions of the James Fenimore Cooper school of fiction to the fantastic sensationalism of some modern movies; from the early exploitation of land-hungry Europeans to present-day petty racketeering, the history of white-Indian relations has been a history of inaccuracy or ignorance, relieved occasionally by rare and refreshing streams of factual illumination.

One of the important aims of present-day Indian Administration has been to intensify, to amplify, and to spread this hitherto feeble light of fact. The public is beginning to learn that fact is more interesting than fiction; that the unvarnished truth about Indians and Indian affairs is more absorbing than misconception.

Correcting traditional misconceptions has been only a small part of the Indian Service informational problem.

To explain and interpret the new policies to the Indian Service personnel, to the Indians and to the many thousands of non-Indians who are intensely interested in Indian matters, has become a problem of major importance.

Further to facilitate the spread of current and historical information both from published and official material, these among many other things are being done:

Under the direction of the information officer the facilities of the Indian Service library are being thoroughly and methodically revamped with a view to making quickly available the many-sided material contained in the rich reservoir of the Indian's past and present life. In recent years the demand for this material has in-

creased to the point where thousands and thousands of inquiries pour in each year from every corner of the United States and from many foreign countries.

Innumerable bulletins dealing with various phases of Indian life have become obsolete and are being replaced by timely and attractive publications of convenient size and in numbers somewhere near commensurate to the demand.

Another major task of the Information Office has been the analysis of all material currently published on Indians and Indian matters. Between January 1 and June 1, 1939, 28 books on Indian subjects were published and 47 leading periodicals carried articles on Indians and Eskimos.

An outstanding example of the dramatic focusing of public attention on Indian matters is furnished by the Indian exhibit at the Golden Gate International Exposition in San Francisco. The response to this presentation has been so overwhelming as to precipitate great demands for information of many types and in many fields.

To a lesser extent this is also true of the many Indian presentations offered at fairs and elsewhere throughout the country.

The persistent effort has been to make immediately available to all persons in this country and the many foreign countries from which requests pour in, full, factual, and interesting information on current and historical Indian matters. Among the principal beneficiaries are: Schools and colleges, Members of Congress, periodicals and newspapers, church and club groups, museums and libraries, historical associations, other Government departments, and the Indian Service personnel itself.

The entire emphasis has been placed on meeting needs for information which are manifested in a variety of ways and which have never before been so multitudinous.

COOPERATION

The Indian Service has obtained from agencies of government, National, State, and local, a vast range of technical and human skills, services, and intimate knowledge such as could not in years have been acquired by the Service acting alone.

These cooperative liaisons are being developed not only with Federal agencies, but with numerous State and local groups in many parts of the country.

Some examples of these cooperative activities are as follows:

The Farm Security Administration has granted a number of loans to Indians, has aided in drought relief, and allocated a substantial sum to the Indian Service for general rehabilitation work.

The Soil Conservation Service has proved of tremendous aid to the conservation program of the Indian Service. The T. C.–B. I. A. (Technical Cooperation, Bureau of Indian Affairs) unit has continued to conduct human dependency surveys, studies of range management, soil classifications, and other conservation surveys. Conservation agreements have been entered into between the Indian Service and the Soil Conservation Service covering long-range programs on a number of reservations.

The work of the Civilian Conservation Corps constitutes one of the really important contributions to Indians made by other governmental agencies.

The National Youth Administration has approved participation of Indian youth in its student-aid program. Six dollars a month may be allowed students attending Indian schools to assist in providing clothing, school supplies, and lunches. This program includes not only Indian students in public schools, but those attending Federal schools as well.

Progress in the field of social security for Indians has been steady and gratifying. The number of Indians benefiting from Social Security assistance has nearly doubled during the past year—an increase from 6,451 Indian recipients in October 1937 to 11,162 in November 1938, with a continuing increase since that time. It is estimated that more than two-thirds of the Indians eligible for such assistance are now receiving it. A study of the amounts granted to Indians indicates that the average monthly grant to them is lower in most States than the average grant for the State as a whole. This can be partly accounted for by certain free services available to Indians.

In the field of child welfare we have continued to provide for certain Indian children through contract with the Michigan Children's Aid Society and the Wisconsin State Board of Control. In California, especially in the Sacramento Agency, foster home care for dependent children is obtained through contracts with the various counties which share the cost in some instances and provide the needed services. In North Dakota a contract has been in effect for 2 years whereby the State and the Indian Office share the cost of a child-welfare worker in the Fort Totten Reservation. This experiment was so successful that the State offered to share the cost of another child-welfare worker, who was then placed at Turtle Mountain July 1, 1939. Both of these workers are on the staff of the State board of public welfare and work on the Indian reservations in behalf of Indian children under the direction of the State supervisor of child welfare.

Under the Johnson-O'Malley Act the Secretary of the Interior again this year negotiated contracts with the States of California, Washington, and Minnesota for the education of Indian children, and with the State of Wisconsin for child-welfare services. A limited contract was entered into for the first time this year with the State of Arizona for the education of Indian children in public schools.

The Works Progress Administration project, having for its object the repair, preservation, recording, indexing, and filing of many thousands of maps, was completed during the year, except the final preparation of the indexes. These valuable maps have been repaired and are now in the custody of The National Archives.

A second project for the indexing of approximately 25,000 deeds and other miscellaneous documents in the Records Section of the Land Division has been practically completed and the indexes are now in use.

Interdepartmental Rio Grande Board

Use of land is the main basis of Indian economic life. This land is situated amid lands not owned by Indians; often it is a critical part of watersheds whose total fate determines the fate of all the populations dwelling within them. Every technology of land use is needed by Indians, and they can contribute—have contributed—important technologies and modes of social action to the land-use programs of the whole country.

Therefore, the land-use program of the Indian Service no longer is insulated into one Federal service; the Indian land-use program is part of the warp and woof of the economic enterprise of the several regions.

The most representative expression of these facts is the work of the Interdepartmental Rio Grande Board, whose active membership now consists of the Departments of Agriculture and Interior as departments, and of the Bureau of Agricultural Economics, Forest Service, Soil Conservation Service, Indian Service, Grazing Service, and Reclamation Service. Consulting members are the National Resources Planning Board, the Reconstruction Finance Corporation, and the General Land Office.

The Interdepartmental Rio Grande Board is in no instance an administrative agency; but through the consultations of the agencies that make it up, and through the researches and contacts by its whole-time officers, the Board is influencing the horizon and the particular methodologies of each of its component groups, within the historically richest watershed of the United States.

Ethnically, the Rio Grande watershed has no parallel anywhere, being inhabited by pure-blood Indian tribes, an ancient Spanish-American population with much Indian blood, and a more recent population migrated from other parts of the United States. The resources of the watershed, acutely diminished through prolonged overuse, do not suffice for adequate support of the population dependent upon them for immediate subsistence. Yet into this watershed's economy, commercial exploitation has been thrust; and not alone today, but through more than a generation past. Wreckage of the uplands has brought dangerous wreckage of the irrigated lands along the river and has complicated the water-supply problem all the way from the Colorado line to the Gulf of Mexico.

The central task of the Interdepartmental Rio Grande Board is to discover, and through indirection to put into effect, measures giving a permanent future to the native rural populations of the watershed, while correcting, before it is quite too late, the devastating misuse of the lands in the area. Incidentally, a new type of administrative coordination and integration is illustrated by the Interdepartmental Rio Grande Board, applicable in principal to many other regions of the country.

THE FUTURE OF THE INDIAN

The Indian race is no longer vanishing. It is neither dying out nor is it rapidly merging into the white society. Indians as Indians will apparently continue as a part of American life for many years.

Population trends.—The Indian population is still more than holding its own in numbers both in the country as a whole and on most of the reservations.

During the past 10 years, the number of Indians listed on current census rolls at Federal agencies has increased at the rate of approximately 1.2 percent per year. This compares favorably with an average annual increase for the population at large, as estimated by the Bureau of the Census as of July 1, 1938, of only 0.7 percent over the past 8 years.

The total Indian population of the United States under the jurisdiction of the Office of Indian Affairs as of January 1, 1939, was 351,878. As of January 1, 1938, the number was 342,497, denoting an increase of 9,381. This increase is due in part to the inclusion of 3,000 unenrolled Navajo in Arizona and of 2,126 Chippewa recently organized in Michigan and an additional 1,157 in Wisconsin. In addition to this Indian population, the Indian Office has under its jurisdiction the education and medical relief of approximately 30,000

natives of Alaska—a total responsibility, therefore, for the welfare of more than 380,000 Indians and Eskimo citizens.

Indian Population in Continental United States Under Jurisdiction of the Office of Indian Affairs, by State, January 1, 1939*

State	Number	Percent of total	State	Number	Percent of total
Total reported	351,878	100.0	Nebraska	4,687	1.3
			Nevada	5,395	1.5
Arizona	[1] 49,898	14.2	New Mexico	36,489	10.4
California	[2] 23,131	6.6	New York	6,698	1.9
Colorado	873	.2	North Carolina	3,427	1.0
Florida	581	.2	North Dakota	11,401	3.2
Idaho	4,209	1.2	Oklahoma	97,394	27.6
Iowa	471	.1	Oregon	4,785	1.4
Kansas	2,088	.6	South Dakota	28,578	8.1
Louisiana	[3] 104	(4)	Texas	330	.1
Michigan	[5] 4,530	1.3	Utah	2,197	.6
Minnesota	16,136	4.6	Washington	13,913	4.0
Mississippi	1,974	.6	Wisconsin	[6] 13,624	3.9
Montana	16,583	4.7	Wyoming	2,382	.7

*See the Statistical Supplement to the Commissioner's Annual Report for population by tribe.
[1] Includes an estimate of 3,000 unenrolled Navajos under the Navajo central agency.
[2] Decrease due to a new estimated figure for unenrolled population.
[3] Revised estimate.
[4] Less than 1/10 of 1 percent.
[5] Increase due to the enrollment of 2,126 recently organized Chippewa.
[6] Includes approximately 1,000 recently organized Indians in Wisconsin.

Within the continental limits of the United States almost half of the entire Indian population is found in the three States of Oklahoma, Arizona, and New Mexico, in that order.

Another ten States contain about 48 percent of all the Indians in the United States. The remainder of the Indian population is widely scattered with less than 2 percent of the aggregate number in any one State.

The rate of increase is now following an accelerating upward trend. Should the rate of growth for the past quarter century continue for another 25 years, Indians in the United States will number well over 400,000. While this is proportionately a very insignificant figure, it nevertheless presages a very serious pressure of Indian population upon existing reservation lands. Already this pressure is being felt in the Navajo jurisdiction and in others where prospects of acquiring additional lands are not too hopeful.

Assimilation.—Most previous data have tended to confirm the general impression that the Indian is losing his racial identity. The full-blooded population seemed doomed to diminish and finally to disappear, if only through mixed marriages.

Doubt of the inevitability of this trend is raised by detailed analysis recently made by the T. C.–B. I. A.[1] in cooperation with the

[1] Technical Cooperation—Bureau of Indian Affairs, a unit of the Soil Conservation Service which makes surveys of Indian reservations for the use and guidance of the Indian Office.

Indian Office of data on degree of Indian blood on a few selected reservations. These analyses corroborate the belief that the full-bloods are declining at an accelerating rate, and that the rate of decline is the highest where the percent of full-bloods in an Indian community is the smallest. These studies, however, brought to light another trend which is extremely significant; namely, that assimilation of the Indian population into the white race is now being retarded, at least in the Sacramento jurisdiction, the Pine Ridge Reservation, the Lower Brule Reservation, and the Uncompahgre and White River bands of the Uintah and Ouray agency.

On all of the reservations studied, the decline in the percentage of full-bloods and the increase in the percentage of mixed-bloods was marked, but on the Pine Ridge, Lower Brule, Sacramento, and part of the Uintah and Ouray jurisdictions, the quantum of Indian blood among the mixed-bloods is increasing, indicating not only that intermarriage between mixed-bloods and full-bloods is fairly common but also that mixed-bloods are now tending to marry back into the Indian group rather than to marry whites.

This trend arises from the fact that most Indian communities are no longer parts of frontier or pioneer white communities where the number of white men greatly exceeds the number of white women. As the sex ratio among whites becomes more and more normal, the chief reason for intermarriage is removed, and in some areas, such as California, distinct barriers to intermarriage are appearing. The T. C.-B. I. A. study of Pine Ridge pointed out the correlation between a trend toward normal sex ratio among whites and the decline in intermarriage between Indians and whites. Similar studies in other areas might provide a basis for determining whether the trend toward assimilation where it exists is to be permanent, or whether it is merely the result of a temporarily abnormal condition in the white population.

The Indians, both mixed- and full-blood, who remain members of Indian communities, find themselves forming a more and more definitely self-conscious racial minority group. The data are still far too incomplete to make possible definite conclusions concerning the long-time trends in degree of Indian blood. They do give some indication, however, that in a few areas the Indian population is not blending with the surrounding population at so rapid a pace as during the past few years, but that, as with other racial minorities in this country, especially the Negro, the Indians are gradually becoming a racial group whose members will theoretically have, on the average, slightly less than one-half Indian blood if the full-bloods die, out, and racial exogamy entirely ceases. This tendency will un-

doubtedly be exaggerated on such reservations as Lower Brule, where white-owned land is being bought up by the Government in an attempt to make the reservation entirely Indian owned, and therefore entirely Indian occupied, thereby decreasing opportunities for Indian-white contacts.

Similar situations occur elsewhere in allotted areas where interspersion with whites has resulted in a rapid assimilation of the Indian. As timber is removed, as the fertility of the soil is lost, the whites tend to move on. In many areas where Indians live, the white population is decreasing, and opportunities for Indian-white contacts likewise are on the decrease.

The future of Indian culture is brighter today than at any time since the advent of the white man. Not only will it continue to give deep satisfactions to the Indians themselves, but in its interaction with the white culture will make fundamental contributions to the improvement of the American design for living.

The Indians of the United States constitute a very small fraction of the Indian population of Pan-America. Twenty-five or thirty millions of Indians, many living according to their old concepts and traditions, may yet furnish a common basis for the development of a more closely integrated life among all of the Americas.

Recently a seminar-conference of Canadian and American Indian Service officials, missionaries, and anthropologists was sponsored by Yale University, the University of Toronto, and the Carnegie Corporation. This is the beginning of efforts of American States with Indian populations to share experience in methods and problems. A much larger conference, including all of the countries of North, South, and Central America was scheduled last year to be held at La Paz, Bolivia. Conditions in that country forced postponement of the conference, but it is expected that it will be held during the summer of 1940.

OFFICE OF EDUCATION

J. W. Studebaker, *Commissioner*

INTRODUCTION

IT seems fitting that the 1939 annual report of the Office of Education should review progress not for 1 year alone, but at least briefly, for the entire period from 1869 to 1939. The former year marked the placing of the Office of Education with the United States Department of the Interior; the latter year marked the transfer of the Office to the newly created Federal Security Agency. The transfer, effective July 1, 1939, was a part of the President's Reorganization Plan.

REORGANIZATION

In his message of April 25, 1939, to Congress, the President said:

> Because of the relationship of the educational opportunities of the country to the security of its individual citizens, the Office of Education with all of its functions, including, of course, its administration of Federal-State programs of vocational education, is transferred from the Department of the Interior to the Federal Security Agency. This transfer does not increase or extend the activities of the Federal Government in respect to education, but does move the existing activities into a grouping where the work may be carried on more efficiently and expeditiously, and where coordination and the elimination of overlapping may be better accomplished. The Office of Education has no relationship to the other functions of the Department of the Interior.

The President's Plan also affected the Office of Education in that it transferred the Radio and Motion Picture Divisions of the National Emergency Council to the Office.

RECORD OF EFFORT AND PROGRESS

Thus with the passing of 1939, the 70 years of association of the Office of Education with the Department of the Interior were concluded. And thus the 1939 report is the concluding chapter under the Department, in a long series of chapters which have recorded educational effort and progress throughout the United States and other countries.

FIRST TIME SUITABLY HOUSED

During the past 2 years the Office of Education, for the first time in its history, has been suitably housed for effectively and economically carrying on its wide range of educational activity. The Office, during 1939, received thousands of visitors who hold important positions in the States and in many foreign countries. The offices in the new Interior Building have most creditably served the need. The library of some 250,000 volumes—one of the largest of its kind in the world—has during these 2 years been adequately housed and is serving the largest clientele it has ever served.

Other facilities that the Office has available in the new Interior Building include the art gallery, conference rooms, museum, and auditorium. Their availability has added greatly to efficiency not only for the staff but for conferees and others coming to the Office on important educational missions.

Reviewing a bit more, it was 72 years ago when, by an act of the Thirty-ninth Congress, approved March 2, 1867, a Department of Education was created for the purpose of collecting and diffusing information concerning the condition and progress of education in the several States and Territories, and of promoting the cause of education in other ways. For two years, this Department functioned independently. Then, in 1869, its title was changed from the Department of Education to the Office of Education and the agency was placed with the Department of the Interior. In 1870, the Office became the Bureau of Education and this title was retained until 1929, when it again became the Office of Education.

At various periods in the history of the Office of Education certain administrative duties have been added to its original functions. In 1885 it was designated to take charge of the education and welfare of the natives of Alaska, in which capacity it continued to act until 1931, when these duties were transferred to the Bureau of Indian Affairs.

By the Land-Grant act of August 30, 1890, known as the second "Morrill" Act, the Secretary of the Interior was charged with the administration of the acts concerning land-grant colleges. The Office of Education was made responsible for the task of obtaining and reporting upon the information required.

In 1933, the functions of the Federal Board for Vocational Education were assigned to the Office of Education.

Since 1936, various allotments from Federal Emergency Relief Funds have been made to the Office of Education for educational

projects. These projects have been carried out under the supervision of the Commissioner of Education.

There have been 10 Commissioners of Education during the period as follows: Henry Barnard (1867–70), John Eaton (1870–86), N. H. R. Dawson (1886–89), William T. Harris (1889–1906), Elmer Ellsworth Brown (1906–11), Philander P. Claxton (1911–21), John James Tigert (1921–28), William John Cooper (1929–33), George F. Zook (1933–34), and the present Commissioner, J. W. Studebaker (1934 to date).

In 1929, Congress provided for an Assistant Commissioner of Education and Bess Goodykoontz has served in that capacity during the period from 1929 to date. J. C. Wright, who was Director of the Federal Board for Vocational Education, has served since 1933 to date as Assistant Commissioner for Vocational Education, and C. F. Klinefelter has served as Assistant to the Commissioner since 1937.

THE EDUCATIONAL SITUATION

Viewing the educational situation during the year 1939, the following are some indications, activities, and trends that seem significant:

ELEMENTARY AND SECONDARY SCHOOLS

In spite of the decrease in elementary school enrollments, approximately 75 percent of the children and young people attending, and 60 percent of the teachers employed, are in the elementary schools.

The Office of Education and a number of organizations primarily interested in the field have sponsored conferences during the past year for the purpose of giving increased attention to the problems.

As evidenced in State programs, attention is being given to guaranteed minimum school terms, and to the raising of certification requirements for teachers in elementary schools. The use of radio and visual aids, extension of library services to elementary schools, especially in rural areas, the emphasis upon health, safety, speech, conservation, and character education, and the inclusion of parents and other citizens of the community in planning the education program, are among developments which hold increasing importance.

The public high school continues to attract students in increasing numbers. It also continues to bring an ever-expanding diversity of types. Reliable statistics place the number of students taking high-school work of all types—junior, senior, 4-year, evening, special—at about 7,750,000.

In the effort to adapt the educational program to all young people, fundamental changes have occurred and are occurring both within and without the schools. In recent years the high school has greatly expanded its offerings, especially in training for health, citizenship, and vocational competence. Guidance service, always a part of real teaching, is being emphasized and extended through supplying assistance and advice from trained and qualified specialists and counselors. The educational significance of student activities is respected perhaps as never before. Teaching methods are being modified to fit the individual student needs. The surpassing value of activity and practice in relation to instruction is recognized in cooperative and part-time programs in the schools, in Civilian Conservation Corps camps, and in National Youth Administration projects. The changed and changing viewpoint is evidenced in the emphasis on broad outcomes, not only in the scholastic field but also in habits, skills, tastes, appreciations, and attitudes.

HIGHER EDUCATION

Enrollments in institutions of higher education continue to increase. It appears with such increases that a larger and larger fraction of the students find it necessary partially or wholly to support themselves while in college. Institutions of higher education are therefore having to find work opportunities or provide scholarship funds or loan funds for an increasing proportion of students. The National Youth Administration, which has continued through 1939 to help approximately 10 percent of students enrolled in colleges, has been of very great service.

As college enrollments increase, it is becoming more evident that a large number of young people now in college will make their living at occupations only slightly related to their college training. This has accentuated certain trends: (1) Colleges are broadening their curricula, thus making adjustments to young people not keenly interested in the more abstract forms of learning; (2) colleges are making more frank acknowledgment of the fact that the primary function of liberal-arts education is not its aid in making a living but its aid to a richer and happier life; (3) colleges are experiencing difficulty in financing their programs. Because of this many of them are resorting to raising student fees even at a time when increasing numbers of students find it necessary to work their way at least in part through college. Since privately controlled institutions depend more largely on fees than do publicly controlled institutions, the tendency of students to select publicly controlled institutions is proving a serious financial handicap to privately controlled institutions. At the same time the

reduction in interest rate on securities held as endowment by colleges is operating more seriously to handicap the privately controlled institutions than the publicly controlled. These financial trends are constituting a serious problem for many privately controlled institutions.

A new plan of State surveys of higher education was tried in 1939. In general, requests to the Office of Education to make surveys of higher education in a given State have either not been possible due to lack of facilities or have been accepted and staff members assigned to devote a considerable amount of time to them. The survey in 1939 of higher education in the State of Nebraska, however, has been conducted largely with the help of Nebraska educators working with a staff member in the Division of Higher Education acting as adviser. This survey was broken down into projects and each project carried out by a local Nebraska committee. The reports of these projects were then submitted to a central committee of which the staff member in the Office of Education was chairman. The central committee was responsible for recommendations growing out of the group of committee reports. It is believed that this method has merit in that it enables the Office of Education to participate in a greater number of surveys and at the same time assures the permanent interest of the State people in the results of the survey because they have been directly responsible for the studies underlying it.

A committee consisting mainly of leaders in the field of graduate education, notably deans of graduate schools, cooperating with President Isaiah Bowman, Johns Hopkins University, in preparing under the leadership of the Office of Education, a fundamental report on objectives of graduate education in the American democracy. It is this plan of cooperation among leaders in education, stimulated and guided by the Office of Education, which represents one of the significant contributions which the Office of Education should be able to make.

LIBRARY SERVICE

Adequate library service is essential in any educational program. With a view to attaining this adequacy, librarians during the past year have been attacking especially such problems as equalization of facilities offered, evaluation of service rendered, effective utilization of resources, determination of unit costs, classification of personnel, and in-service training.

Upon each of these problems, progress has been made. In the matter of equalizing opportunity figures released by the American

Library Association show that approximately 3,000,000 more persons now have access to public-library facilities than in 1934. Office of Education statistics in process of compilation also indicate an encouraging growth in the library service. Librarians have continued to press for State aid as necessary in remedying the economic inability of certain localities to provide essential library facilities. During the year one southern State, hitherto without a library extension agency, created one; and five States either amended laws or passed new ones permitting larger units of library administration.

In the school library field, emphasis has been placed upon the need for developing elementary school libraries, a branch of the work which many feel has lagged in comparison with secondary school libraries. In the evaluation of library service, the influence of the Cooperative Study of Secondary School Standards has continued to spread. This study has indicated that quantitative standards of equipment and service are not satisfactory bases for judging library efforts, and that the facilities and service must be judged in the light of what the school is trying to do.

Impetus has been given to the libraries of teacher-training institutions by grants made to 29 institutions from an educational foundation. Junior colleges and liberal arts colleges have already been the beneficiary of similar aid.

SOME MAJOR PROJECTS

STATE PROGRAMS STUDIED

During the year the Office of Education undertook a comprehensive study of the organization and functioning of State programs of education. Since the study of the States' relation to higher education has been under way for several years and certain aspects of the study have already appeared in print, the present series of studies serves to round out the picture of the ways in which the States function in providing public education for their citizens. Library service, an outstanding part of a State's educational program, is included in the study.

Every State in the Union has established at least one State agency for administering its educational program—the State department of public instruction, or a department of similar name. Every State has established at least one State board or commission with educational functions either of a general or of a special nature. In each of these aspects of the programs of education, however, the States vary greatly. They also change greatly over a period of years.

These changes represent continuous efforts on the part of State departments of education to increase the efficiency of State services in improving educational conditions and in keeping such services in step with changing conditions. Each State recognizes that the experiences of other States in organizing and maintaining educational services are of value in planning its own services. Therefore the United States Office of Education is frequently asked for information as to practices current in the various States, and particularly those in which State departments of education are engaged.

Consequently, the series of studies includes careful analysis of (1) the wide variety of ways in which State departments of education and State library departments are organized to perform their functions, (2) their powers and duties, (3) the extent of their personnel, and (4) their relation to other departments of the State government. Included also is a study of the several State boards of education, their organization and functions. The chief State school officer, as the responsible administrative officer for the State's educational program, is the subject of another part of the study. All of these studies will attempt to bring the history of State school programs up to date, and to describe the current status of each aspect of their organization and operation.

Among the functions exercised by State departments of education are those of organizing or assisting local school districts to organize schools; administering the compulsory attendance laws; establishing programs of study and preparing courses of study; establishing the qualifications necessary for teachers and certificating teachers; administering the State school funds; promoting and supervising effective instructional programs including special facilities for vocational education, for health education, for the education of youth and adults, for handicapped and other exceptional children; providing for the school census and recording and reporting school statistics for the State. Each of these functions and some additional ones will be the subject of separate study and report. Similarly for library service the operations of State boards, State libraries and other State agencies and officials will be the subject of separate report.

During the year ended June 30, 1939, committees of from two to five members of the staff have visited 30 States, interviewing State officials, collecting information on a series of interview sheets prepared for the purpose, gathering printed material and documents of various types, and securing much helpful advice from school officials. The remainder of the States will be visited, and analysis of the data and preparation of the reports are under way. At the present time it is planned to issue separate reports as listed below on the next page:

Organization and operation of State boards of education.
The chief State school officer: His status and functions.
The organization of State departments of education.
Functions of State departments of education in the organization and administration of schools.
Functions of State departments of education with respect to school finance.
State supervisory and instructional programs.
State supervisory programs at the elementary level.
State supervisory programs at the secondary level.
State supervisory programs in special education.
State supervision of schools for Negroes.
State supervision of health, safety, and physical education.
State supervisory programs for youth and adults.
State supervisory and instructional programs in parent education.
State supervisory and instructional programs for art and music, and for radio and visual aids.
State curriculum programs.
Standardization and accrediting of schools by State departments of education.
Supervision of physical plant facilities by State departments of education.
Pupil personnel services, as functions of State departments of education.
State programs for the preservice education of teachers.
Organization and operation of State agencies for library service.

INTERNATIONAL INTELLECTUAL COOPERATION

The Office of Education worked in cooperation with the Department of State in considering various invitations during the year to the United States from the governments of other countries to participate in international meetings and activities as follows:

Fourth World Congress of Workers for Cripples, London, England.
Eighth International Conference on Public Instruction, Geneva, Switzerland.
Fifteenth International Congress of the History of Art, London, England.
Thirty-first Congress on Esperanto, Bern, Switzerland.
Twenty-second International Congress against Alcoholism, Helsinki, Finland.
International Exposition of Rural, Family and Household Documentation, Liége, Belgium.
International Family Days, Liége, Belgium.
Twenty-seventh Congress of Americanists, Mexico City, Mexico, and Lima, Peru.
Seventh International Congress of Genetics, Edinburgh, Scotland.
Fifth International Congress of Linguists, Brussels, Belgium.
International Film Festival, Cannes, France.
Eighth Pan-American Child Congress, San Jose, Costa Rica.

Nominations of suitable delegates were made in case of acceptance.

INTERAMERICAN UNDERSTANDING

The Office of Education, in connection with the eighth conference of the World Federation of Education Associations, this year published a bulletin on Education in the United States of America.

Through the helpful cooperation of the National Education Association and the World Federation of Education Associations, the publication was translated into Spanish and Portuguese. It was prepared as "a modest contribution toward inter-American cultural understanding." Many schools, colleges, and other agencies contributed numerous illustrations and other material toward making the publication valuable. More than 7,500 free copies have already been distributed in the United States and in South America.

PLANNING WITH STATE DEPARTMENT

It has been the policy of the Office of Education to seek wherever possible to coordinate its activities with related activities in other departments of government. The new Division of Cultural Relations in the State Department was charged with administrative responsibility over the program of government fellowships established by the Buenos Aires Pan-American Congress in 1936.

To select these students and professors, and to make the necessary contacts with the universities in this country and in the Latin-American republics, is primarily an educational job. The Division of Cultural Relations had optional procedures from which to choose. It could establish these educational contacts itself, and thus in considerable part duplicate the machinery which has already been established and must be continuously maintained in the Office of Education, or it could enter into an agreement with the Office under which the work would be done by the Office of Education according to plans previously agreed upon by the Division of Cultural Relations and the Office.

After a series of conferences, the latter alternative was adopted, and a memorandum of agreement signed by the Secretary of the Interior and the Secretary of State which divides the responsibility between the Division of Cultural Relations and the Office of Education.

This agreement is itself significant as a measure of economy and efficiency in government, but it is even more significant as a type of relationship which can be worked out successfully in many educational areas which lie within the interests of the several departments of government.

ASSISTANCE TO FOREIGN STUDENTS

Considerable help is given to foreign students who come to this country and Americans who study abroad by interpreting the studies taken in other countries in terms of the education systems of the

United States. This service of the Office is rendered mainly to admissions offices of colleges and universities and its purpose is to place such students so that they can work here to the best advantage to themselves and the satisfaction of the institutions they enter. Such a service should be a potent factor in promoting better intellectual cooperation. How widely its effects can be felt is shown by the fact that during the year credentials came from 30 European countries, 11 Asiatic, 4 African, 16 Latin American, 5 other American, Australia, New Zealand, and 3 of the outlying parts of the United States, making a total of 71 different political areas in all parts of the globe. The requests numbered 1,040.

One hundred fifty-five cases that had previously been handled were for one reason or another reviewed.

This wide representation from abroad also scatters widely in the United States. The 1,040 requests for evaluations came from 40 of the States, the District of Columbia, and the Philippine Islands.

The admissions officers of 167 colleges and universities and 13 high schools requested information of one kind or another regarding the placing of foreign students.

ADULT CIVIC EDUCATION FORUMS

Forum demonstrations under direction of the Commissioner of Education were continued during the 1938–39 season in some of the smaller communities of the country. Three hundred thousand dollars of Federal funds was allocated to the Office to finance such programs. Instead of the funds being allocated to city or county superintendents to be administered locally, they were used for four main purposes under direct supervision of the Office:

For the employment of a Washington staff composed of an assistant administrator, a field counselor, a field representative, 2 secretaries, and 4 typists qualified by the local W. P. A.

A staff of about 300 relief workers assigned to communities throughout the country.

For the employment of 15 forum leaders who traveled from area to area, staying from 3 to 5 months for each program.

For the employment of 15 forum counselors working through 15 State departments for 3½ months.

The cooperative demonstration centers, as they were named, were in 15 areas of the country. Each area served from 5 to 10 communities and were centered at: Santa Ana, Calif.; Atlanta, Ga.; Kalamazoo, Mich.; Minneapolis, Minn.; Gulfport, Miss.; Trenton, N. J.; Schenectady, N. Y.; Santa Fe, N. Mex.; Fargo, N. Dak.;

Portland, Oreg.; Columbia, S. C.; Providence, R. I.; Ogden, Utah; Seattle, Wash.; Milwaukee, Wis.

During the last quarter of the year the State Departments of Education in 15 States selected State forum counselors who, with the help of W. P. A. workers, organized planning conferences throughout these States to assist local school authorities in the establishment of forums with local resources. The salaries of these counselors were paid by the project. Each of the following States was served by a forum counselor: Arkansas, California, Georgia, Mississippi, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Texas, Vermont, Washington, and Wisconsin.

The emphasis of the 1938–39 program was placed on the problem of organizing and administering forums in smaller communities with populations of 1,000 to 25,000. The objective of the demonstration was to plan and administer a program in areas where several independent school systems of limited resources might cooperate and pool their funds to provide educational forums under qualified leadership. The cooperative forum programs sought to demonstrate a practical means by which a leader may be shared by several school districts.

Local advisory committees were established and usually assisted the local superintendent in selecting the subjects to be discussed which were, of course, within the field of study of the forum leader. Such advisory committees made up of representative citizens also helped in promoting interest in the program.

Each forum leader, in addition to the "regular" scheduled meetings at established centers which were often conducted with related subjects on a weekly or biweekly basis, also conducted "off schedule" meetings usually at organized club groups in the community. Such meetings acquainted large sections of the population with the forum demonstration. Many of these "off schedule" meetings were with student audiences at high schools and institutions of higher learning.

Efforts were made to acquaint audiences with suitable reading material on public affairs; pamphlet displays were set up and bibliographies were mimeographed and distributed. Libraries were often inadequate to help but where possible cooperation with local librarians was established.

In the 196 communities served by the forum leaders, 1,332 "regular" meetings were held. In this same area 1,160 "off schedule" meetings were held. The total attendance for the "regular" meetings numbered 151,970, for the "off schedule" 247,234.

Relief workers also assisted some 30 communities to carry on forum and adult civic education programs. From both these groups a total of 1,949 meetings were held with an attendance exceeding 169,788.

Since the beginning of the project more than 500 communities in 40 States have participated in the forum program; 36 State conferences have been conducted; 9 Office of Education publications dealing with various aspects of this field of education have been published and widely distributed; more than 17,000 meetings have been conducted with a total attendance of almost 2,000,000.

COOPERATION WITH PUBLIC SERVICE GROUPS

The Office of Education cooperates with many and various types of organizations. During the past year the American Association of University Women requested the Office to prepare a series of discussion outlines for the use of study groups of its local branches. Thus far, seven such outlines have been prepared. Most of these were first mimeographed and sent to members of more than 100 local branches. Demand for the outlines was so great not only from members of that organization but from other organizations and from individuals interested in studying the public-school system that the supply was soon exhausted. In view of this interest the Office of Education printed the outlines as a series of leaflets under the general heading Know Your School. The titles of the outlines published during the year are Know Your Board of Education, Know Your Superintendent, Know Your School Principal, Know Your Teacher, Know Your School Child, Know What Modern Elementary Schools are Doing, and Know How the Schools are Financed.

Sensing the constant need to stimulate interest of parents in the study of local and home education problems, the National Congress of Parents and Teachers cooperated with the Office of Education in the production of a radio series entitled Wings for the Martins.

This series presented familiar home problems of education and suggested means for some solutions. Broadcasts embraced such subjects as the kindergarten, report cards, selection of a college, school boards, library, and playgrounds, and their relation to the life of an average American family.

The series began November 16, 1938, and continued to May 4, 1939. An average of 75 N. B. C. stations carried this program to their communities.

Planning committees representing the Office of Education, the National Congress of Parents and Teachers and representatives of the National Broadcasting Co. developed the program outline.

The National Congress of Parents and Teachers especially aided in the building of audiences for the series among its 2,000,000 members through its publications, conventions, and conferences throughout the country. Letters received during the course of the series told of the utilization of these programs at P. T. A. meetings and of the establishment of P. T. A.-sponsored listening groups. The study guides issued were frequently made the basis of group discussions.

More than 25,000 letters were received during the 26 weeks of broadcasting.

EDUCATIONAL BROADCASTING

The Radio Project of the Office of Education began the fifth year of demonstration and service in educational broadcasting with an attendant growing interest in radio education by schools and colleges, civic groups and mass audiences generally. To serve the needs of these groups and audiences the following major activities have been carried on: National educational radio programs presented in cooperation with national chains, local radio stations, Government agencies such as the Smithsonian Institution, and national associations such as the National Congress of Parents and Teachers; during the past year the Educational Radio Script Exchange continued its work as a "clearing house" for recordings, scripts, production aids, and other information to help promote more effective use of radio for educational purposes.

Concurrently, the Radio Project sponsored additional enterprises to promote the cause of education by radio: Cooperative research projects were developed in problems of education by radio and carried on in cooperation with colleges and school systems; cooperative radio demonstration centers for experimentation in use of radio for education have been sponsored at colleges, universities, and in local school systems.

Operating under a Works Progress Administration allotment, the Radio Project has carried forward the aims of the Federal Government to give work to persons in need of work and to help restore them to normal employment. The project has given employment to 245 workers per month in 17 States. Many of these were able to return to private enterprise.

Two coast-to-coast radio series dramatized and emphasized democratic ideals:

Americans All—Immigrants All, a series of 26 half-hour broadcasts, was presented during the year in cooperation with the Columbia Broadcasting System and the Service Bureau for Intercultural Education. These programs told of the gifts men and women from

many nations brought to our national life and culture. The series was carried by 107 stations and prompted 85,000 written responses from listeners. The Women's National Radio Committee singled out the series as the "most original and informative program of 1939."

Democracy in Action is the title of a series of half-hour programs interpreting the Federal exhibits at the New York World's Fair and dramatizing government at work. This series, presented in cooperation with the Columbia Broadcasting System, continues into 1940. Transcriptions of the broadcasts will be made available through the Script Exchange.

Two other network series were produced in 1939 by the project:

Wings for the Martins, in a series of 26 half-hour broadcasts, dramatized problems confronting a typical American family in its attempt to educate its children.

The World Is Yours continued into the fourth year its half-hour dramatizations of history, exploration, and science, depicting the exhibits and fields of activity of the Smithsonian Institution. Listener response to this series, presented in cooperation with the National Broadcasting Co., continues to be heavy, with 152,450 letters for the year.

Local Government at Work is a series of programs prepared for the Educational Radio Script Exchange. These scripts have been written in cooperation with national police, fire, and municipal officer associations. Presented locally by school or civic radio production units, these scripts promote an understanding of the work of the city or county governments.

Program planning and script writing have also gone forward on housing, vocational agriculture, home economics, guidance, and other subjects.

EDUCATIONAL RADIO SCRIPT EXCHANGE

The Script Exchange designed as an aid to school and civic groups interested in the study and production of educational broadcasts attained a new level of service in 1939, when 72,000 copies of scripts were requested. Since this service was inaugurated about 250,000 copies of scripts have been made available to approximately 7,000 groups and institutions, including colleges, universities, high schools, radio stations, civic and private organizations. These figures are particularly significant in view of the fact that not more than one copy of any script was given or loaned to any one group.

Early in 1939 the exchange released a new supplement to its catalog of scripts, listing 100 additional scripts and bringing the total number of scripts offered to 281. Scripts listed in the catalog pre-

sent a wide variety of subjects and utilize varied radio techniques. In addition, the exchange has assembled a reference library consisting of approximately 2,000 educational scripts.

Many of the scripts issued by the Script Exchange are accompanied by production notes and theme music. A Radio Glossary, Handbook of Sound Effects, Radio Manual, and a Radio Bibliography are available to organizations seeking to become adept in the art of production. More than 16,000 copies of these production aids and supplementary materials were requested during the past year.

Information.—The exchange, through its "central clearing house" work, gathers and disseminates information about educational radio by way of correspondence, survey reports, articles, and personal consultation. The exchange circularized 1,686 colleges and universities in the United States asking data on specialized courses in the field of radio. Results of this survey have been widely disseminated and copies of the report are available from the exchange.

Network programs frequently cannot be utilized by schools because of conflicting time schedules. For that reason teachers and administrators have been asking for recordings of radio programs. Early this year a grant from the Committee on Scientific Aids to Learning of New York City made possible the recording of Americans All—Immigrants All. These transcriptions are made in two sizes—12-inch records playable on ordinary phonographs and 16-inch records, for which "play-back" equipment is needed. The number of orders for recordings which have already been received in the Script Exchange bear testimony to the widespread interest in the new service.

Contributions by the network and cooperating agencies resulted in a favorable project-sponsor ratio for expenditures. On the average this ratio was $1 from the Government to $4 from private industry.

More than 300,000 postcards, letters, telephone calls, and telegrams reached the Office of Education from radio listeners.

The Office of Education has stimulated the development of local school and college radio producing groups to study broadcasting and to cooperate with local stations. These groups have grown from fewer than 300 in 1936 to more than 800 in 1939.

These activities have been carried on with emergency funds and with temporary personnel. But radio is here to stay. The longer it stays the more strikingly does it reveal its undreamed of possibilities for education. It is to be hoped that the day is near when the Office of Education will be equipped to demonstrate these possibilities on a permanent basis.

THE FEDERAL RADIO EDUCATION COMMITTEE

The Federal Radio Education Committee is composed of 40 members, scattered throughout the country. In the interest of conserving the limited funds available for travel and administration it has been felt that the expense of bringing the entire committee together in Washington should not be incurred unless there was urgent need for doing so. Instead, the formulation of policies and practices is done by a small executive committee of nine members composed of four broadcasters, four educators, and one representative of the Federal Communications Commission.

As a major piece of research and investigation, the Office of Education has this year undertaken to do a study for the Federal Radio Education Committee. With funds pledged by the National Association of Broadcasters, the Commissioner of Education, who is chairman of the committee, early in 1939 appointed as assistant to direct the Office study, as well as to coordinate the research studies and services being carried on under the sponsorship of the Federal Radio Education Committee.

The Office of Education study has a threefold purpose. First, a study of successful efforts by local broadcasters to cooperate with civic and other nonprofit groups. This survey to discover, analyze, and interpret the activities of local broadcasters, is expected to reveal ways and means of applying demonstrated successes to other communities.

Another important aspect of the study is the survey of the whole question of teacher-training and college courses in the field of radio. This project is intended to answer certain fundamental questions regarding the school use that is now being made of radio, together with college-course offerings for the training of teachers in the preparation and utilization of radio, as well as for professionalizing the personnel of broadcasting stations. On the basis of this study, courses will be analyzed and suggestions will be made for their effective use. Bibliographical information and sample composite outlines of courses will be made available to interested institutions.

The third aspect of the study is the development of an experiment and idea exchange, from which the findings and resources of various experiments and experiences in commercial stations, universities, and other groups may be brought together and made available through a national clearing house.

The combined funds that have been provided by various agencies and organizations to underwrite the several research studies derived from the study program of the Federal Radio Education Committee,

at the present time, total approximately $500,000. A brief account of the research studies now in progress outside the Office of Education follows: A study of listening groups is being directed from the American Association for Adult Education and is financed by the Carnegie Corporation. This survey will examine the educational value of organized listening groups and the organization and motivation behind them. The study will be conducted in two parts—the first to deal with the relative merit of listening in a group as compared with listening alone; and the second, to study the organization, the motivation, and the objectives of listening groups now existent, both in the United States and in Europe.

A Study of the Problems and Methods of Broadcasting to and by Schools is conducted from Ohio State University. It is financed by the General Education Board. Since the preparation and production of school broadcasts represent a large investment in terms of radio time, talent, and staff, one of the most important steps in educational broadcasting is centered in the evaluation of radio broadcasts for schools. It is expected that this study will represent a careful and comprehensive plan for gathering evidence, developing techniques, and establishing criteria for guidance in the planning of future programs.

A Study of the Essential Value of Radio to All Types of Listeners being conducted for Princeton University is financed by the Rockefeller Foundation. A well-coordinated research project has been formulated so as to give trained investigators an opportunity to study the essential value of radio to all types of listeners. It is proposed that this project shall determine what makes a radio broadcast "effective" before adult broadcasting can become consistently "effective." This project has been under way for 2 years, and a recent new grant of funds will permit its continuance until June 1, 1940.

The study program of the Federal Radio Education Committee is the development of the combined efforts of men in the field of broadcasting, having practical problems to be solved, and of educators facing the problem of learning how to make the best use of the medium of radio under the American system of broadcasting. The combined results of this leadership in the coordination of several major studies and experiments should fill a long-felt want for that body of authoritative literature which characterizes the maturity of any field.

IMPROVEMENT OF NATIONAL STATISTICS

In carrying out the long-time cooperative program on school records and reports with the States this year, the Office of Education

was able to give individual advisory and consultative service to eight State departments of education in their revisions of records and reports, and to 48 State departments of education in their collecting of statistics for the Biennial Survey of Education.

Through personal and regional conferences in the program for uniform records and reports, the States have had opportunities individually and collectively to consider the findings of analyses and to discuss proposed changes in forms and procedures, as submitted by the Office of Education with the counsel and advice of the National Advisory Committee on School Records and Reports. Furthermore, as changes have been effected through new and revised forms, States, after attempting to use them for a year or two, have recommended further changes and modifications. This procedure helps in the production of materials of greatest use to the States. That the States are decidedly interested is evidenced by the fact that more than two-thirds of the States reported in November 1938 that they had made revisions of some or all of their recording and reporting forms in accordance with the findings and recommendations of the cooperative program.

Recent surveys of the status of libraries have shown the need for adequate and comparable statistical data on library coverage, service, growth, personnel, income, and expenditures. These are basic facts essential in studying present library conditions and in planning for future progress in libraries.

The Office of Education has undertaken a Nation-wide collection of public library statistics and has made the preliminary preparation for a similar gathering of data from the institutions of higher education. The figures for public school libraries, last gathered in 1934–35, will be requested again as soon as the two studies just mentioned are completed. According to present plans, these statistical surveys will be made at periodic intervals, so that a fundamental body of library data will be available.

For the study of public library statistics the Office of Education is using a uniform blank devised after study and numerous conferences by a committee composed of representatives from the State library agencies, the American Library Association, and the Office of Education.

In requesting returns the Office of Education has worked either through the State library agencies or directly with the individual libraries in a given State, according to the preference of the State agency. As a result of a letter of inquiry addressed to these agencies from the Office of Education, 30 States elected to collect the figures

for the Federal Office, 12 preferred to have the Office of Education collect directly, 4 had no agencies operating, and 2 have been unable to complete plans for the collection of public-library statistics.

Under this new plan of cooperative effort the same form is being sent out at approximately the same time by the information-seeking agencies. Heretofore, a public library has been receiving from three or four different sources, requests for statistical information at different times, with no two question blanks the same, and definitions of terms, if given, not always consistent. Now the State agencies, with a few exceptions, are using the blank for their own collection of statistics and the American Library Association is likewise using it for the annual figures requested from a selected group of institutions.

Reports from many libraries indicate greater facility in answering the questions, as a result of the uniform blank and the cooperative method of making the study. There is promise, therefore, of obtaining a high percentage of returns from the reporting libraries. The National Committee on Municipal Accounting has accepted as standard the classification of finances on the report form.

Following a procedure similar to that used in the public-library form, a blank has been devised to meet the special needs of college libraries. The expected use of this statistical form by the fact-gathering agencies, including the Office of Education, should insure comparable and adequate data on college libraries for administrators and librarians.

The emphasis, during the year, placed on conferences and committee work on State school statistics, and the use of field service beginning in October instead of January or later have given very complete returns for the 1937–38 chapters of the Biennial Survey of Education. A 100 percent return was received for the public high schools in 41 States and the District of Columbia and in the other 7 States comparatively few of the schools did not report.

DIVISION REPORTS

In addition to major projects in which divisions of the Office have joined in their efforts during the year, the separate divisions have carried on many various activities. A few of these are noted in the following statements from the chiefs of divisions:

AMERICAN SCHOOL SYSTEMS DIVISION

The members of the American School Systems Division conducted studies on problems of school administration, school finance, school buildings, elementary and secondary education, and parent education.

During the year the school buildings specialist completed a study of public school buildings erected with P. W. A. aid to determine how many school buildings had been erected in cities and how many in places outside of cities; to what extent the construction of these buildings had resulted in eliminating small ones; the space provided for play and recreation; the kind of facilities contained in the buildings; and the cost of the buildings.

A school-building study was made of the planning and design of school auditoriums, as an aid to school superintendents and architects in planning auditoriums for school and for community use.

The study of local school units was brought to final completion early in the year and resulted in the publication of two bulletins: Bulletin 1938, No. 10, Local School Unit Organization in Ten States, and Bulletin 1938, No. 11, Principles and Procedures in the Organization of Satisfactory Local School Units. The first-named bulletin shows for 10 States the pattern and historical development of local school-unit organizations; types, size, and number of units; procedures for changing boundaries; and factors encouraging and discouraging satisfactory organization. A summarization of the data for the 10 States is also presented. The second bulletin was prepared to serve as a guide to State and local school administrators in planning studies for their respective school systems.

Federal Funds for Education, 1937–38, is the title of a study made by the specialist in school finance. This study shows the amounts of funds provided each of the States by the Federal Government for educational purposes. Another study in the field of school finance was published as Pamphlet No. 79, Legislative Plans for Financing Public Education. The purpose of this study was to furnish useful information and guidance in the development of State legislation for the financial support of public education.

A digest of the enactments of State legislatures relating to education was prepared by the specialist in school legislation. The review summarizes outstanding measures enacted in 1937 and 1938 affecting education and also the principal tendencies of educational legislation in the United States.

Parent Education Programs in City School Systems is the title of a study completed by the specialist in parent education. The study was prepared to answer inquiries of school administrators and others as to what constitutes a parent-education program, how and for whom it functions, what it costs, what it accomplishes, and what superintendents think of parent education.

Among other studies and materials prepared during the year by the specialists of the Division were:

A suggested administrative report to States. The form represents those data which the States in regional conferences have indicated as desirable, and embraces those items of information needed locally and on a State-wide basis.

Bibliographies: Good References on Fiction Portraying Home Life and Family Relationships; Good References on Mental Hygiene at Home and at School.

Statistical tables showing kindergarten enrollments for 1936–38 in States and in cities of different population size.

The amount and percentage of public-school revenue receipts by sources for each of the States, 1929–30 and 1935–36.

Contributions to Bulletin 1939, Miscellaneous No. 3, "Education in the United States of America," on such topics as elementary and secondary education, administration of education, primary education, school organization, and program of instruction.

Legislative Action Before the Seventy-fifth Congress—outlining bills introduced relating to education and also those enacted into law.

The Selection, Qualifications, and Tenure of Principal State School Officials, as of January 1, 1939.

At the request of the board of education of the post of the United States Marine Corps at Quantico, Va., a study of the school situation, especially as related to the curriculum and to school buildings, was made and a report submitted appraising the curriculum, teacher preparation, and existing school buildings, and making recommendations for the modification of the curriculum, for new housing facilities, and for an adequate staff and budget.

The State school administration specialist has rendered consultative service on school records and reports to the State Departments of Education of Pennsylvania and of Kentucky, and the District of Columbia at their request. At the request of the Florida State Department of Education he acted as consultant on a survey of a county school system of that State. He also acted as adviser to representatives of Columbia University who are conducting a Nation-wide study of the problems of transportation of school children.

The specialist in nursery-kindergarten-primary education acted as adviser to the United States Housing Authority on building facilities for preschool and school children in the new housing projects. She also cooperated with the Children's Bureau in planning record forms for gathering data on day-nursery and nursery-school enrollments.

The specialist in secondary education who as secretary of the Committee on Coordination in Secondary Education outlined, planned, and attended meetings and prepared minutes; collected information for a subcommittee on education of pupils of superior intelligence; arranged and carried out plans for printing a bulletin on Suggested

Studies on Education and as secretary of the Committee on Cooperative Study of Secondary School Standards planned and attended meetings and prepared the minutes; prepared a progress report, and reviewed manuscripts of three printed publications.

A conference on elementary education held at the Office of Education in June 1938 formed the basis for a second and more extensive conference attended by a number of State supervisors and directors of elementary education held at the Office in October 1938.

The first conference resulted in the raising of questions concerning current problems in elementary education, issues in curriculum, school organization and administration, and teacher education. Tentative reports on each of these are to result in a bulletin which will attempt to give a bird's-eye view of elementary education as it exists at the present time in the United States. The second conference made many of the questions of the previous group concrete and specific as conference members discussed common problems, exchanged descriptions of responsibilities of an elementary supervisor in a State department of education, and recommended to the Office of Education types of service which it might offer to persons in each of the 48 States who are responsible for the supervision of elementary education.

As a result of the conferences State supervisors and directors of elementary education organized informally for a subsequent meeting in Cleveland during the February session of the American Association of School Administrators. At that time members of the Office of Education staff who had been responsible for the first conference cooperated in carrying out the program. This informal organization will continue, and plans to suggest from time to time ways in which the Office of Education can be of assistance.

Sample books of elementary and high-school report cards were prepared and loaned to 140 committees and individuals—superintendents, principals, teachers, and college staff members in more than 30 States. Sets of stereopticon slides showing curriculum activities, school equipment, and report cards were loaned to schools and organizations.

HIGHER EDUCATION DIVISION

Activities of the Higher Education Division for the fiscal year may be briefly summarized as follows:

Four members of the staff carried forward a cooperative study in the field of accreditation of colleges and universities as carried on by State agencies. An exhaustive questionnaire was filled out for these State accrediting agencies and the materials tabulated and ana-

lyzed. One staff member visited five States in preparation for a historical study of the development of accreditation in these States. The historical development of accreditation as carried on by most of the national and regional accrediting associations was examined. The chief of the Division studied the literature dealing with problems and issues involved in accreditation and sought to discover the relation of these problems to the activities of accrediting carried on by State agencies. The authors joined in preparing a summary of findings and recommendations with respect to the best development of accreditation.

The first stage of the work of the committee on graduate study and research set up by the Commissioner of Education in 1937 was completed during the past year. President Bowman of the Johns Hopkins University completed revisions of the report which was being prepared with the help of a committee. This report deals with the basic situations underlying standards of graduate study and research in American universities and should serve as a useful guide to institutions and to educational officers seeking to maintain satisfactory graduate schools.

Work was completed on the Development of State Programs for the Certification of Teachers. This bulletin defines standards and discusses principles which should be helpful in guiding State departments of education in their efforts to improve the quality of teaching through raising the standards required for teacher certification.

The Division continued its long-time research and service project into the relation of the State to higher education. The purpose of this project is to study and develop fundamental theories and principles which may be utilized by the States in improving their present systems of higher education.

The Chief of the Division has served as adviser for the survey of higher education being carried on by the Nebraska State Planning Board for the State of Nebraska.

At the invitation of the President of the University of Arizona, assistance was given in planning for a self-survey of the university to be carried on by officers and committees of the faculty in the institution.

The Chief of the Division visited representative colleges and universities in Alabama, Arizona, California, Florida, Mississippi, North Carolina, Tennessee, and Texas, for the purpose of studying the details of their administration and instruction.

In connection with the study on graduate work and research, graduate schools of 12 universities and colleges were visited.

Thirty-five States were visited by members of the Division in connection with the cooperative study in the field of accreditation of colleges and universities.

Eight States were visited in connection with the Coordinated State Study of State Boards and Departments of Education.

The usual administrative duties have been carried on in connection with the Morrill and Supplementary Morrill funds for the land-grant colleges. Annual reports have been received, checked, and certified for the 69 land-grant colleges with respect to their expenditures of these funds.

The annual inspection of Howard University has been made by a member of the Division and the annual report compiled by the president of the University, in line with a plan approved by the Office of Education. The final report was approved and filed for use by the Congress as required by law.

COMPARATIVE EDUCATION DIVISION

The Division of Comparative Education is obligated to gather information available in any language about all levels and kinds of education outside of the United States, reassemble and reexpress it in English and distribute it within this Nation whose people are for the most part not familiar with foreign languages and have had little experience with education systems abroad.

International events during the year caused a considerable increase in the work of the Division. The flow to this country of foreigners from disturbed areas in Europe raised the number of credential evaluation from 910 in 1937–38 to 1,040 in 1938–39, even though arrangements were made with one of the large metropolitan universities to do its own evaluating. Comparative figures for some of the European countries during the past 2 years are as follows:

Country	Number of cases		Country	Number of cases	
	1937–38	1938–39		1937–38	1938–39
Austria	18	93	Lithuania	2	12
Czechoslovakia	19	46	Poland	31	53
Hungary	15	37	Germany	210	204

Interest in what other countries, especially those with totalitarian governments, are doing in education has grown considerably in the United States and brought more than the usual number of requests for information.

Help to Americans traveling abroad to study education in other countries was given in the form of letters of introduction and advice to 27 persons. Visitors from Poland, Czechoslovakia, Brazil, Turkey, England, Syria, and China came for aid in studying education in the United States.

One hundred twenty requests from students in this country for assistance in writing term papers, theses, or dissertations on some phase of comparative education were handled. They related to 33 different foreign countries and covered many different fields of education abroad such as the history of education, cost of education, physical, visual, and vocational education, illiteracy, civil service for teachers, teaching of foreign languages, education in totalitarian States, the study of optometry, and adult education, in addition to the more common and frequent demands for specific data about the usual elementary, secondary, and higher levels of instruction.

The Division advised in outlining courses in comparative education at Temple University, University of Virginia, Howard University, and the University of Georgia.

The Division completed chapter VII of volume I of Bulletin 1937, No. 2, A Survey of a Decennium of Education in Countries Other Than the United States; and Bulletin 1938, No. 15, Education in Germany.

The specialist in western European school systems returned in July of 1938 from a visit to the Netherlands and Scandinavia to study the education of teachers in those countries. The Chief of the Division gave 3½ months mainly to an investigation of education in Italy, but included as secondary purposes of the trip, visits to Egypt, Palestine, Syria, Greece, Switzerland, France, Belgium, and England where he conferred with education authorities and called at different schools, especially those maintained by American effort.

The Division of Comparative Education is not a translating agency but, in connection with its work of aiding both foreign students and collegiate admissions officers, it must of necessity translate the credentials that come to it in languages other than English. Mainly in this connection a total of 384,820 words—which amounts to about 1,540 typewritten pages—were translated during the year from 33 different languages.

As a matter of cooperation with other governmental agencies, translations amounting to 21,755 words from 12 different languages were made by the Division of Comparative Education during the year.

SPECIAL PROBLEMS DIVISION

The Division of Special Problems includes regularly established services in the fields of education of exceptional children, children in rural and sparsely settled communities, native and minority groups, including education in the Territories and insular possessions, and Negroes. Conservation education and visual aids in education are also included.

Research and investigatory activities in the assigned fields of service constitute the major responsibilities of this as of other Divisions of the Office. Not all projects under way are completed during any one year. Certain studies concerned with continuing functions of the Office, familiarity with current education practices, for example, are always in process.

The work of the specialist in the education of exceptional children was devoted in large part during the year to consideration of two phases of work in this field not previously reached, namely, the education of handicapped children in residential schools and provisions in public-school systems for socially maladjusted children. Two studies were completed during the year, both growing out of national conferences called the preceding year by the Commissioner of Education. One, a study of educational programs in residential schools, was consummated through personal visits to a number of such schools augmented by descriptive circulars and catalogs and correspondence. The report of this study describes the educational programs under way in residential schools for four types of handicapped—namely, for blind, deaf, mentally deficient, and socially maladjusted—children. The other study was an analysis of existing clinical facilities in public-school systems for the adjustment of behavior problems of school children. Another study concerned with hospital schools was revised and edited in the Division.

The work begun in the Division during the preceding year designed to assist school systems in newer curriculum developments has continued. Three studies having to do with conservation education were prepared for publication. One of these is concerned with curriculum content in conservation, one with methods of teaching conservation in the elementary schools; a third study nearing completion deals with suggestive content material and methods concerned with conduct of conservation excursions. These studies are expected to contribute substantially to the development of curriculum programs in this rapidly growing field.

The use of visual aids in the classroom is another of the newer developments concerning which school officials seek information and

guidance. During the year an informative bulletin, School Use of Visual Aids, containing the first survey of the extent to which school systems in the United States, classified according to size, use the different types of visual aids in their classrooms came from the press and has been widely used.

The growing demand for information concerning opportunities for the preparation of teachers in these newer fields, conservation and the use of visual aids in the classroom, led to the development of two catalog studies of such offerings in higher institutions of learning. One concerns courses offered in the use of visual aids in the classroom; the other, concerns courses in teaching conservation. Both studies give information concerning types of courses available, and type and location of institutions offering them in the several States. Teacher-education institutions desirous of introducing courses in these fields or improving those now offered need information concerning ways in which successful departments are organized and types of teaching procedures followed in other similar institutions. Demands for advisory service of all types in both these newer fields of instruction continued to increase.

Some years ago a service concerned with the education of children in outlying parts of the United States and of minority groups in the several States was established. One of the outcomes planned was the preparation of a series of reports describing the educational systems in each. During the year an addition to the series, a report on education in the Panama Canal Zone, was completed. The report includes an account of social and economic conditions among the people of the Canal Zone; a résumé of the history of provisions for education since the beginning of American occupation and a description of the present school system.

At the request of the Commissioner of Education of Puerto Rico outlines of proposed revisions in the courses of study for the schools of the island were reviewed in the Division. A memorandum was prepared concerning the proposed changes with comments and suggestions. At the request of the Committee on the Teaching of Modern Languages of the American Council on Education, information was gathered and reported concerned with textbooks issued in Spanish-speaking areas of the United States and Puerto Rico.

Studies concerned with the education of children in rural and sparsely settled communities made during the year related to the movement for improved educational facilities in elementary schools through centralized schools, and in secondary schools through curricular enrichment. One study describes ways in which centraliza-

tion of small schools is taking place and the rapidity with which larger schools are replacing one- and two-teacher schools in the 48 States and for the country as a whole. This study was completed during the year. The second study now nearing completion is concerned with curriculum offerings in small high schools. The results so far collected indicate that in spite of progress and enrichment of offerings in these schools there is need for more practical and vocational courses, more general cultural courses such as music and art, and more attention to health and leisure-time activities.

During the year one of the specialists participated in an extensive study of education in the C. C. C. camps, including field investigation, committee discussions, and the preparation of a report to the Commissioner of Education. The specialist in the education of Negroes is following up the National Survey of Vocational Education and Guidance of Negroes, recently completed.

Considerable attention has been given to preliminary planning for the proposed survey of higher education of Negroes for which Congress appropriated $40,000 to the Office of Education. The study is to extend over a 2-year period. An advisory committee has been selected to assist in formulating objectives and in developing procedures for the study.

Field work during the year included visiting schools, including State colleges, State residential schools, hospital schools, schools organized for special purposes or for special types of children; visiting for advisory purposes State and local school systems, headquarters of educational organizations and State departments of education; and participating in State and local teachers meetings in 17 different States.

Planning and participating in conferences, both those called by the Commissioner of Education and by other agencies, are important phases of the work of the Division. During the year a conference of State directors and supervisors of special education, called by the Commissioner of Education, was planned and conducted by specialists in the Division.

A number of short bibliographies on special subjects were prepared in answer to individual requests, including phases of visual education, rural education, and special education. Three bibliographies in the Good Reference Series were completed as follows: Curriculum and Social Change; Language Handicaps of Non-English-Speaking Children; Negro Education. Mimeographed supplements to Pamphlet 71, An Annotated Bibliography on the Education and Psychology of Exceptional Children were revised.

STATISTICAL DIVISION

In order to show the national status of education, the United States Office of Education collects, compiles, and publishes statistical data for many types of public and private education. Approximately 55,000 school systems, schools, or libraries periodically receive requests for statistical information. The statistical studies which were in process in 1938–39 are shown in the following table, in which capital letter C stands for data collected; T, tabulated; and C–T, collected and tabulated within the year.

Subject of study, 1938–39	Type of study	
	Biennial	Periodic
Federal: Expenditures for education		C–T
State school systems: Personnel and finances	C	
City school systems:		
Personnel and finances	C	
Per pupil costs		C–T
Higher education:		
Personnel and finances	C	
Land-grant colleges		C–T
Receipts and expenditures (preliminary)		C–T
Secondary schools:		
Staff, students, etc		C–T
List of accredited schools		C–T
Libraries, Public: Personnel and finances		C

LIBRARY SERVICE DIVISION

The general objective of the Library Service Division during the past year has been to further and assist development in the various fields of library service—school, college, public, and special libraries.

As a contribution toward this objective, the Division has been conducting studies which should furnish, when completed, some of the fundamental body of data so greatly needed in the attack on many problems confronting librarianship. In conjunction with the Statistical Division, it has engaged in the cooperative effort to collect comparable library statistics on a comprehensive scale. It has been preparing legal digests which should be helpful in school library and public library administration; it has participated in surveys of libraries and library conditions; and it has compiled selected bibliographies to serve as guides in book selection. In addition the Division has acted in a consultative capacity on library problems for individuals, groups, and institutions, and has assisted on numerous occasions the cause of in-service training for librarians.

Among major studies made during the year is the compilation of a list of 500 books for the preschool and elementary school children, selected and annotated to meet the constantly growing number of

requests from school librarians, supervisors, and those interested in children's work. Since the tentative list, chosen on the basis of defined criteria, was submitted to specialists in the field for criticisms and suggestions, the completed product represents the combined opinion of a group in the field as well as the judgment of the specialist in school libraries in the Office of Education.

Another bibliographic project completed was the revision of the circular One Dollar or Less: Inexpensive Books for School Libraries. The previous edition of this publication proved helpful to teachers, librarians, and others as a guide in selecting inexpensive but good books for children.

One member of the Division participated in an extensive survey of the University of Georgia library made by a special committee at the request of the president of that institution. This survey covered in considerable detail the administration of the library, its financial support, the quality of its book collection, the use of the library, the competency of its personnel, and in addition made specific recommendations concerning possible improvements.

The study of school library legislation in the 48 States and the District of Columbia is under way. The work is covering such points as legal provisions for the establishment and maintenance of school libraries, their administration, the requirements regarding their librarians, the relationships with other agencies, and other legal specifications.

A staff member of the Division also took part in an extensive study of public library personnel in order to prepare a classification scheme for library positions, with their respective duties and qualifications outlined, and to group municipal public libraries on the basis of certain criteria. This plan has been adopted officially by the Council of the American Library Association and is now available for use with necessary adaptations by local units.

Another research study was that on the effect of the lowered postal rates on books upon schools and libraries. At the request of the President of the United States, the Commissioner reported on the benefits of the 1½ cents per pound book rate, made possible by an Executive order signed November 1, 1938. For 5 months, data were collected from schools and libraries, showing the amount of savings in shipping charges on purchased books, and interlibrary loans, with resulting economies for the book budget. The final tabulation showed an estimated annual saving to library and school budgets of $1,600,000, and a calculated additional use of 3,250,000 volumes. Numerous intangible benefits, such as improved and prompter service, were also indicated.

Preliminary work was done on a proposed study of unit costs of services and operations in regional libraries. Exploratory steps in this direction have been made in one of the Louisiana regional libraries, and on the basis of trials made a form for gathering the needed data has been devised. As soon as other work now pending is completed, it is proposed to formulate this study as a project, for, combined with the extensive Montclair Public Library study, it should yield for library administrators some needed data on the problem of costs in the various library processes.

At the invitation of the Commissioner of Education, State school library supervisors met on March 30–31 with the members of the Office of Education staff in Washington to discuss mutual problems and to make future plans. At the conference the supervisors pointed out the need for strengthening the elementary-school-library program, for including a school-library administration unit in the general administration courses as given in the education curriculum, and discussed the criteria for evaluating school libraries, and the essentials of good certification. The conferees also advised concerning the services which the Office of Education could render to supervisors of school libraries.

Requests for advice on library problems have been received in the Division from 38 different States, the District of Columbia, and 4 foreign countries. As examples of this kind of service rendered by the Division, the following may be noted:

Advice on classification and qualifications of the personnel in a municipal public library, and on the specifications for bookmobiles for a foundation interested in extending library service to rural schools.

Suggestions on compilation of book lists for such organizations as: The American Youth Commission, the National Congress of Parents and Teachers, the Chicago Board of Education, the Farm Security Administration, and Indian schools.

Preparation of a library promotional program for a branch of the American Association of University Women.

Advice on requirements of library science courses for a Negro college.

Advice on the effect of present copyright provisions upon libraries in the United States.

Suggestions to a New Zealand educator on rural-library problems.

Assistance on library planning programs for communities in Mississippi, Texas, Montana, New Mexico, West Virginia, Oregon, Idaho, Nebraska, and Missouri.

Among problems confronting the division, several might be singled out especially. One is the need to have on the staff specialists in college library work in order to assist librarians in that field. Changes in methods of instruction have placed new responsibilities

upon college libraries and have created problems upon which considerable research is required. It is desirable that such research be undertaken.

THE LIBRARY

The second year in the suitable new quarters of the Library saw the work progressing much more smoothly than ever before in its history. There remained but few adjustments to be made and every effort could be centered on the many projects that for years had been awaiting attention.

A number of W. P. A. workers were assigned to the Library and under supervision they performed many essential tasks that had long needed to be done. The books had never been thoroughly cleaned. One employee spent several weeks with a vacuum cleaner and put the whole collection into good condition.

Many of the older books which had been bound in sheepskin were dilapidated and in need of rebinding. As funds have been barely sufficient for the current binding, this material had never received attention. One of the W. P. A. workers knew how to repair books, and he instructed one of the others so that for several months a repair job has been in process with excellent results. Many volumes have thus been restored to usefulness.

One project which has had to wait for years for attention was the organization and listing of the textbooks in the historical collection. These books had been packed in boxes and stored, so that it was impossible to consult any of them. With the added shelf space available in the new Interior Building it has been possible to have the books unboxed, sorted, and arranged on the shelves in subject groups. A temporary worker was put on the project for 6 months full-time. She continued the listing of the textbooks on cards and practically completed the work for those published before 1875. The group of those published before 1875 consists of about 8,000 titles and covers the following categories: Arithmetic, geography, history, art, music, juvenilia, Latin, Greek, Spanish, French, science, also readers and spellers. It is hoped that it may be possible to fill many of the gaps in this valuable collection.

Through the medium of the "open exchange" plan many valuable publications which could not be had from the source of issue have been obtained. From the education collection of Harvard College Library was received a large collection of reports of State and city boards of education; also an interesting collection of catalogs of early academies and secondary schools. There was also a considerable amount of miscellaneous material which was exceedingly important

to the Library. From the Institute of International Education at Columbia University there was received much material on foreign education, including monographs, reports of foreign ministries of education, and catalogs of foreign universities.

In answer to continued requests for loan of curriculum material especially to libraries of boards of education and educational divisions of public libraries, there was started last year a duplicate collection of courses of study. This project has been successfully continued this year with the result that many courses of study have been loaned to boards of education in various parts of the country. Several boards of education have cooperated heartily in this project and have contributed two copies of all courses issued. Requests for loans addressed to these contributing boards have then been turned over to this library and the material sent from here.

The Library has also cooperated with the American Home Economics Association by becoming a depository for the archives of that association. This material will be placed in the Library and will be available for research in the field of home economics. The main collection of books and periodicals of the National Occupational Conference was sent to this Library and has been absorbed into it.

Although the use of the Library has increased greatly and the amount of work accomplished has more than doubled, there has been no increase in the number of the regular staff for the past 5 years. It would have been impossible to carry on the work since coming into the new building but for the W. P. A. workers that have been detailed to the Library.

That the Library has been used by an increasing number of people is evidenced by the following comparison of statistics of book circulation with those of the preceding fiscal year.

	1938	1939
Books borrowed	6,338	7,181
Books used in reading room	[1] 18,000	22,416

[1] Approximate.

The number of books borrowed from the Library of Congress increased from 406 in 1937–38 to 1,701 in 1938–39. This increase was largely due to the demands of the script writers in the Radio Project of the Office of Education.

In the Cataloging Division 5,883 volumes representing 3,204 titles were classified and cataloged. Twenty-eight thousand, seven hundred eighty-six cards were filed in the card catalog. Five hundred volumes classed in division "B" (psychology and religion) were re-

classified and recataloged and new cards were made. This change was made because this section of the Library of Congress classification had recently been expanded.

EDITORIAL DIVISION

Services of staff members of the Editorial Division during the fiscal year have included the editing and preparing of manuscripts for publication; issuing of School Life, official monthly journal of the United States Office of Education; publishing the annual educational directories; planning and conducting exhibits at major educational conventions; promoting the distribution of publications; having charge of the Office's mailing lists; issuing press releases and news letters; participating in conferences and kindred activities.

A total of 61 new publications of the Office were delivered from the Government Printing Office during the year and a total of 69 new manuscripts were completed and sent to the Printing Office for publication. In all, 1,920 requisitions for printing and binding, and other reproduction processes were handled by the Division.

Approximately 100,000 copies of School Life (in 10 issues, October to July inclusive) were distributed to libraries; university, college, and school administrators; teachers in practically all fields; organizations; and citizens interested in education. Four of the 10 issues contained special pictorial features which presented a bird's-eye view of educational activities in the United States. School Life, begun in 1918 as a 16-page publication, has grown to a 36-page journal, which each month contains latest reports on research conducted by the Office of Education, and other activities; news of education in this country and abroad; announcements of new Government publications of interest to educators; and other related material by specialists in their fields. More than 118,000 copies of reprints from School Life were also made available to those interested.

The Division, with the cooperation of the Higher Education and the Statistical Divisions, issued the four parts of the Educational Directory for 1939. Part I gives the roster of State and county school officers; part II, of city school officers; part III, of colleges and universities; and part IV, of educational associations and directories. The demand for these directories has increased to such an extent over the years, that the editions are frequently exhausted two or three months before the new edition is off the press. That was the case this fiscal year with part III.

One of the helpful ways in which the Office of Education brings to the attention of educators and to the public throughout the coun-

try the information which it gathers and disseminates is through the medium of educational exhibits. During the year this service was extended to a larger number of major education association conferences and conventions than in previous years. Office of Education exhibits were prepared upon request for many leading educational organizations including the National Education Association, American Vocational Association, American Home Economics Association, American Library Association, Association for Childhood Education, American Association for Health, Physical Education, and Recreation, and the American Association of School Administrators. Small exhibits and publications for display were sent to many other meetings.

The Office cooperated with representatives of the New York World's Fair and the Golden Gate Exposition in helping to design the educational exhibits.

News releases prepared especially for newspapers and other publications afforded another important channel through which the Office disseminated information during the year. These releases reported the high-light educational research findings published in Office of Education bulletins. They called attention to new publications issued, and revealed useful information collected by Office of Education specialists. The statements also reported Office of Education activities and services. They were sent to newspapers, news services, educational editors, special feature writers, and leaders in various fields of education throughout the United States.

In order to reach as large a number of people as possible to let them know of the availability of Office of Education publications, the Editorial Division has from time to time issued announcement leaflets of new bulletins and has utilized various other channels of publicity for this purpose.

More than 334,000 copies of Office of Education publications have been sold at nominal prices during the year by the Superintendent of Documents. More than 569,000 free copies have been issued, making a grand total of 903,000 copies.

Mailing lists for the year totaled 334 containing 186,992 addresses. These mailing lists are increased by the many requests to be placed on mailing lists, that come into the Office.

A new Handbook and Directory of the Office of Education was prepared during the year and will soon be off the press. A revised list of Office of Education publications has also been issued, covering publications from 1930 to 1939.

ALL DIVISIONS

Incoming mail to the Office of Education during the year totaled 617,143 communications, or approximately 50 percent greater than for the fiscal year 1938.

Among the great group of other agencies with which Office of Education staff members cooperated during the year in varying capacities such as service on committees, participating in conventions and conferences, writing articles, etc., were the following:

American Council on Education.
American Association of University Women.
American Association of Collegiate Registrars.
Association of American Universities.
Institute of Administrative Officers in Institutions of Higher Education.
National Council of Chief State School Officers.
Society for the Promotion of Engineering Education.
United States Employment Service.
B'nai B'rith Vocational Service Bureau.
Young Men's Christian Association.
National Federation of Business and Professional Women's Clubs, Inc.
National Vocational Guidance Association.
American Vocational Association.
National Education Association.
American Youth Council.
National Youth Administration.
National Occupational Conference.
United States Army.
Works Progress Administration.
United States Civil Service Commission.
United States Department of Agriculture.
United States Public Health Service.
American Association for Advancement of Science.
American Association of School Administrators.
Southern Association of College and University Business Officials.
National Temperance Council.
West Virginia State Education Association.
Oklahoma State Education Association.
Association for Childhood Education.
Progressive Education Association.
American Library Association.
National Congress of Parents and Teachers.
White House Conference on Children in a Democracy.
American Country Life Association.
American Association on Mental Deficiency.
American Association for Adult Education.
American Association of Instructors of the Deaf.
International Council on Exceptional Children.
Association of Secondary Schools and Colleges for Negroes, and many other groups.

HEALTH AND PHYSICAL EDUCATION

In the realm of health and physical education a study concerning the selection, training, duties, and supervision of school janitors, a subject which has not been covered for some years, was completed and published under the title, "The School Custodian."

A comprehensive study of the materials and methods of instruction in hygiene was completed, as was also an investigation into the important subject of routine health examinations of school children. In conjunction with the United States Public Health Service, an introductory chapter and suggestions for teachers to be included in a publication on Communicable Diseases was prepared. The Office also cooperated with that Service in the revision of a joint publication on High Schools and Sex Education.

The consultant in hygiene served as a member of: White House Conference on Children in a Democracy; American Association of Health, Physical Education, and Recreation; Advisory Council of the Summer Round-up of the National Congress of Parents and Teachers; International Congress on Open-air Schools; American Youth Commission; American Public Health Association; National Tuberculosis Association; American Social Hygiene Association; World Federation of Education Associations; and National Conference for Cooperation in School Health Education.

A conference on health education was called by the Office, and personnel attending included State directors of health and physical education, city directors of hygiene, and superintendents of city schools.

INDUSTRIAL ARTS

During the past year considerable interest was manifested in instructional materials and methods used in shops and laboratories. The Office of Education cooperated with the International Bureau of Technical Education in a study of instructional devices conceived, planned, and constructed under the direction of teachers for use in their classes in vocational schools and in courses in physics and mechanics. The study was concerned with the extent to which such teaching devices are prepared by teachers to meet the special needs of their classes in contradistinction to standardized materials purchased from commercial firms. The Office collected the information and illustrative material on this question from a number of schools throughout the United States and forwarded it to the Bureau for compiling an international report on this subject.

Cooperation was also extended to the committee on teacher training of the American Vocational Association in planning the study of the industrial arts programs in teacher-training institutions.

From information collected from individual teacher-training institutions a list of such institutions having a department of industrial arts was compiled. An annotated bibliography on industrial arts covering recent books and periodicals was compiled.

The consultant continued to serve as secretary of the section on supervision and administration of guidance of the National Vocational Guidance Association.

TESTS AND MEASUREMENT

There was completed during the year a bulletin on Minimum Essentials of the Individual Inventory in Guidance, designed particularly for those who have not had extensive training in the use of various trait-measuring devices. The bulletin brings to bear on the problem not only the use of aptitude tests of the more formal type, but also the use of other trait records such as marks, social traits, home conditions, and the like. The bulletin emphasizes, however, the wealth of guidance values to be found in scores on tests so often used by schools, i. e., tests of achievment in subject matter, intelligence tests, and special subject prognostic tests. A study of the values of various measures for guidance purposes was made.

Advisory work in connection with the use of cumulative records has continued this year. The State cumulative record plans of Kentucky and North Carolina were studied. A field trip in this connection was made to the Kentucky State Department of Education and the University of Kentucky. The consultant has frequently conferred with the Research Division of the W. P. A. relative to the encouragement and review of projects involving the use of cumulative records.

Studies on which progress has been made during the year are: (*a*) A study of new methods of evaluation. This study is bringing up to date the many possibilities of measuring pupil behavior in the classroom and in the social situation. (*b*) Reporting to parents. This study is attacking the problem of the best ways of reporting the growth of pupils to parents so that more effective cooperation between the home and school will result. (*c*) A study of the validity of a typical interest questionnaire at the secondary level.

VOCATIONAL EDUCATION

NEW SERVICE ORGANIZED

In an effort to meet new problems and needs which have arisen recently in the field of vocational education, several new services have been added during the year to the Vocational Division.

Among these is the Occupational Information and Guidance Service. A professional staff consisting of a chief of service, two specialists in occupational information, one specialist in tests, measurements, and personnel records, one specialist for consultation in field service, and one specialist for occupations for girls and women, has been provided for.

Three consultants in various fields of vocational education have been added to the staff of the Office of Education during the year: (1) A consultant in public-service training, who is responsible for conducting studies and investigations in the field of public service occupations and assists State school officers, colleges, and universities, and other organizations and groups interested in the development of vocational education, in promoting or improving programs of training in public-service occupations; (2) a consultant in employee-employer relations, whose responsibility is to make studies and investigations of problems arising from the use of Federal funds in connection with vocational training for wage-earning pursuits, and to check various training programs against special standards in order to safeguard the interests of workers and the use of public funds provided for vocational education; and (3) a consultant in curriculum problems who cooperates with Federal and State agencies in the field of vocational education on procedures and plans for the development of vocational-training programs at various educational levels, and conducts research in curriculum problems.

The name of the Commercial Education Service of the Office of Education was changed during the year to the Business Education Service as a result of the enlarged scope of its activities. In addition to administering the program of distributive education under the provisions of the George-Deen Act, the Business Education Service will continue to render advisory service and to conduct studies and investigations in all phases of business education as provided under the Smith-Hughes Act. The staff of the Business Education Service, which formerly consisted of a chief and secretary, has been enlarged to include a chief, four regional agents, and a research agent and additional secretarial help.

Because of the expanding program of vocational education and the consequent increase in the volume and complexity of administrative problems, it has been necessary to create a new position—executive assistant in vocational education—whose duties are to act as assistant to the Assistant Commissioner for Vocational Education. Several additions have been made to the personnel in already established services.

VOCATIONAL EDUCATION PROBLEMS

In reviewing the year's activities, it seems advisable to set down briefly some of the factors which those responsible for the development of vocational-education programs have been obliged to take into consideration in their efforts to further these programs.

In the field of agricultural education, for instance, it has been necessary to take into consideration the fact that vocational agriculture students have come to realize that farming is a business requiring special training, and that young farmers are aware that they must be trained to be sound financial managers, thrifty buyers, efficient producers of crops and livestock, and capable salesmen in marketing their products. There is a second factor which those responsible for agricultural education have had to consider also—that vocational education in agriculture is a continuing education program, and that it should be planned to include the education of the farm boy, in full-time classes, of young men seeking to become established in farming in part-time classes, and of adult farmers who need help in solving farming problems which continually confront them, in evening classes.

Another factor is the slowing down of the movement of surplus rural youth to the cities and to industry. This has increased the difficulty experienced by those who remain on the farm.

The higher age of entrance of young people into industrial employment has affected the work in trade and industrial education to a marked extent. Because many industries will no longer employ workers under the age of 18 years, a large number of young persons, who would otherwise be at work, remain in school. This has resulted in a marked increase in enrollment in day trade courses planned to prepare for entrance into employment.

The increasing technicality of industrial occupations has made necessary the establishment of courses which will enable workers to keep up with changing needs and requirements. Increasing interest in apprenticeship, also, has resulted in a recognition of a need for related courses in mathematics, science, drawing, blueprint reading, and other subjects related to the trade. Enactment of labor and

social legislation for workers has necessitated changes in trade and industrial schools and courses, especially those organized for employed persons.

Studies made by the States, the Office of Education, and other organizations during the past few years have served to emphasize the need for education in connection with home economics courses in money-saving skills. Such studies include those made by the National Resources Committee on the distribution of consumer incomes; those on family expenditures made by the Department of Agriculture, Bureau of Home Economics, and the Department of Labor, Bureau of Labor Statistics; and studies of these and other organizations on expenditures for housing, household operation, health, clothing, transportation, recreation, and other items.

Several factors have influenced the procedures and activities of those responsible for promoting training in the distributive occupations. Among these factors or tendencies are the following: The demand for an increasing number of workers in the service occupations; the responsibility placed upon all types of distributors to supply more accurate merchandise information to consumers, which has necessitated setting up courses on merchandise knowledge; the tendency for distributive businesses to become more professionalized as a result of the adoption of more exact management methods, thus emphasizing the need for instruction in management phases; the demand for salesmanship or selling courses which will offer instruction geared to present-day salesmanship needs; and the tendency to depend upon specific job analysis in setting up courses in distributive education.

INTEGRATION IN VOCATIONAL EDUCATION

In view of the interest manifested in recent years in the question of integration of various phases of education, the Office of Education, in cooperation with the States, has given this problem considerable attention. During the past year, what have been designated as "integration workshops" or discussions have been conducted at the University of Florida, the University of Tennessee, the University of North Carolina, and elsewhere. At these "workshops" teachers of every type of subject in the secondary school system gathered together with a view to discovering the part each phase of education plays in relation to the other and to the whole secondary education fabric.

Joint vocational training also has been resorted to in the education of adult woman workers for the dual responsibility of wage earning and homemaking, which requires cooperative effort on the part of trade and industrial home-economics-education workers.

A step toward better integration has been taken in a number of States through joint programs of training worked out by representatives of agricultural education and home-economics education.

THE FEDERAL ADVISORY BOARD

From the inception of the program of vocational education carried on under Federal grants, emphasis has been placed, first by the Federal Board for Vocational Education and more recently by the Office of Education, upon the importance of setting up advisory committees to assist in the establishment and operation of vocational education programs.

The Federal Advisory Board for Vocational Education succeeded the Federal Board for Vocational Education which was created under a provision of the Smith-Hughes Act. As at present constituted, the Federal Advisory Board for Vocational Education, which meets in the Office of Education on call of the chairman, is composed of the Secretary of Agriculture, the Secretary of Labor, the Secretary of Commerce, and the Commissioner of Education, ex officio; and the following lay members: Clarence Poe, editor, The Progressive Farmer, Raleigh, N. C., chairman and member representing agriculture; Paul H. Nystrom, president, Limited Price Variety Stores Association, New York City, member representing manufacturing and commerce; and Henry Ohl, Jr., president, Wisconsin State Federation of Labor, member representing labor.

The function of the Board is to advise the Commissioner of Education on various phases of vocational education. At its meeting held June 13, 1939, the Board gave consideration to a number of problems with which the Office of Education has been confronted during the year. It recommended, among other things, that the matter of the proposed standards for approving institutions to train teachers of vocational agriculture be referred to the joint committee of the Office of Education and the Department of Agriculture, which is working on the improvement of the curriculum standards in agricultural education, especially in the land-grant colleges; and that the Office of Education undertake the necessary studies to determine how it may encourage the various States, in cooperation with various retail and other distributive trades to make beginnings in the organization of comprehensive and well-coordinated courses of study that will aid in raising the efficiency of the distribution of goods in this country.

The Board stressed the fact that the success of the work of the Office of Education in the field of employee-employer relations, as they apply to vocational education, will depend largely upon the

functioning of advisory committees set up by State and local vocational education groups.

ADVISORY COMMITTEES

The Office of Education has set up in connection with its own program several types of advisory committees.

The Technical Advisory Committee on Trade and Industrial Education is composed of three representatives of employees, three representatives of the employer group, and three representatives from the field of vocational education. Meetings are held at the Office at least twice a year to consider current and future problems in the field of trade and industrial education and to make recommendations regarding policies and practices to be followed in establishing and maintaining training programs in this field.

As an example of the problems with which this committee concerns itself may be mentioned its consideration at one of its sessions of the application of the Wage and Hour Act on the compensation of those enrolled in cooperative part-time classes in the field of trade and industry, in an effort to arrive at a policy which could be formulated for the guidance of those responsible for vocational education programs in the States; and its consideration at a second meeting of proposed amendments to be made by Congress to the Smith-Hughes Act of 1917, under the provisions of which vocational education reimbursed from Federal grants was established in the States.

The Technical Advisory Committee on Trade and Industrial Education consists of the following persons: John P. Frey, president, metal trades department, American Federation of Labor; George L. Googe, southern representative, American Federation of Labor; Emile Rieve, president, Full Fashioned Hosiery Workers; R. O. Small, State director, vocational education, State of Massachusetts; Mrs. Betty Hawley, secretary, advisory committee on industrial education, board of education, New York City; John H. Zink, president, Heat and Power Corporation, Baltimore, Md.; B. H. Van Oot, State supervisor of industrial education, Richmond, Va.; Max Meyer, garment manufacturer, New York City; Thomas J. Thomas, vice president, Chicago, Burlington & Quincy Railroad.

Among other committees are: (1) The Advisory Committee on Vocational Training for Firemen, appointed by the Commissioner of Education during the year, consisting of members who are principally chiefs of municipal fire departments, and whose function is to advise the Commissioner of Education in regard to desirable lines of development to be followed in the field of training for fire department personnel; (2) a National Committee on Standards in Agricul-

tural Education, consisting of a State supervisor and a State teacher trainer of agricultural education from each of the four administrative regions of the country, and of which a member of the Office of Education staff is secretary and coordinator, and whose function is to lay a foundation which will enable Federal, State, and local administrators to set up standards through a national evaluation of vocational agriculture; (3) the Interdepartmental Advisory Committee on Vocational Training for the Mechanical Trades with reference to the Aviation Industries, whose function is to coordinate the efforts of the Federal departments and agencies primarily concerned with functions pertaining to vocational education for the mechanical trades, with special reference to aviation industries, including apprenticeship; (4) the Joint Committee on Relationships Between the Vocational Education Division of the Office of Education and the Agricultural Extension Service of the United States Department of Agriculture, which has been working on a program designed to coordinate country educational programs for agriculture and homemaking through the cooperation of agricultural and home economics extension agents, and vocational agriculture and home economics teachers in such a way as to remove the possibility of overlapping and duplication of effort; and (5) the committee of the American Vocational Association appointed to assist the Office of Education in the formulation of policies and to make a further study of the development of programs of agricultural education.

GROWTH OF VOCATIONAL EDUCATION

Figures submitted by the States for the year ended June 30, 1938, showed that 1,810,150 persons were enrolled in vocational education schools and classes in all fields of vocational education. This represents an increase of 313,313 over the previous year, distributed as follows: An increase of 66,476 in vocational agriculture schools, 79,592 in trade and industrial schools, 131,169 in home economics schools, and enrollments totaling 36,076 in distributive education. Present reports indicate that the enrollment figures for the year ended June 30, 1939, will materially exceed those for 1938.

Approximately 650 new departments of vocational agriculture were established in rural high schools during the past year. This increase has necessitated a corresponding increase in the number of persons being trained as teachers of vocational agriculture. The number of prospective vocational agriculture teachers who completed teacher-training courses increased from 1,237 for the year 1937 to 1,508 for the year 1938. Data show that 1,752 prospective teachers

should complete training this year and that about 1,575 will probably be placed.

It is significant that the enrollment in day trade classes, which, in the past few years, have absorbed many of those who would otherwise enroll in part-time continuation classes, has increased progressively for the past 20 years. Training in the day trade class has, in the past few years, tended to become pre-apprentice training. This is considered a desirable condition, since it helps to insure complete training for young workers and tends to limit the enrollment to the number of persons who will be needed as workers.

It is estimated that 750,000 persons were enrolled in trade and industrial classes during the year 1938–39. This exceeds by more than 100,000 the number enrolled for the year 1937–38.

Reports from the States indicate that approximately 1,500 additional home-making programs were established during the year and that the increase in enrollment in all home-economics departments for the year will approximate 75,000.

The growth during the year in the program of distributive education, provided for under the terms of the George-Deen Act of 1936, has been substantial. Unofficial data collected by members of the staff of the Business Education Service of the Office of Education, indicate that approximately 68,000 persons employed in the distributive field are enrolled in adult extension classes and 5,033 in cooperative part-time classes. During the past year, many of the distributive education classes have been organized in the smaller centers and have enrolled an increasing number of workers from small stores, a contrast with the previous year when most of the classes were organized in the larger centers, and the enrollment was composed largely of workers from the larger stores.

Twenty-six full-time and 9 part-time supervisors, assistant supervisors, teacher trainers, and research workers are now employed by State boards for vocational education in 25 States. Forty-four States have operated classes in distributive education during the year, as compared with 36 last year.

COOPERATIVE SERVICES TO THE STATES

The Federal vocational education acts expressly provide for cooperation with the States in the promotion of vocational education in agriculture, the trades and industries, home economics, and the distributive occupations. Services in these fields are rendered to the States by the Office of Education on a cooperative basis and at the request of State boards for vocational education.

Among the types of such services are the following: Assistance in perfecting plans for local programs of vocational education; participation in conferences and meetings on vocational education; preparation of material which will aid States and local communities in improving their programs; assistance in making surveys and special studies; assistance in institutes and courses for teacher trainers and teachers; and assistance in planning and improving curricula in various fields of vocational education.

Some of the principal services rendered to the States by the Vocational Division of the Office of Education during the year are reviewed under each field.

AGRICULTURAL EDUCATION

Regional conferences of supervisors and teacher trainers in the field of vocational agriculture for whites and Negroes were held under the direction of agents of the Office of Education during the year. Special stress was given in these conferences to the necessity for developing programs and formulating procedures designed to strengthen the training provisions, both technical and professional, for teachers of agriculture. Field visitations, requested by State and college officials, have been made by the agricultural teacher-training specialist of the Office to 13 teacher-training institutions preparing white teachers and to 4 institutions preparing Negro teachers, for the purpose of conducting surveys and formulating specific recommendations for the improvement of teacher training. In addition, regional agents of the Office have followed up the visits of the teacher trainer at the training institutions for the purpose of giving them assistance in adopting the recommendations of the teacher-training specialist.

Assistance was given the States in working out curriculum changes in an effort to secure greater uniformity and balance in courses of vocational agriculture, particularly between agricultural subjects and farm mechanics. Emphasis was placed upon the necessity for improving materials of instruction and for developing subject-matter materials for teachers.

The States have also been aided by the Office in developing outlines for use in promoting programs of systematic instruction for out-of-school young men and in making studies dealing with basic problems, as a means of securing authoritative information upon which to base an instructional program. State boards for vocational education have been encouraged to plan instruction for out-of-school youth on a year-around basis. As an aid to teachers in making such studies, the Office of Education issued during the year, Vocational

Monograph 20, Discovering Occupational Opportunities for Young Men in Farming, which shows one procedure that may be followed in making occupational opportunity studies.

With the assistance of the Office of Education, programs of research in agricultural education were formulated in 14 States.

Staff members assisted in setting up special summer schools and conferences for employed agricultural teachers, participated in 39 State conferences, served as instructors in 9 summer-school courses at teacher-training institutions, and, in the case of several States, in formulating plans for livestock-marketing schools undertaken by States in cooperation with terminal markets.

TRADE AND INDUSTRIAL EDUCATION

Included in the list of services rendered in the field of trade and industrial education may be mentioned: Making surveys to determine possible needs or opportunities for vocational courses; conducting teacher-training conferences or courses; training conference leaders; conducting conferences for groups from industry; planning courses of study for vocational schools; preparing teaching material; advising with trade and industrial-education officials regarding plans and equipment for buildings to be used for trade and industrial training; assisting in making plans to be followed in training special groups or meeting special problems; furnishing information regarding training for girls and women; assisting in the development of handicraft industries; and assisting in plans for setting up representative advisory committees in connection with trade and industrial education in the States.

The Office of Education has also devoted considerable time during the year to problems of regional and national interest in the field of trade and industrial education. Studies of occupational fields have been made and publications involving the findings of these studies prepared and published. Information about methods of dealing with specific problems of trade and industrial education and about the work done in special trade and industrial schools has been studied and distributed; and groups of persons engaged in various industries have been brought together for the discussion of training problems.

Considerable attention has been given to the development of courses for training persons employed in public service occupations and to various training problems met with in the aviation industry.

In cooperation with the Federal Committee on Apprenticeship the Office of Education has encouraged the adoption of approved apprenticeship plans, and has aided in the organization and maintenance

of educational classes in which apprentices may receive needed training in related subjects.

HOME ECONOMICS EDUCATION

In general, services to the States in the field of home economics education have included assistance in: The development of research programs; the evaluation of State programs of supervision, administration, and teacher training; and the solution of curriculum problems through guidance in committee work and planning and participating in summer sessions and various types of teacher's conferences.

The Office of Education has assisted teacher-training institutions in cooperative studies of teacher-training programs, and in putting into effect recommendations growing out of such studies.

To provide assistance in special fields of home economics education, the Office last year conducted 12 conferences as follows: Three in different sections of the country for workers concerned with graduate programs in home economics education; three regional conferences and three intraregional conferences in which a total of 439 home economics leaders participated; a conference of 43 representatives of Negro teacher-training institutions from 12 States; a meeting of members of regional committees in agricultural and home economics education concerned with planning joint programs of education for farm families; and a conference for city supervisors of home economics in cooperation with Cornell University, to consider special problems of supervision and administration of home economics in urban centers.

A survey of 14,000 secondary schools made by the Office of Education during the year is being analyzed in an effort to find out the number of junior and senior high schools offering home economics courses; the number enrolled in these courses; the percentage of girls attending these schools who are enrolled in home-economics courses; the length of class periods and the number of periods per week scheduled in home economics; the length of the home-economics course in years; the scope of the content of courses, required and elective; and the extent and type of home contacts made by teachers.

Activities of the Office in the field of the home economics curriculum during the year have included: Work with home-economics staff members in 20 colleges or universities, on college curriculum problems in 6 State conferences; assistance to curriculum committees in 6 States and in all regional conferences including a conference for Negro home-economics workers; and 18 teachers' conferences on cur-

riculum problems. Two mimeographed documents on the curriculum in home economics were prepared during the year, and a third publication, on procedures in developing curriculum materials, was in process of preparation.

BUSINESS EDUCATION

Eight different types of service have been rendered by the Office of Education in the field of business education during the year, as follows: Assistance in formulating and revising State plans for distributive education; selecting qualified persons as State supervisors and teacher trainers in distributive education; organizing a teacher-training program for the professional training of teachers of adult extension classes; formulating teacher-training programs for summer schools for the training of supervisors, coordinators, and teachers; planning courses of study for cooperative part-time classes in retailing; planning courses and selecting instructional material for adult extension classes; arranging and directing local and State-wide conferences of coordinators and teachers of distributive occupational classes; and cooperating with State boards of education in formulating and revising State courses of study in business education.

OCCUPATIONAL INFORMATION AND GUIDANCE

The Occupational Information and Guidance Service acts as a clearing house for occupational and other information. Approximately 1,000 letters a month are received by the Service requesting information. This has required the preparation of numbers of brief mimeographed and multigraphed documents, through which correspondents are directed to local sources of information or to research material.

The Service also supplies a center of coordination for the various private and public agencies which have contributions to make on problems of occupational information and guidance.

First-hand assistance in the field of occupational information and guidance has been given in answer to many requests from the States, and assistance was given in planning and carrying on a course on guidance programs at the University of Florida, which reached workers interested in the guidance field in most of the Southern States. Numerous conferences of representatives of groups whose interests are allied to the field of guidance were held in the Office of Education during the year.

The Office of Education has cooperated with State boards for vocational education by making it possible for them to initiate State programs of supervision in occupational information and guidance, under the Smith-Hughes and George-Deen Acts. Such programs vary according to local conditions, but on the whole supply the same type of service to the State and its localities as the Office supplies to the Nation and to the several States.

Within 9 months, Georgia, North Carolina, Maine, Maryland, Michigan, and Pennsylvania have set up supervisory programs of occupational information and guidance. Plans for similar services are under way in numerous other States.

Included in the year's activities was the preparation of three bulletins, one on guidance programs for rural high schools, one on minimum essentials of the individual inventory in guidance, and one on organization and administration of an occupational information and guidance service.

CONSULTING SERVICES

During the year the consultant in vocational education has cooperated with a number of States and organizations in activities connected with training for fire fighters, including the preparation of a bulletin on vocational training for firemen; with the District of Columbia in an analysis of jobs in fire-alarm bureaus; with the Federal Bureau of Prisons in developing training programs for employed prison personnel; with the Home Owners' Loan Corporation in developing in-service training for supervisors; with the Navy Department in developing in-service training for junior naval architects and marine engineers; with the Federal Bureau of Investigation, in training personnel; with various Government bureaus in preparing mimeographed publications on training for various types of work in Government services; and with the State of Washington in preparing a bulletin on training for the aircraft industry.

The consultant in employee-employer relationships has given considerable time to the working out of employee-employer problems applying to the program of vocational education in trade and industry, particularly, and has devoted attention to the problem of State and local advisory committees in connection with the setting up and operating of vocational education programs. In these activities he has cooperated closely with representatives of the American Federation of Labor and other labor organizations.

Nineteen States were visited by the consultant in public service training during the year for the purpose of advising with State

boards for vocational education or with directors or supervisors of public-service training. Services of the consultant in these States ranged from counseling on the formulation of contemplated programs and reviewing existing programs on guidance in the development of a specific short course for policemen, to consultation on the organization of a training unit in the New York Civil Service Commission.

Inasmuch as the consultant on curriculums for vocational education came to the position late in the year, no record is available on activities in that field for the period covered by this report.

COOPERATION WITH OTHER AGENCIES

The Agricultural Education Service cooperated with the Farm Credit Administration in the preparation of a series of 20 circulars on cooperative marketing, designed especially for the use of teachers of vocational agriculture. A plan for cooperative studies on agricultural financing is being developed jointly with the Federal land bank in St. Louis, which will include loans made to groups of students by production credit associations.

The Agricultural Education Service also worked with the Seventh World's Poultry Congress in planning a program which included exhibits of farm-youth activities in the poultry industry, judging contests, demonstration and enterprise contests, and entertainment features; with the Soil Conservation Service of the Department of Agriculture in setting up schools in soil-conservation practice for vocational agriculture teachers, and in preparing a bulletin on conserving farm lands; with various other divisions of the Department of Agriculture, including the Extension Service, the Bureau of Plant Industry, Bureau of Agricultural Economics, Farm Security Administration, and Agricultural Adjustment Administration, in activities represented by these divisions; with the National Youth Administration in reaching rural youth with agricultural education; with the Rural Electrification Administration in the preparation of teaching material for vocational agriculture teachers; with the United States Employment Service in finding agricultural employment for trained agriculture workers; and with the American Country Life Association, the North American Country Life Association, the North American Wild Life Conference, and the National Livestock Loss Prevention Board.

The Trade and Industrial Education Service cooperated during the year with seven governmental agencies and 15 non-Federal agencies. This Service worked with: The Civil Aeronautics Au-

thority on training facilities for aviation mechanics; the Federal Committee on Apprenticeship, on the development of apprenticeship; the United States Civil Service Commission, on training programs for Federal employees; the War Department, on training in various branches of the Army; the Interdepartmental Committee on plans for national defense; the United States Labor Department, on problems relating to employment standards; and the Forest Service, on training of field workers.

The Trade and Industrial Education Service also cooperated in various ways with the following nongovernmental agencies: American Municipal Association; American Federation of Labor; Brotherhood of Painters, Decorators, and Paperhangers; Institute of Aeronautical Science; International Association of Fire Chiefs; International Association of Fire Fighters; Bricklayers, Masons, and Plasterers International Union; National Aeronautic Association; National Association of Master Plumbers; National Occupational Conference; United Association of Journeymen Plumbers and Steamfitters; International Association of Chiefs of Police; Structural Clay Products Institute; National League of Nursing Education; and National Association of State Boards of Examiners in Cosmetology.

The Home Economics Education Service cooperated with the United States Department of Agriculture in planning for a possible survey of housing in connection with the 1940 census, in collecting illustrations of cooperation in home-economics programs, and in preparing questions to be used in conferences on the topic "Farm Family Economic Outlook for 1938–39"; with the Farm Credit Administration in the preparation of a bulletin on family credit problems; with the National Education Association in preparing a joint publication on curricular problems concerned with education for home and family living; with the Southern Association of Secondary Schools and Colleges in a study of secondary schools; with the Land-Grant College Association; American Vocational Association; the Grange; the Farmers' Union; and the American Country Life Association.

The Business Education Service has worked in close touch with representatives of distributive businesses, officers of retail associations, representatives of business educators' organizations, and members of government agencies, in the preparation of publications and in the selection of appropriate training material for programs in distributive education; in formulating training programs; in planning conferences and convention programs; and in other ways.

Included in the list of the agencies with whom the Service cooperated during the year are: The American Retail Federation, National Grocers Institute, National Association of Retail Grocers, National Retail Furniture Dealers, National Association of Retail Lumber Dealers, American Trade Association Executives, American Pharmaceutical Association, National Retail Dry Goods Association, National Canners Association, National Paint, Varnish, and Lacquer Association, National Association of Better Business Bureaus, Eastern Commercial Teachers' Association, National Commercial Teachers' Federation, the National Council of Business Education, Southern Business Education Association, the Department of Business of the National Education Association, and the Central Commercial Teachers Association.

RESEARCH ACTIVITIES

Research already under way in various fields was continued during the year and the program was expanded to include a number of new fields.

Research in the field of agricultural education has included: A national evaluation of vocational agriculture to secure information that may be used as a basis for formulating definite Federal, State, and local standards for administration, supervision, and teacher training; a study of the responsibilities and relationships of State vocational education divisions and teacher-training institutions; a study of agricultural education of less than college grade; a continuing study of teacher training in 71 institutions preparing vocational agriculture teachers, now in its third year; a study of supervision in agricultural education in States of the central region; a study of programs for out-of-school young men on farms; and a study of education in Civilian Conservation Corps camps, in cooperation with other members of a committee appointed for this purpose.

Among the studies conducted in the field of trade and industrial education are the following: Placement records of students who have been trained in federally aided trade and industrial education courses; equipment available for training workers in several trades in vocational and nonvocational schools; enrollment by ages in day trade courses; facilities—shop space, pupil capacity, qualified teachers, and value of equipment—in schools offering day trade courses; an outline of training for plumber apprentices; duties of airline hostesses; aviation training in secondary schools, colleges, and universities;

185642—40——10

facilities for training aviation mechanics in federally aided courses; employment requirements in aviation; the formation, duties, and accomplishments of advisory committees; the duties of coordinators in part-time cooperative schools; and the work of coordination in day, part-time, and evening schools.

Research activities in the field of home-economics education have taken two forms: (1) A series of conferences with different research groups concerned with research in home-economics education, held by the agent in studies and research in 10 different States; and (2) the preparation of an illustrative series of socio-economic research abstracts bearing on home economics education. The home-economics research conferences were held with directors of graduate work and supervisors in home-economics education, and similar specialists, for the purpose of evaluating the needs for research and graduate work, determining how such programs may be set up, formulating plans for cooperation in research between State vocational divisions and teacher-training institutions, and selecting problems on which research is needed.

Studies in curriculum building in business education, including distributive education, in teacher training, and in State and local supervision were made by the Office of Education during the year. In addition, the Office has, through conference and correspondence, given assistance to individuals and groups engaged in various research studies and investigations in the field of business education, such as curriculum revision, teacher-training problems, follow-up studies, occupational surveys, job analyses, and methods of teaching business subjects.

Among other studies in vocational education on which work was done by the Office of Education during the year, also, were: One on training programs for prison officers; another on materials for the guidance of teachers of prison officer courses; and a third on analyses of prison employees' jobs.

NEW DEVELOPMENTS

Outstanding in the new developments in vocational education is the plan followed, particularly in the Southern States, of conducting joint programs in vocational agriculture and homemaking referred to in a previous section of this report.

As a result of the higher age of entrance into employment, preemployment training, formerly planned for pupils in the 14- to 16-year-old group with elementary school training only, is now planned

for pupils who have completed all or a part of the high-school course. The enactment of wage-hour and apprentice legislation has also necessitated adjustments in part-time cooperative courses in which students spend part time in classroom instruction and the rest in practical work on the job.

The widespread adoption of new processes, the use of new materials, and the introduction of new machines and new products have resulted in the setting up of new training courses. The need for broader basic training, with the possibility of adaptation to different fields of industry, has given emphasis to technical training.

New buildings are being erected to house trade-training programs, more attention is being given to qualifications of teachers, greater efforts are being made to relate trade training to the work which pupils will be called upon to do later, and definite attempts are being made to enlist the cooperation of workers and employers in training programs.

Outstanding of the new developments in the field of home-economics education is the experiment in education for family life, sponsored by the Office of Education and started in communities in four different States. Each of the four demonstration centers is developing its program in cooperation with a large advisory committee and a smaller planning committee composed of representatives of the school system and of various community agencies and groups, in accordance with local needs and conditions. The Office of Education will make available to other communities from time to time descriptions of procedures used in these centers.

Important among new developments in the field of business education is the recognition on the part of businessmen and business educators that the traditional business course does not meet the requirements for employment. There is an imperative need, it is believed, for occupational surveys, follow-up studies, and the revision of business curricula based upon the findings of such research.

Future Farmers of America

The Future Farmers of America, composed of 205,000 members in 6,000 centers in the 48 States, Hawaii, and Puerto Rico, has taken a definite place as an agency for the improvement of agricultural conditions and country life.

In the national program of work which the organization laid down for itself this year, such projects as establishing libraries in local F. F. A. chapters, individual and cooperative thrift plans, home

improvement, rural fire prevention, conservation of natural resources, livestock loss prevention, leadership training, farm business experience, radio broadcasting by local and State units, public speaking, and camp and recreational activities were emphasized.

Among achievements of the F. F. A. during the year may be listed the holding of an intensive leadership school for national officers, preparation of a 60-foot exhibit for the World's Poultry Congress in Cleveland, Ohio, and the acquiring of a 22-acre site near Mount Vernon, Va., on which a permanent F. F. A. camp will be developed.

At the Eleventh National F. F. A. Convention held in Kansas City, Mo., October 17 to 21, 1938, the total attendance was 6,000. The National F. F. A. monthly radio program of the organization, sponsored and supervised by the Office of Education, entered its eighth year of continuous broadcasting in 1939.

New Farmers of America

The New Farmers of America is the national organization for Negro boys enrolled in vocational agriculture classes. This organization, composed of 25,000 members in 692 local chapters, carries on activities similar to those of the Future Farmers of America.

APPROPRIATIONS, 1939 AND 1940

The total amount appropriated for administering the vocational education program carried on under the provisions of the Smith-Hughes and George-Deen Acts, for the year ended June 30, 1939, was $425,000.

In 1939 the amount appropriated under the George-Deen Act was $12,552,068, with the provision that the allotments to the States should be computed on the basis of the total amount authorized by the act.

The acts authorizing appropriations for allotment to the States for vocational education provide that unexpended balances remaining in the States at the close of a fiscal year shall be deducted from the allotments to those States for the ensuing year. Appropriations made in consideration of the unexpended balances provide that the allotments to the States shall be made on the basis of the total amounts authorized in the acts.

Appropriations for allotment to the States and Territories for vocational education are shown in table 1, and allotments to the States and Territories in table 2.

TABLE 1.—Appropriations for Allotment to the States and Territories for Vocational Education 1939, 1940

Act	Appropriation	
	Fiscal year ended June 30, 1939	Fiscal year ending June 30, 1940
VOCATIONAL EDUCATION		
Smith-Hughes Act:		
Total	[1] $7, 167, 000	[1] $7, 167, 000
Vocational agriculture	3, 027, 000	3, 027, 000
Vocational trade, industry, and home economics	3, 050, 000	3, 050, 000
Vocational teacher-training	1, 090, 000	1, 090, 000
George-Deen Act:		
Total	[2] 12, 552, 068	[2] 13, 750. 000
Vocational agriculture	3, 696, 530	3, 920, 000
Vocational trade and industry	3, 647, 183	3, 990, 000
Vocational home economics	3, 731, 531	3, 920, 000
Distributive occupations	624, 542	940, 000
Vocational teacher training	852, 282	980, 000
An act making appropriations for the Territory of Hawaii:		
Total	30, 000	30, 000
Vocational agriculture	10, 000	10, 000
Vocational trade, industry, and home economics	10, 000	10, 000
Vocational teacher training	10, 000	10, 000
An act making appropriations for the island of Puerto Rico:		
Total	105, 000	105, 000
Vocational agriculture	30, 000	30, 000
Vocational trade and industry	30, 000	30, 000
Vocational home economics	30, 000	30, 000
Vocational teacher-training	15, 000	15, 000
Total	19, 854, 068	21, 052, 000

[1] Permanent and continuing appropriation. Estimated expenditure $7,000,000.
[2] Allotments to States made on basis of $14,483,000 as authorized in the act.

TABLE 2.—Allotments of Federal Money to the States and Territories for Vocational Education for Each Fiscal Year, 1938 to 1941, Inclusive [1]

State or Territory	Smith-Hughes funds (appropriated)				George-Deen funds (authorized to be appropriated)					
	Total	Agriculture: For salaries of teachers, supervisors, and directors	Trade, industry, and home economics: For salaries of teachers	Teacher training: For salaries of teachers and maintenance of teacher training	Total	For agricultural education	For trade and industrial education	For home economics education	For distributive occupations	For teacher training
Total	[2] $7,157,977.62	[2] $3,018,853.83	[2] $3,049,265.27	[2] $1,089,858.52	[3] $14,483,000.00	$4,067,200.00	$4,058,975.00	$4,048,825.00	$1,254,000.00	$1,054,000.00
Alabama	160,268.82	106,018.23	32,611.15	21,639.44	401,144.05	165,947.24	55,072.91	135,856.98	24,429.46	19,837.46
Arizona	35,926.19	15,926.19	10,000.00	10,000.00	80,408.60	20,000.00	20,000.00	20,408.60	10,000.00	10,000.00
Arkansas	113,969.95	82,028.87	16,776.23	15,164.85	305,740.84	138,607.14	30,995.77	105,115.82	17,120.09	13,902.02
California	313,266.41	84,540.06	182,301.17	46,425.18	493,375.58	76,828.34	213,243.37	108,333.79	52,410.87	42,559.21
Colorado	61,536.56	28,757.35	22,779.21	10,000.00	123,622.04	35,018.40	31,752.56	36,851.08	10,000.00	10,000.00
Connecticut	89,214.52	26,484.45	49,589.77	13,140.30	144,923.17	20,000.00	64,104.14	33,938.47	14,834.50	12,046.06
Delaware	30,000.00	10,000.00	10,000.00	10,000.00	80,000.00	20,000.00	20,000.00	20,000.00	10,000.00	10,000.00
Florida	84,785.54	39,488.86	33,290.52	12,006.16	159,855.59	34,542.21	50,149.93	50,602.96	13,554.13	11,006.36
Georgia	175,228.68	112,207.67	39,236.98	23,784.03	430,909.73	175,634.20	62,833.09	143,788.43	26,850.55	21,803.46
Idaho	37,587.72	17,587.72	10,000.00	10,000.00	85,860.29	23,322.53	20,000.00	22,537.76	10,000.00	10,000.00
Illinois	420,534.11	111,199.48	246,935.68	62,398.95	673,513.00	123,722.64	279,646.92	142,496.48	70,444.17	57,202.79
Indiana	185,584.34	80,412.77	78,689.02	26,482.55	360,165.48	100,662.97	102,283.38	103,044.87	29,897.00	24,277.26
Iowa	146,260.73	83,146.09	42,908.77	20,205.87	331,923.17	121,080.05	62,961.33	106,547.48	22,811.05	18,523.26
Kansas	111,527.42	64,167.24	31,978.49	15,381.69	250,754.04	87,561.92	49,499.38	82,227.05	17,364.88	14,100.81
Kentucky	157,592.30	101,201.53	35,010.22	21,380.55	379,737.33	145,672.06	60,643.33	129,684.62	24,137.19	19,600.13
Louisiana	124,390.87	70,683.15	36,522.14	17,185.58	282,172.30	102,842.00	53,597.61	90,576.86	19,401.35	15,754.48
Maine	50,615.30	26,528.15	14,087.15	10,000.00	101,582.84	21,171.85	26,416.52	33,994.47	10,000.00	10,000.00
Maryland	92,659.43	36,602.80	42,714.98	13,341.65	162,385.90	29,400.76	58,788.05	46,904.63	15,061.81	12,230.65
Massachusetts	225,939.31	23,310.27	167,878.22	34,750.82	294,968.15	20,000.00	174,008.92	29,870.92	39,231.31	31,857.00
Michigan	270,137.03	85,855.27	144,684.11	39,597.65	459,102.70	96,872.60	171,207.64	110,019.17	44,703.06	36,300.23
Minnesota	148,887.03	72,816.70	55,103.85	20,966.48	317,424.54	110,858.20	70,365.18	93,310.90	23,669.73	19,220.53
Mississippi	124,424.02	93,141.81	14,847.09	16,435.12	349,001.51	168,741.26	27,283.12	119,356.49	18,554.13	15,066.51
Missouri	209,813.81	98,675.62	81,459.38	29,678.81	431,203.86	137,990.54	106,052.83	126,447.79	33,505.35	27,207.35
Montana	39,875.61	19,875.61	10,000.00	10,000.00	90,801.51	25,331.93	20,000.00	25,469.58	10,000.00	10,000.00
Nebraska	82,280.54	49,713.06	21,299.32	11,268.16	192,684.27	72,518.94	33,409.76	63,704.76	12,720.99	10,329.82
Nevada	30,000.00	10,000.00	10,000.00	10,000.00	80,000.00	20,000.00	20,000.00	20,000.00	10,000.00	10,000.00
New Hampshire	32,679.49	10,714.23	11,965.26	10,000.00	80,000.00	20,000.00	20,000.00	20,000.00	10,000.00	10,000.00
New Jersey	218,495.63	39,135.29	146,312.71	33,047.63	302,649.11	20,000.00	164,895.07	50,149.88	37,308.52	30,295.64
New Mexico	37,642.12	17,642.12	10,000.00	10,000.00	82,607.48	20,000.00	20,000.00	22,607.48	10,000.00	10,000.00
New York	679,136.35	115,167.53	461,031.10	102,937.72	947,775.59	89,138.46	500,480.36	147,581.33	116,209.68	94,365.76
North Carolina	192,981.96	131,572.98	35,484.35	25,924.63	485,954.01	198,094.85	66,222.13	168,604.08	29,267.15	23,765.80
North Dakota	51,635.26	31,635.26	10,000.00	10,000.00	129,730.19	49,191.21	20,000.00	40,538.98	10,000.00	10,000.00
Ohio	371,096.69	119,248.45	197,495.50	54,352.74	627,015.40	125,453.59	237,563.83	152,810.82	61,360.55	49,826.61
Oklahoma	143,352.81	87,756.55	36,002.87	19,593.39	337,188.90	126,795.87	57,856.10	112,455.55	22,119.60	17,961.78
Oregon	57,324.88	25,866.11	21,458.77	10,000.00	111,628.76	27,693.47	30,789.18	33,146.11	10,000.00	10,000.00

Pennsylvania	537,709.58	172,677.04	286,273.09	78,759.45	858,491.92	106,072.11	370,028.00	221,276.85	88,914.06	72,200.90
Rhode Island	47,842.03	10,000.00	27,842.03	10,000.00	88,296.97	20,000.00	28,296.97	20,000.00	10,000.00	10,000.00
South Carolina	106,714.19	76,236.31	16,259.29	14,218.59	274,928.97	113,473.43	34,676.21	97,692.95	16,051.82	13,034.56
South Dakota	51,323.28	31,323.28	10,000.00	10,000.00	128,452.67	48,313.48	20,000.00	40,139.19	10,000.00	10,000.00
Tennessee	156,555.22	95,875.76	39,282.82	21,396.64	376,206.74	150,491.95	59,084.68	122,859.89	24,155.35	19,614.87
Texas	343,814.26	191,491.24	104,691.96	47,631.06	780,504.42	291,248.04	146,433.22	245,386.28	53,772.22	43,664.66
Utah	35,132.76	13,466.11	11,666.65	10,000.00	80,000.00	20,000.00	20,000.00	20,000.00	10,000.00	10,000.00
Vermont	33,424.97	13,424.97	10,000.00	10,000.00	80,000.00	20,000.00	20,000.00	20,000.00	10,000.00	10,000.00
Virginia	145,433.63	91,209.99	34,419.18	19,804.46	337,148.87	117,718.58	62,036.16	116,880.97	22,357.89	18,155.27
Washington	89,381.85	37,840.26	38,757.07	12,784.52	165,452.09	37,731.20	53,077.76	48,490.36	14,432.86	11,719.91
West Virginia	104,667.06	68,990.85	21,535.80	14,140.41	226,923.60	55,607.33	53,981.55	88,408.27	15,963.56	12,962.89
Wisconsin	169,327.36	77,210.55	68,083.37	24,033.44	343,977.87	109,088.25	86,784.01	98,941.39	27,132.12	22,032.10
Wyoming	30,000.00	10,000.00	10,000.00	10,000.00	80,000.00	20,000.00	20,000.00	20,000.00	10,000.00	10,000.00
Alaska					80,000.00	20,000.00	20,000.00	20,000.00	10,000.00	10,000.00
Hawaii	30,000.00	10,000.00	10,000.00	10,000.00	80,020.99	20,020.99	20,000.00	20,000.00	10,000.00	10,000.00
Puerto Rico	105,000.00	30,000.00	60,000.00	15,000.00	254,271.99	126,739.41	21,941.06	79,764.66	14,253.00	11,573.86
District of Columbia					80,512.97	20,000.00	20,512.97	20,000.00	10,000.00	10,000.00

[1] Allotments based on United States census returns of population in 1930. For the years 1942 to 1951, inclusive, allotments will be based upon returns of population in 1940.
[2] The allotments to Hawaii and Puerto Rico are not included in the totals under the Smith-Hughes Act.
[3] The sum of $13,750,000 was appropriated for the fiscal year 1940, with the proviso that the allotments to the States and Territories be made on the basis of $14,483,000, the full amount authorized.

VOCATIONAL REHABILITATION

During the fiscal year plans were consummated for the establishment of a program of vocational rehabilitation in the State of Delaware, whose legislature at its 1939 session accepted the provisions of the Federal Rehabilitation Act.

Thus the 48 States, the Territory of Hawaii, the island of Puerto Rico, and the District of Columbia have enacted rehabilitation legislation. All of them with the exception of Kansas now have a program of rehabilitation in operation. Plans were initiated during the year whereby funds will be made available from public sources other than the State legislature to initiate a program in Kansas.

Under Federal acts the Congress is authorized to appropriate $1,938,000 annually for the maintenance of rehabilitation programs in the States. This amount was made available to the States during the fiscal year 1939. The allotments of Federal money to the States and Territories for vocational rehabilitation for the fiscal years ending June 30, 1939 and 1940, are shown in table 1.

The Federal act for promotion of service to the blind does not authorize a specific appropriation, nor does it provide for Federal aid to the States in carrying out the program outlined in the act. However, the Congress made available to the Office about $23,000 for administration of the act, and the maintenance of the program in the States is financed by State appropriations and contributions from agencies interested in the rehabilitation of the blind.

The number of disabled persons rehabilitated—that is, restored physically where possible, trained where necessary, and placed in remunerative employment—during the fiscal year ended June 30, 1938, was 9,725. No figures on the number of cases rehabilitated during the fiscal year ended June 30, 1939, are yet available. However, information from the States and Territories indicates that the number may even exceed the number rehabilitated during the preceding year.

IMPROVEMENT AND EXPANSION

There are many indications of a growing interest on the part of State rehabilitation officials in the improvement and expansion of their programs for rehabilitation of special groups, such as the deaf and hard of hearing and those disabled through tuberculosis and heart diseases. In several States cooperative programs for providing services to these groups have been established.

During the year there was a material growth in service for the blind in the 39 States cooperating in this movement, in Hawaii, and

in the District of Columbia. Two hundred and fifty blind persons were established in vending stands in Federal buildings, and about 500 in other buildings.

DIFFERENT SERVICES

The services of the Rehabilitation Division fall in two categories: First, specific services to State officials; and, second, general research activities. Included in the specific services are assistance in the training of new personnel, organizing working relations with welfare agencies other than rehabilitation agencies, improving statistical and financial record systems, improving case service records, reorganizing State programs, and in extending State programs in local communities.

An important phase of the research activities of the Rehabilitation Division staff was the making of surveys of State rehabilitation programs. Reports on surveys include specific recommendations for the improvement of the State programs. The findings of the surveys are in each instance discussed with State rehabilitation officials, and assistance is given them in effecting the recommendations contained in the survey report.

Members of the research service of the Rehabilitation Division were engaged during the year in the preparation of a series of monographs dealing with approved techniques in rehabilitation case work; in a study of the feasibility of rehabilitation of persons handicapped through tuberculosis; in a study of the post-rehabilitation experiences of cases rehabilitated in the fiscal year ended June 30, 1936, to determine their present employment status and the substantiality of the rehabilitation service rendered them; and in a study of the success factors in training disabled persons in commercial and industrial establishments.

CORRELATION WITH OTHER SERVICES

The rehabilitation services in the States cooperate with State agencies engaged in the administration of accident compensation, public employment service, and service for crippled children. During the year the Rehabilitation Division assisted the States in the formulation of agreements of cooperation with these agencies and in the establishment of effective working relations.

The Social Security and Fair Labor Standards Acts materially affect the conditions under which disabled persons are employed. Under the Social Security Act, moreover, the physically handicapped

are entitled to benefits. It provides pensions for the blind, aid to dependent children, and health service. In order that a State rehabilitation service may best serve the physically disabled, it must work in close cooperation with unemployment compensation, public assistance, health, and welfare service. During the year the staff aided the States in initiating plans for correlating their services with the agencies here enumerated.

The extension of benefits under the social security program has resulted in the reference of larger numbers of disabled persons to State rehabilitation departments. One of the effects of this larger referral of cases is the recognition of the need of many handicapped persons for special types of service leading to their vocational adjustment. If these needs are to be met by the State rehabilitation services, some liberalization of policy will be necessary. Rehabilitation is now making a study of these needs in order to determine what action should be taken to assist the States in meeting these new problems.

The tables which follow show the amount of Federal money now available to the States and Territories for rehabilitation purposes.

APPROPRIATIONS, 1939 AND 1940

Allotments of Federal money to the States and Territories for vocational rehabilitation for the fiscal years ending June 30, 1939, and 1940, as shown by table 2, amounted to $1,938,000. This does not include, however, a special allotment of $5,000 to Hawaii and allotments of $25,000 and $15,000, respectively, to the District of Columbia and Puerto Rico.

TABLE 1.—Appropriations for Allotment to the States and Territories for Vocational Rehabilitation 1939, 1940

Act	Appropriation	
	Fiscal year ended June 30, 1939	Fiscal year ending June 30, 1940
Vocational Rehabilitation Act:		
Total	[1] $1,800,000	[1] $1,800,000
Hawaii	5,000	5,000
Puerto Rico	15,000	15,000
District of Columbia	25,000	25,000
Total, vocational rehabilitation	1,845,000	1,845,000

[1] Allotments to States made on basis of $1,938,000, as authorized in the act.

TABLE 2.—Allotments of Federal Money to the States and Territories for Vocational Rehabilitation, Fiscal Years Ending June 30, 1939, and 1940

State or Territory	Amount	State or Territory	Amount
Total	[1] $1,938,000.00	Nevada	$10,000.00
		New Hampshire	10,000.00
Alabama	40,912.77	New Jersey	62,481.73
Arizona	10,000.00	New Mexico	10,000.00
Arkansas	28,671.54	New York	194,619.94
California	87,774.11	North Carolina	49,014.59
Colorado	16,014.02	North Dakota	10,526.32
Connecticut	24,843.80	Ohio	102,762.39
Delaware	10,000.00	Oklahoma	37,044.38
Florida	22,699.53	Oregon	14,746.17
Georgia	44,967.45	Pennsylvania	148,907.13
Idaho	10,000.00	Rhode Island	10,629.16
Illinois	117,975.03	South Carolina	26,882.47
Indiana	50,069.43	South Dakota	10,711.91
Iowa	38,202.37	Tennessee	40,453.71
Kansas	29,081.51	Texas	90,054.00
Kentucky	40,423.30	Utah	10,000.00
Louisiana	32,492.04	Vermont	10,000.00
Maine	12,328.69	Virginia	37,443.44
Maryland	25,224.49	Washington	24,171.15
Massachusetts	65,701.88	West Virginia	26,734.67
Michigan	74,865.59	Wisconsin	45,139.00
Minnesota	39,640.43	Wyoming	10,000.00
Mississippi	31,073.18	District of Columbia	25,000.00
Missouri	56,112.45	Hawaii	10,000.00
Montana	10,000.00	Puerto Rico	15,000.00
Nebraska	21,304.23		

[1] A special allotment of $5,000 to Hawaii and the allotments to the District of Columbia and the island of Puerto Rico are not included in the total.

EDUCATIONAL ACTIVITIES IN C. C. C. CAMPS

(Junior Companies Only)

In his message to Congress recommending the transfer of the Civilian Conservation Corps to the Federal Security Agency, the President once again stressed the social and educational aspects of the organization. He said in part, "The Civilian Conservation Corps, now an independent establishment, is placed under the Federal Security Agency, because of the fact that its major purpose is to promote the welfare and further the training of the individuals who make up the corps, important as may be the construction work which they have carried on so successfully. * * * This transfer would not interfere with the plan of work heretofore carried on, but it would enable the Civilian Conservation Corps to coordinate its policies, as well as its operations, with those other agencies of the Government concerned with the educational and health activities and with human security."

This statement again indicates the unique character of the C.C.C. as an educational agency. Every phase of camp life contributes to the employability and civic usefulness of the young men enrolled in the corps. The routine and discipline of camp life, the hours of

work in the open air, the good food, regular hours, and association with the supervisory personnel assist immeasurably in the development of the enrollees.

Aside from these intangible values, however, a great variety of organized educational activities are carried on in the camps. These include counseling and guidance, academic education, vocational and job training, informal educational activities, and other courses such as health, first aid, safety, lifesaving, and professional training for instructors and enrollee leaders.

A few of the outstanding achievements of the year are as follows:

The average strength of the corps was 275,572 enrollees, and the average regular attendance in organized classes and activities was 249,768 enrollees, or 91.5 percent of the average strength.

The reports indicate that the average enrollee spent slightly more than 4 hours each week in his educational activities.

Thirty-seven percent of all enrollees participated in academic classes; 47 percent in vocational classes; 65 percent in job-training activities; 16 percent in informal activities; 13 percent in professional training; and 59 percent in such classes as first aid, safety, health, and life saving.

A total of 8,445 enrollees who entered the corps illiterate were taught to read and write during the year.

Five thousand one hundred and forty-six enrollees completed the elementary grades and received eighth-grade diplomas; 1,048 received high-school diplomas; and 96 received college degrees.

One hundred and three thousand nine hundred and thirty-nine enrollees were awarded 174,277 C.C.C. unit certificates; 15,150 were awarded 17,096 C.C.C. educational certificates; and 23,836 were awarded 26,691 C.C.C. proficiency certificates.

One million five hundred and thirty thousand six hundred and seventy-three guidance interviews were held by C.C.C. officials during the year.

There was an average of 24,476 instructors, or 16 per camp, each month.

An average of 6,203 educational films were shown each month with a monthly attendance of 503,566; 7,320 lectures were given during an average month, with a monthly attendance of 960,379.

Thirty-one thousand and eight enrollees were discharged to accept employment during the year. Many of these men were assisted in qualifying for and finding their jobs through their participation in the educational program.

The Enrollees

The age of junior enrollees ranges from 17 to 23, the average being about 20 years. Forty-four percent of the men had never been employed or were only occasionally employed prior to their enrollment in the corps. An additional 23 percent had been unemployed for a period ranging from 7 months to more than 3 years. Thirty-three percent had been unemployed for 6 months or less. The following table gives these figures in detail:

TABLE 1.—Length of Unemployment of Junior C. C. C. Enrollees (Data as of May 31, 1939)

Length of unemployment	Number of enrollees	Percentage
Never employed	78,435	30.6
Intermittently employed	34,722	13.6
Less than 2 months	33,854	13.2
2 to 6 months	49,753	19.4
7 to 12 months	32,125	12.5
13 to 24 months	16,530	6.5
25 to 36 months	6,118	2.4
More than 3 years	4,554	1.8
Total	256,091	100.0

Thirty-one percent of the junior enrollees come from farms, 23 percent from rural nonfarm areas, and 46 percent from urban sections. In educational level the enrollees range from illiterates to college graduates. The average member dropped out of school in the eighth grade.

TABLE 2.—Educational Level of Enrollees Prior to Joining C. C. C. (Data as of May 31, 1939)

Completed school grade	Number enrollees	Percentage	Completed school grade	Number enrollees	Percentage
None	933	.4	Tenth grade	31,777	12.4
First grade	1,316	.5	Eleventh grade	19,915	7.8
Second grade	2,409	.9	Twelfth grade	32,012	12.5
Third grade	4,721	1.8	First year college	2,225	.9
Fourth grade	8,020	3.1	Second year college	704	.3
Fifth grade	11,754	4.6	Third year college	137	.1
Sixth grade	19,026	7.4	Fourth year college	67	
Seventh grade	32,772	12.8	Over 4 years college	9	
Eighth grade	53,857	21.0			
Ninth grade	34,437	13.5	Total	256,091	100.0

The Guidance Program

From the beginning of the C.C.C. educational program, guidance has been considered the major educational activity. The typical young man who enters the C.C.C. is barely 20 years of age. He had left school when he was in the eighth grade. He has had little

or no work experience and may be bewildered and disheartened by his futile efforts to secure a job. He has had little if any vocational training and has received practically no vocational guidance. Because of his unfortunate experiences, he may be apathetic and indifferent or perhaps embittered in his attitudes. Many of the men leaving their homes for the first time are homesick and skeptical of the opportunities awaiting them.

When he enters camp he is subjected to a score of new influences. Work, play, study, the routine and discipline of camp life, association with his fellows, and contacts with the supervisory personnel—all contribute to his development. He must be guided, however, if he is to secure the maximum benefits from these experiences.

The guidance procedure begins with the selection and enrollment of the enrollee. Only those enrollees are selected who are in need of employment and who demonstrate their physical and mental ability to profit from the experience in the camp.

In general, the guidance program includes an orientation program to adjust the new men to camp life; a systematic counseling program carried on by the educational adviser and other qualified members of the supervisory personnel; the assignment of the men to work and educational activities in accordance with their needs, interests, and abilities; a periodic evaluation of their progress; and an attempt to place the men in jobs and follow them up after their discharge from the corps to assist in their readjustment.

General Education

During the past year 91.3 percent of the enrollees regularly attended educational classes during their leisure time. The average enrollee spent about 4 hours each week in this way.

Two of the major objectives of the C.C.C. educational program are to eliminate illiteracy and to raise the educational level of enrollees deficient in school subjects. To accomplish this, elementary, high school, and college courses are offered to enrollees in the camps. During an average month, 102,138 enrollees, or 37.4 percent of the men, regularly attended academic courses.

There were 7,415 illiterates in the camps during an average month and 7,224 (97.4 percent) attended literacy courses. 8,445 illiterate enrollees were taught to read and write during the year. 92,068 enrollees were on the elementary level and of these 48,876 (53.1 percent) took elementary courses. 5,146 were awarded eighth-grade certificates as a result of their work. 138,347 enrollees were on the

high-school level and 47,229 (34.1 percent) of these men attended high-school courses. 1,048 were awarded high-school diplomas. 35,743 were on the college level, and 2,268 (6.3 percent) attended college classes during the year. 96 received college degrees. In addition, a report for the period from July 1 to October 15, 1938, indicated that during this 3½ months' period, 763 scholarships were established for enrollees by 189 different colleges and other institutions.

Elementary Curriculum

A study was made of the academic curriculum of the C. C. C. during the year. It was discovered that, although 86 different-named elementary subjects were offered in the camps, 97 percent of the enrollees attended classes in 9 different subjects, including literacy training, grammar, penmanship, reading, spelling, arithmetic, civics, geography, and history.

Vocational Training

Vocational training is considered one of the major objectives of the program, and 49.5 percent of the educational activities are classified as having vocational objectives. It is necessary to train the men for the jobs which they are called upon to perform in the camps, and further, to train them for jobs which they may secure upon their discharge from the C. C. C. Job training is an important part of the educational and training program.

A study made of the vocational curriculum revealed that 249 different vocational subjects were being taught in the camps. However, 71 percent of the men were enrolled in 21 major courses, which included bookkeeping, shorthand, typing, office practice, business management, electricity, house wiring, radio service, carpentry, masonry, cabinetmaking, general agriculture, soil conservation, forestry, auto mechanics, blacksmithing, welding, retail merchandising, surveying, and drafting. Instructional outlines in these and a few additional subjects are now being prepared for use in the camps.

The extent of participation of enrollees in job training and vocational courses is shown in the following tabulation:

Enrollee Participation in Job Training and Vocational Courses

Average number enrollees attending job training courses	178,918
Average number enrollees attending vocational courses	127,383

A feature of the C. C. C. educational program is the emphasis placed upon informal types of education, such as arts and crafts,

dramatics, and music. The reports indicate that 16 percent of the men engaged in these activities during the past year.

There is a variety of other educational activities carried on. All camps provide instruction in health, first aid, and safety. Officers, foremen, enrollees, and other instructors in most camps attend foremanship classes, leader training, and teacher training groups. Eighty-seven thousand eight hundred and forty-two lectures were delivered in the camps during the year, and 74,435 educational films were shown. The average monthly circulation of books from the camp library amounted to 192,324, with 39.5 percent of the enrollees borrowing the books. An average of 6,665 enrollees attended schools and colleges in the vicinity of the camps, and 17,695 took correspondence courses. An average of 865 companies published camp newspapers each month.

Teaching Staff

The teaching staff of the C. C. C. educational program is drawn largely from the personnel in each camp. For example, during an average month there were 24,476 persons acting as instructors in the camps. Of this number, 1,446 were camp educational advisers; 3,029 were Army officers; 9,953 were members of the technical services; 6,410 were enrollees; 1,745 were W. P. A. instructors; 66 were N. Y. A. student teachers; 1,098 were teachers from the local school system; and 726 were volunteer instructors from nearby communities.

Cooperating Agencies

Much of the success of the C. C. C. educational program has been due to the cooperation of four major departments of the Federal Government—Labor, War, Interior, and Agriculture. In addition, State, local, and private educational organizations and other agencies have assisted greatly in the development of the program. The Works Progress Administration made available an average of 1,745 instructors per month and the National Youth Administration an additional 66. State and local educational institutions provided an average of 1,098 instructors each month. One hundred and eighty-nine colleges and other institutions offered scholarships to enrollees and more than 60 provided correspondence courses at reduced rates for the enrollees. Hundreds of other schools and colleges have placed their facilities at the service of enrollees during the school year. Likewise, other nongovernment agencies, such as the Chamber of Commerce, Junior Chamber of Commerce, Y. M. C. A., Kiwanis, and Rotarians, have aided in training the men and placing them in employment.

OFFICE OF EDUCATION PUBLICATIONS—ALL DIVISIONS

(Completed for Printing During the Fiscal Year 1939)

Bulletins

1937 No.

2. Biennial survey of education, 1934–36.
   Vol. I, chapter I. Elementary education, 1930–36.
   Vol. II, chapter I. Statistical summary of education, 1935–36.
29. Are the one-teacher schools passing?

1938 No.

13. Statistics of the education of Negroes.
15. Education in Germany.
16. Accredited higher institutions, 1938.
17. Hospital schools in the United States.

1939 No.

1. Educational directory, 1939.
   Part
   I. State and county school officers.
   II. City school officers.
   III. Colleges and universities.
   IV. Educational associations and directories.
2. Accredited secondary schools in the United States.
3. Higher educational institutions in the scheme of State government.
4. The school auditorium as a theater.
5. Bibliography of research studies in education 1937–38.
6. Education in Yugoslavia.
7. Individual guidance in a C. C. C. camp.
8. Public education in the Panama Canal Zone.
9. Residential schools for handicapped children.
10. The graduate school in American democracy.
11. 500 books for children.
12. The warp and woof of health instruction.

1940 No.

15. Clinical organization for child guidance within the schools.
16. A review of educational legislation, 1937 and 1938.

Miscellany

3. Education in the United States of America.
4. La Educación en los Estados Unidos de America.
   A Educação nos Estadoas Unidos da America.
   School Life index, volume XXIII.
   Handbook and directory of the Office of Education, 1939.

Pamphlets

86. Per pupil costs in city schools, 1937–38.
87. Parent education programs in city school systems.
88. One dollar or less—Inexpensive books for school libraries.

Leaflets

14. Pharmacy. Revised.
29. Textbook expenditures in large city school systems, 1932, 1934, and 1936.
31. Government publications of use to teachers of geography and science.

185642—40——11

47. Know your board of education.
48. Know your superintendent.
49. Know your school principal.
50. Know your teacher.
51. Know your school child.
52. Know your modern elementary school.
53. Know how your schools are financed.
54. Federal funds for education, 1937–38.

Bibliographies

23. Language handicaps of non-English-speaking children. Revised.
29. The curriculum and social change. Revised.
35. Visual aids in education: Research studies.
38. The elementary-school principal.
47. Fiction portraying home life and family relationships.
58. Music instruction.
59. Art instruction.
69. Mental hygiene at home and at school.

Vocational Education Bulletins

13. Agricultural education—Organization and administration. Revised.
198. Conference topics for the retail grocery business.
199. Vocational training for firemen.
200. Related instruction for plumber apprentices.
201. Conserving farm lands.
202. Minimum essentials of the individual inventory in guidance.
203. Guidance programs for rural high schools.
204. Occupational information and guidance—Organization and administration.
205. Cooperative part-time retail training programs.
206. Credit problems of families.

Monographs

19. Agricultural education programs.
20. Discovering occupational opportunities for young men in farming.

Leaflets

1. Teaching the control of black stem rust of small grains in vocational agriculture classes. Revised.
3. Teaching the control of loose smuts of wheat and barley in vocational agriculture classes. Revised.
4. Teaching the grading of feeder and stocker steers in vocational agriculture classes. Revised.
6. Instruction in poultry in secondary schools.

CIVILIAN CONSERVATION CORPS

Language Usage Series

Camp life reader and workbook No. 1.
Camp life reader and workbook No. 2.

GEOLOGICAL SURVEY

W. C. Mendenhall, *Director*

ESTABLISHED in 1879, the Geological Survey has now rounded out threescore years of service. Its objective has always been the practical application of science to the public welfare. It has endeavored to maintain high standards of professional work, to make steady contributions to the advance of knowledge within its assigned fields, and to apply this knowledge in the mineral industry, in cartography, and in hydrography. Since its establishment it has published many thousands of reports and maps, thus making available for general use the results of its work in geology, topography, mineral resources, hydrology, and related fields.

The year just ended has been marked by gratifying achievement. For several preceding years the direct appropriations for the Geological Survey, in themselves inadequate, had happily been sufficiently augmented by allotments from Public Works funds to permit the staff to be held together and the work kept reasonably current. But dependence upon uncertain emergency funds does not form the soundest basis for the smooth functioning of a scientific and engineering staff that is difficult to create and difficult to replace. An unstable financial foundation does not encourage the undertaking of the more valuable longer-term major research and technical projects. Thus it was gratifying that for the fiscal year 1938–39 the direct appropriation was restored to its earlier level, although its distribution among the several activities of the bureau was somewhat changed. With this encouragement, which it is hoped foreshadows more adequate and less fluctuating future support, projects could be planned and undertaken with more confidence and could be pursued in a more orderly and effective way.

Geologic investigations, as heretofore, were necessarily divided between fundamental and applied geology. The Geological Survey has always recognized that sound understanding of the principles of any science must precede an attempt to apply those principles in everyday affairs. Hence a part of its energies were devoted to research into the geologic and related chemical and physical processes that have molded the earth and formed and localized the deposits of valuable minerals. Concurrently, a great part of its energies were

given to the search for and the study and mapping of deposits of the metals, nonmetals, and mineral fuels that are essential to the life and well-being of every citizen. This Nation is indeed richly endowed with many of these resources; but, even for those existing in ample store, full knowledge of their location, nature, quantity, quality, and availability is needed for their conservation, wise use, and orderly development. Even more important is the effort to discover new sources of those minerals which are vital to the national economy and the national defense and which thus far have been found in this country only in insufficient quality or quantity. For the minerals in this group the Nation has been dependent almost wholly on foreign supplies. Moderate progress in the search for these strategic and deficient minerals was made during the past year by use of a small allotment of Public Works funds. Hope for greater progress in this task was raised by the enactment, late in the year, of legislation authorizing the appropriation of $150,000 annually for four years to the Geological Survey for this purpose, beginning with the fiscal year 1939–40.

Among the more unusual geologic investigations of the year was a study, by several Survey geologists in collaboration with scientists of other institutions, of the deep-sea cores taken by Dr. C. S. Piggot, of the Geophysical Laboratory of the Carnegie Institution, between Newfoundland and Ireland. In cooperation with the Public Health Service, studies were made of geologic factors that might have a bearing on the prevalence of tuberculosis in certain areas. A new mineral, shortite, a calcium-sodium carbonate, was discovered in a core from an oil and gas well in Wyoming, and its nature and occurrence are being further studied. A two-volume lexicon of geologic names, long in preparation, was published during the year, and is of great value as a working tool for all geologists in Federal and State agencies, in the teaching profession, and in the oil and mining industries.

Growth of population and of industrial development have brought about in many parts of the country an acute need for more adequate supplies of water. Prolonged droughts have emphasized that need. Disastrous floods have brought increased demands for protection measures. Each year the Nation has become more water conscious, and each year there has been an increased and more vigorous attack upon the problems of conserving already available supplies, of obtaining additional supplies for domestic, municipal, and industrial use and irrigation, and of preventing or controlling floods and developing power. All planning for these projects is dependent upon adequate information on the flow of streams and the amounts of underground water—information that is obtained by the water-resources investiga-

tions of the Geological Survey. Hence there has been a steady growth in the direct appropriations for these investigations, the funds transferred from other Federal agencies for work required by them, and the contributions from States and municipalities for cooperative work. Last year the funds thus made available and the results accomplished by their use were greater than ever before, and further increases are expected.

Topographic surveys, Federal and cooperative, during the past year covered more than 27,000 square miles in 45 States and in Puerto Rico. A feature of the work was the increased use of stereophotogrammetric equipment, by which mapping is accomplished through the use of aerial photographs—a method in which the Geological Survey was a pioneer and which is being constantly studied and improved.

Progress in the topographic mapping of our country, however, is far too slow. The need for adequate maps in national defense and in all forms of national development is so acute that a greatly expanded program, adequately financed, should be undertaken as soon as possible and pushed to early completion. Such a program, endorsed by the Secretaries of War, Interior, and Commerce, was briefly outlined in Senate Document No. 54, Seventy-sixth Congress.

Investigations of the mineral resources of Alaska were continued on a modest scale during the year. The investigations and mapping projects of the Geological Survey during several decades have aided much in the development of the mineral industry of the Territory, whose mineral production now amounts to $25,000,000 or $30,000,000 annually and has reached a total of more than three-quarters of a billion dollars.

In the administration of the land-classification and mineral-leasing activities of the Geological Survey more than 9,500 reports were made regarding the mineral resources, water power, or storage possibilities of public land, and the Government's ownership of great reserves of coal, oil and gas, potash, phosphate, and other minerals was safeguarded. Technical supervision was given to more than 8,500 properties containing oil and gas, more than 600 containing coal, and 100 containing other minerals. On Indian land more than 4,900 oil and gas leases were supervised, in addition to more than 200 properties containing coal, asbestos, and lead and zinc. Mineral production during the year from public and Indian lands and naval petroleum reserves under supervision of the Geological Survey had an estimated value of $83,000,000, and revenue received by the Government as a result of this production amounted to about $9,500,000.

GENERAL SUMMARY OF THE YEAR'S ACTIVITIES

Geologic work.—Seventy-three field parties worked during the year in 30 States. Of these, 21 parties financed with Public Works Administration funds investigated strategic minerals and made urgently needed classification of public and Indian lands. The strategic-minerals program included examination of quicksilver, chromite, and tin deposits in California; tungsten, quicksilver, nickel, and tin in Nevada; manganese and tin in New Mexico; manganese and chromite in Oregon; manganese and tin in Washington; chromite in Wyoming; and tin in Virginia, North Carolina, and South Carolina. Most of these projects were completed during the year.

Work in cooperation with the States was continued in the metal-mining districts of Colorado, Idaho, and New Mexico and in the oil and gas region of Kansas. In Massachusetts proposed State highway routes were investigated, and geologic factors were considered in planning for flood control. Two cooperative projects were conducted in Tennessee. The study of source beds of petroleum was continued in cooperation with the Petroleum Institute, and physiographic and geologic studies of general educational and direct practical value were continued in the Yosemite, Sequoia, and Zion National Parks in cooperation with the National Park Service. Comparative investigation of gravity anomalies was undertaken with the Coast and Geodetic Survey. The possible relation of geologic conditions to the prevalence of tuberculosis in certain southern areas was studied for the Public Health Service. Other Federal organizations were rendered consultant service by the Geologic Branch.

Ore deposits were studied in mining regions of Alabama, Arizona, Arkansas, California, Colorado, Idaho, Montana, Nevada, New Mexico, the Tri-State district, the southeastern States, Oregon, Utah, Washington, and Wyoming; coal, oil, and gas fields were studied in Arkansas, California, Montana, New Mexico, Oklahoma, Pennsylvania, Utah, and Wyoming. Areal and tectonic studies were made in the Death Valley region of California, the Guadalupe Mountains and Sierra Diablo region of Texas, and the Gulf and Atlantic Coastal Plains. In several field projects airplane photographs were used either in the preparation of base maps or as aids in tracing certain features. The use of airplane photographs in geologic field work is increasing markedly.

Projects were completed in the Jamestown district, Colorado, the Silver Belt of the Coeur d'Alene district and Boise Basin, Idaho, the Little Hatchet Mountains, New Mexico, York County, Pa., Guadalupe Mountains and Terlingua quicksilver district, Texas, Marysvale district, Utah, and the region south of Cody, Wyo. Athough work in the San Juan region, Colorado, is expected to continue several years, a very valuable report on guides to prospecting in the Uncompahgre (Ouray) district has been completed. A report on the exceedingly complex geologic structure in the Tonopah-Hawthorne region, Nevada, has also been completed.

New major Federal projects other than those on strategic minerals were begun in the Santa Maria Basin, California, Strawberry Valley, Utah, North Cheyenne Reservation, Montana, and Mount Diablo, Texas. A special investigation of outstanding interest was a study of cores obtained by Dr. C. S. Piggot, of the Carnegie Geophysical Laboratory, from the sea bottom at several places between Newfoundland and Ireland. The first and more general part of the report on this study shows striking climatic changes during and since the latest glacial period as reflected by bottom sediments and low forms of animal and plant life.

Geophysical field investigations were conducted in Florida, Kentucky, and Montana, and research on the interpretation of field data and the improvement of apparatus was continued.

A total of 300 reports, of varying scope, embodying the results of field projects that lasted from a few weeks to several years, were in preparation during the year.

In the petrographic laboratory 1,694 thin sections, 193 polished sections, and 195 polished specimens were prepared for optical study of rocks, ores, and minerals. Improvements in the mounting of polished sections and equipment were made.

In the Section of Chemistry and Physics 3,058 examinations, analyses, and tests of rocks, ores, minerals, and samples were made, including 917 for private parties. The examinations of drill cores obtained during prospecting work on leased public lands led to the discovery of the new mineral shortite. Crystallographic, optical, and spectrographic studies led to a better understanding of certain complex closely related minerals. New methods of chemical analysis and improvements in chemical and optical procedure were devised, and base exchange in river clays was studied as a contribution to the subject of sedimentation and the salinity of the ocean. Investigation of bleaching or adsorbent clays has culminated in the completion of a comprehensive report on their distribution, geologic features, physical and chemical properties, and economics. During 1939 attention has been given to the location and development of domestic clays that are the equivalent of special imported clays. Preparation of mathematical tables for calculating deep-earth temperatures was continued, in cooperation with the Works Progress Administration.

Explorations in Alaska.—During the field season of 1938 eight field projects were carried on by the Alaskan Branch. They included three geologic investigations relating to the mineral resources of the Territory, a general study of recent mining developments in the more important camps, and four that were primarily topographic. For the field season of 1939 five field projects—three geologic and two topographic—had been started before the end of the fiscal year 1938–39, and one, a general survey of mining conditions, was undertaken later in the season. All of this work will continue throughout the open season as late as conditions permit. Other work included the usual collection of statistics regarding the production of mineral commodities.

Topographic mapping.—The area covered by new topographic surveys, resurveys, and revision amounted to 27,110 square miles. In the topographic mapping, done in 45 States and Puerto Rico, 16 States, Puerto Rico, and the Tennessee Valley Authority cooperated. The area covered by planimetric maps without contours, compiled from aerial photographs, covered 2,180 square miles in 3 States. By a cooperative agreement with the Tennessee Valley Authority, the Geological Survey mapped from aerial photographs by stereophotogrammetric methods 1,974 square miles. In connection with this work, 15 complete stereophotogrammetric units are installed and in use at the Chattanooga office of the Geological Survey. One hundred and seventeen square miles was mapped by stereophotogrammetric methods in the Washington office. This method of mapping is continuing to gain favor. It has been proved conclusively that this method is adaptable, with added economy and speed, to areas whose relief ranges from moderate to great. In addition to the routine adjustment of primary control, there has been in progress a general adjustment of both horizontal and vertical control to agree with the standard datums of the United

States. During the year six bulletins reporting the results of control surveys have been prepared, and four that had been previously prepared were published. The office work on river surveys that were made by the Conservation Branch is steadily progressing. The maps of 22 projects were sent forward for reproduction during the year. The preparation of the Transportation map of the United States for the Bureau of Public Roads was continued, and maps of 3 States were published or are in proof. Maps of 16 States were in course of publication. Work on the United States part of the map of the world on the scale of 1:1,000,000 was continued. One hundred seventy-one topographic maps were prepared for photolithographing and 60 for engraving, and 375 maps of all kinds were prepared for reprinting.

Investigations of water resources.—The Water Resources Branch collected and prepared for publication stream-flow records at 4,165 river-measurement stations in 47 States, the District of Columbia, and the Territory of Hawaii, thus obtaining information on the behavior of streams in drought, in flood, and in normal conditions—that is invaluable for planning projects for use or control of the surface-water supply. It investigated underground water supplies in 37 States, Hawaii, and the Virgin Islands, and obtained information on the occurrence, quantity, and quality of these supplies, which is essential for the development, conservation, and use of ground water upon which a large part of the population of the country must depend. Investigations of stream flow and silt movement of streams on four projects of the Soil Conservation Service and on the Colorado River and its tributaries were continued. Analysis were made of 1,895 samples of water from surface and underground sources with reference to their suitability for industrial and agricultural uses and for domestic use, so far as such use is affected by the dissolved mineral matter. The annual report of the capacity of water wheels in water-power plants in the United States of 100 horsepower or more as of January 1, 1939, was compiled. Engineers of the Branch had general supervision of operation of 160 projects under permits and licenses of the Federal Power Commission and operated about 295 gaging stations in connection with 118 projects of that Commission. Investigations of the water problems along the international boundary between the United States and Canada were continued for the State Department. The collection of information on recent outstanding floods was continued.

Classifying public land and supervising mineral leases.—The Conservation Branch made 9,638 formal findings of technical fact involving the mineral resources, water power, or storage possibilities of public land; added 19,924 acres to outstanding water-power reserves and eliminated 4,480 acres therefrom; defined the known geologic structure of 10 producing oil and gas fields involving 142,061 acres; completed 780 miles of river-utilization surveys and surveyed in detail 12 dam sites in public-land States; prepared 4 reports based on geologic and geophysical studies of formation materials and conditions at dam sites; administered activities and operations under 160 power projects licensed by the Federal Power Commission and 172 permits and grants from the Department of the Interior; supervised on public land 8,560 oil and gas holdings involving 4,503 productive wells and 685 coal properties, 42 potash properties, 70 sodium properties, 27 sulphur properties, and 7 prosphate properties involving 490 productive mines; continued to assist oil and gas permittees and operators in the preparation of unit plans of development and operation; classified about 250 outstanding oil and gas prospecting permits under the extension provisions of the act of August 26, 1937 (50 Stat. 842); supervised on naval petroleum re-

serves 22 leaseholds involving 284 productive oil and gas wells; and on Indian land 4,984 leaseholds involving 4,039 oil and gas wells, 246 mining properties involving 45 lead and zinc properties, 151 coal properties, and 50 other mineral properties; changed territorial delineation of two mining districts and created a new mining district with headquarters at Carlsbad, N. Mex.

Publications.—The publications of the year consisted of 63 reports in the regular series and 21 pamphlets and circulars for administrative use, a total of 12,713 pages; 301 new or revised topographic and other maps and 278 reprinted maps. Among the book publications were a lexicon of geologic names of the United States (including Alaska), geophysical abstracts, a paper discussing the force required to move particles on a stream bed, reports on the geology and mineral resources of the Fortymile, Eagle, Circle, Nushagak, and Slana-Tok districts and the Chitina Valley, Alaska, and on the nickel content of an Alaskan basic rock; the geology and mineral resources of areas in Arkansas, New Mexico, Oregon, Pennsylvania, Texas, and Utah; oil and gas resources of areas in Oklahoma; spirit leveling in Missouri; records of water levels and artesian pressure in observation wells in the United States in 1937; ground water in the Snake River Plain and Mud Lake region, Idaho, and Holbrook region, Arizona; the floods in the Canadian and Pecos River Basins of New Mexico in May and June 1937, of the Ohio and Mississippi Rivers in January and February 1937, and in Texas in 1935; the drought of 1936; the quality of water of the Rio Grande Basin above Fort Quitman, Tex.; an inventory of unpublished hydrologic data; the 15 annual papers on surface-water supply in the United States and Hawaii; and several papers on paleontology. A new edition of the general list of publications of the Geological Survey was also issued. Besides these printed reports 55 brief papers were issued in mimeographed form as memoranda for the press or as informative circulars.

The Division of Engraving and Printing printed more than 1,003,600 maps and did repay work amounting to about $174,000 for 71 other units of the Federal and State Governments.

GEOLOGIC BRANCH

GENERAL GEOLOGIC STUDIES

A study of the deep-sea cores taken by Dr. C. S. Piggot, of the Geophysical Laboratory of the Carnegie Institution, between Newfoundland and Ireland was made by six Survey geologists and several other scientists representing the Biological Department of the University of Buffalo, the Philadelphia Academy of Natural Sciences, the National Museum, the Bureau of Chemistry and Soils of the Department of Agriculture, and the Geophysical Laboratory. The resulting report on the geology and biology of these cores has been submitted to the Geological Survey for publication.

A lexicon of geologic names was issued as Bulletin 896. Definitions of the more than 10,000 named stratigraphic units in the United States and Alaska, which are scattered throughout the geologic literature of the past 100 years, were summarized and brought together during a period of about 25 years by the Secretary of the Survey's

Committee on Geologic Names. The lexicon will be a valuable aid to all geologists, including those in State geological surveys, in colleges and universities, and the host of geologists connected with the oil and mining industries. It will also help to prevent undesirable duplication of stratigraphic names.

Chapters on coal, petroleum, and natural-gas reserves were prepared for the National Resources Committee summary report of a national energy survey; and a paper on our petroleum reserves was published in the Journal of the Washington Academy of Sciences. Studies of source beds of petroleum, types and ranks of coal, and nomenclature of Carboniferous sedimentary rocks were continued. General studies of the application of geophysics to geology have been continued, new apparatus—gravimeters and seismic exploring units—has been designed and perfected, and new methods have been developed. Geophysical abstracts covering the period October 1937 to September 1938 were issued. Other investigations included Foraminifera of the Cretaceous formations of the Gulf Coast region, the genus *Ceratopea*, Tertiary echinoids of the eastern United States, and Globigerinidae. General studies of strategic minerals have been continued or resumed, and additional information was gathered on phosphate reserves.

WORK IN CHEMISTRY AND PHYSICS

Much of the work was devoted to the study of new minerals, the analysis and description of samples of minerals of economic value from several new localities, and extensive series of analyses to determine the economic possibilities in different areas containing various raw materials, such as phosphates, potash, manganese, and iron ores, mainly on public lands. This work was not restricted entirely to surface samples but dealt also with well cuttings and well cores and with physical measurements at depth.

More definite evidence was obtained of the existence at depth of a considerable bed of carnallite, in Grand County, Utah. This mineral is well known in foreign potash fields but has hitherto not been found in any large quantities in this country. Nickel was determined in basic rocks from Nevada and Admiralty Island, Alaska. A clay from high swampy areas in the Hawaiian Island, the only ceramic clay in the islands, was found to carry a high proportion of titanium, but this does not interfere with its economic use. In all, 3,058 examinations, analyses, and tests of rocks, ores, minerals, and samples were made during the year. These included 917 specimens identified for private parties, 860 chemical analyses made

officially for geologists, and 632 analyses made in connection with research problems, analytical methods, and geochemical and geophysical investigations. The remaining tests related to core samples, well cuttings, and similar materials. Logs of more than 10 deep wells in New Mexico and Utah were completed, with accompanying analyses of individual sections.

Special investigations included a study of the new mineral, shortite, a calcium-sodium carbonate, discovered by J. J. Fahey in a core from the Hay oil and gas well, Sweetwater County, Wyo. The analysis and structural interpretation by X-rays of new varieties of beryl and mica have shown those minerals to have essential differences not hitherto understood or even recognized. Electrical measurements were made on several proposed dam sites in Arizona, Colorado, and the potash area of New Mexico to determine underground conditions. A rapid volumetric method for the determination of fluorine in phosphate rock and other analytical methods were studied and analyses were made of soils from Alabama and Tennessee, in collaboration with the Public Health Service, with reference to the distribution of tuberculosis.

Goniometer measurements were made on crystals of calcite, dolomite, shortite, and regular intergrowths of kleinite and calomel. The relations of rhodonite, pyroxmangite, bustamite, and johannsenite, all manganese silicates, were studied more fully. A series of analyses on secondary sulphate minerals, including some new minerals, from the Tintic Standard mine, Dividend, Utah, was completed and work was begun on similar minerals from Butte, Mont.

Spectrographic tests were made on several minerals and rocks in a search for different minor constituents, a number of which were found or identified in this way. Several commercial ores mined under royalties to the Government were checked as to their content of valuable constituents. A very extensive series of analyses of phosphates from Wyoming was made both for the phosphate content and for several other constituents that may throw light on the conditions under which the phosphatic beds were deposited. Determinations were made of the heavy minerals in placer concentrates from Alaska. Some base-exchange studies of river clays were made to explain the clay's contributions to the sea.

Work on more than 5,000 samples of adsorbent clays has led to the preparation of a report on the geologic age and geographic distribution of those clays, their physical and chemical properties, and the economics of their production. During the past year attention was given to the location and development of American clays that

are the equivalent of the special clays imported from Japan for use as petroleum catalysts, from England for lard refining, and from Germany for petroleum refining. Tests of clays suitable for molding sands led to the location and exploitation of deposits that are now producing 20 tons a day. Additional weight-temperature curves have been run, which are useful in the identification of hydrous minerals and carbonates. Research work has been devoted to the study of special methods for the analysis of clays and to the synthesis of clay minerals.

A final report is being prepared on deep earth temperatures, which will include a summary of all the deep earth temperature data of the world and also a sufficient number of mathematical tables to permit handling problems in geothermics on a rigorous mathematical basis with a minimum amount of labor.

The work in chemistry and physics is mainly confined to the laboratories. However, field work was done in Colorado, Arizona, New Mexico, and Wyoming.

WORK OF THE YEAR BY STATES

Alabama.—Geologic investigations continued on iron ores of Red Mountain formation in northeastern Alabama; on brown iron ore in Russellville district; and on stratigraphy of Upper Cretaceous formations of Alabama and Mississippi. Report on geologic factors affecting tuberculosis in Giles County, Tenn., and Coffee County, Ala., was made for Public Health Service. Tectonic map of the Coastal Plain of Alabama and northern Florida was prepared for a Committee of the National Research Council. Paleontologic and stratigraphic studies were made of several formations and of upper Eocene Mollusca from Alabama and Mississippi.

Arizona.—Investigations continued of geology and mineral resources of Benson, Pearce, and Tucson quadrangles; and of manganese deposits in Artillery Peak Mountains. Report on Ajo quadrangle was completed. Geology of Lone Pine Reservoir was examined for Public Works Administration.

Arkansas.—Manuscripts of report on manganese carbonate in Batesville district and of bulletin on geology of Fort Smith district were completed. Work on reports on fauna and stratigraphy of Morrow group of Arkansas and Oklahoma was continued.

California.—Reports on geology of Kettleman Hills oil field and of Palos Verdes Hills were completed. Studies of subsurface and economic phases of Kettleman Hills oil field; of geology and oil resources of lower Tertiary strata of Reef Ridge; of Foraminifera of Kreyenhagen shale of Garza Creek; and of petrology of siliceous rocks of Monterey formation continued. Investigation of surface and subsurface stratigraphy, structure, and lithology of entire Santa Maria Basin, Santa Barbara County, and bearing of the geology on discovery and development of oil and gas in that area began. In connection with study of source beds of petroleum, conducted in cooperation with American Petroleum Institute, data were collected from several oil fields in Los Angeles Basin. An

article entitled "Calcium carbonate content of some California Mesozoic and Tertiary sediments" was submitted for outside publication.

Areal and structural studies continued in Death Valley region; in San Andreas Rift area; on geology and ore deposits of Ivanpah quadrangle, California-Nevada; on geomorphology of San Joaquin Basin; and on problems of igneous geology in Elsinore, San Luis Rey, and Corona quadrangles. Papers on Tertiary history of Ivanpah region and on structural features of Death Valley region were written for outside publication. A new edition of an oil and gas map for State of California was issued.

Cooperation with the National Park Service continued in preparation of geologic exhibits for Yosemite and Sequoia National Parks and of a paper on the geology of Sequoia National Park. Studies continued of glacial deposits in relation to fault scarps at the east front of the Sierra Nevada. A paper on the history of faulting movements at the east front of the Sierra Nevada as indicated by dislocated moraines was written for outside publication. Studies of strategic minerals, financed by Public Works funds, included quicksilver deposits of Mayacmas and Sulphur Banks districts in and near Lake County, tin in Temescal district, and chrome deposits in Seiad quadrangle. A paper on some features of quicksilver deposits in and near Lake County was prepared for outside publication.

Colorado.—Cooperation with Colorado State Board and Colorado Metal Mining Fund continued. Reports on Ouray and La Plata districts were nearly completed, and investigations continued in Telluride and Red Mountain districts of San Juan area. Report is in progress on Red Mountain-Telluride-Camp Bird-Sneffels area, and one on discontinuities in mineral sequence of San Juan mining district was prepared for outside publication. Paper on structural control of ore deposition in Uncompahgre district was completed. Studies continued of Gold Hill mining district. Preliminary report on this district and paper on nickel deposit near Gold Hill were prepared for outside publication. Detailed report on geology and ore deposits of Jamestown district is nearly completed, also one on deposits of radioactive cerite deposits near Jamestown. Report on geology and ore deposits of Front Range is in progress, and preliminary geologic map of Front Range has been issued. Geologic map of Leadville mining district has been issued by Geological Survey, and explanatory text entitled "Preliminary report on the west slope of the Mosquito Range in the vicinity of Leadville, Colo.," has been published by Colorado Scientific Society. Paper on vein systems of Cripple Creek district and their relation to major structural features was submitted for outside publication. A more comprehensive report on Leadville and one on Cripple Creek district are in preparation for Survey publication. Work was continued in Alta Basin and vicinity; and in Chattanooga, Kokomo, and Tarryall districts and Nederland tungsten district. Papers on geology, mineralization, and placers of Tarryall and Beaver Creeks, Park County, and on vein solutions and rock alteration in Boulder County tungsten district were prepared for outside publication. In connection with proposed extension of Rocky Mountain National Park, geology of southern end of the Park was mapped for National Park Service.

Florida.—Study of physical geography of the State was completed in cooperation with Florida Geological Survey, which is to publish the report. Work was done on revised geologic map of the State. Report on molluscan fauna of Alum Bluff group—gastropods—was completed for Federal Survey publica-

tion, and papers on Upper Tertiary and Pleistocene mollusks of Florida and on Oligocene deposits in Citrus County were submitted for outside publication. Magnetic survey was undertaken and report on geophysical survey of north central Florida is in preparation. Hearings of congressional committee on phosphate held at Lakeland were attended by geologist from Federal Survey with view to revision of estimates of reserves in Florida. Press release on subject was issued by Federal Survey. The tectonic map is mentioned under Alabama.

Georgia.—Manuscript geologic map of coastal plain of Georgia and its accompanying text, prepared in cooperation with the State, were completed. Study of geology and mineral resources of Cartersville region was continued, and paper entitled "Sienna (Ocher) Deposits of the Carterville District, Georgia," was submitted for outside publication. Studies of Upper Cretaceous formations, an extension of investigations in Alabama and Mississippi, were continued.

Idaho.—Work in cooperation with the State was continued in Rocky Bar district and Seven Devils area and was begun in Pine district and New Meadows-Riggins area. Reports on geology and ore deposits of Boise Basin and on placers of Secesh Basin are in preparation. Reports on Dixie placer district, Florence mining district, Atlanta district, and metalliferous deposits of Kootenai County were submitted for publication by the State. Article on use of sedimentation features and fracture cleavage in recognizing overturned strata in Belt rocks of Coeur d'Alene district was prepared for outside publication. Report on geology of Brown and Spangler dam sites, Mann Creek, Washington County, was made for the State.

Noncooperative projects consisted of study of geology and mineral resources of Borah Peak quadrangle; geomorphology of Paradise Valley quadrangle; glacial geology and physiography of part of Idaho adjoining western Montana; and fossil plants from Fort Union and associated formations. Field work was continued in Afton quadrangle and in Irwin and Victor quadrangles with special reference to phosphate.

Illinois.—Monographic study of lower Pennsylvania floras of Illinois and adjacent States begun by the late David White in cooperation with the State was completed in manuscript. Report on Fusilinidae of Pennsylvanian series in Illinois was completed for publication by the State. Study of conditions resulting from Ohio River flood of 1937 was published.

Indiana.—Part 3 of report on flora of New Albany shale (Upper Devonian) and report on new crinoid genus from an upper Mississippian formation of Indiana are in preparation. Study of conditions resulting from Ohio River flood of 1937 is mentioned under Illinois.

Iowa.—Study of Kinderhook fossils from Burlington continued.

Kansas.—Investigation of subsurface Mississippian rocks was continued in cooperation with the State. Map of central and eastern Kansas showing thickness of Mississippian limestones as revealed by well records, the fields that have produced oil and gas from Mississippian rocks, and fields that have produced oil and gas from other rocks on anticlines, with explanatory text, was submitted to the State for publication. The State published cooperative report on geology and coal resources of southeastern Kansas coal field in Crawford, Cherokee, and Labette Counties. Map of the State showing oil and gas fields and producing formations is in preparation. Shoestring sands are mentioned under Oklahoma. Lead and zinc are mentioned under Tri-State.

Kentucky.—Geophysical study to locate position of faults was made in fluorspar area of Crittenden and Livingston Counties. Work on Pennsylvanian floras is mentioned under Illinois and on New Albany shale under Indiana. Study of conditions resulting from Ohio River flood of 1937 is mentioned under Illinois.

Louisiana.—Revised map of the State showing oil and gas fields was published.

Maryland.—Study of Pocono flora and of Pottsville formation is mentioned under Pennsylvania. Geologic map of Frederick County, with structure sections, prepared in cooperation with the Maryland Geological Survey, was published by the State. Geophysical investigations were conducted in the Soldiers Delight and adjacent areas.

Massachusetts.—Geologic work was begun in cooperation with the State. Detailed studies of geology and mineral resources and glacial and physiographic features were under way in Norwood, Lowell, Lawrence, Blue Hill, and Milford quadrangles; and geologic work was done in various sections of the State in relation to highway construction and flood control. Reports were sent to the State on geology of the coast line between Hyannis and Chatham, Cape Cod; on geologic problems of proposed sewer for town of Plymouth; and on geological examination for well site on farm near Sutton. Four special geologic reports relating to highway-construction projects were transmitted to Highway Division. Reports on commercial granites, on geology of granite deposits, and on origin of Chelmsford granites are in preparation.

Michigan.—The report on the cooperative electrical resistivity studies in Michigan will be published by the State. A supplemental report on the Ashley area resistivity investigations and a paper on the fauna of the Marshall sandstone are in preparation.

Mississippi.—Studies were continued of stratigraphy of Upper Cretaceous deposits of Mississippi and of fauna of Vicksburg group. Field work was resumed in Jackson and Pelahatchie quadrangles. Papers were submitted for outside publication on fossil mollusks preserved as clay replacements near Pontotoc; equivalence of Gosport sand to Moodys marl; recent collections of upper Eocene Mollusca from Mississippi and Alabama; and stratigraphy of Upper Cretaceous series in Mississippi and Alabama. Press memorandum on oil possibilities of Columbus anticline with accompanying sketch map was issued.

Montana.—Investigation of geology of Little Rocky Mountains and adjoining regions in Phillips and Blaine Counties and of Fort Belknap Indian Reservation was continued. Paper on large boulders and glacial striae near Little Rocky Mountains was published in an outside journal. Coal resources of Otter Creek area, Powder River, Rosebud, and Big Horn Counties, and of northern Cheyenne Indian Reservation and southern part of Custer National Forest were mapped. Projects on Black Hills Rim, Pleistocene and Recent fault scarps in western Montana, glacial geology and physiography of western Montana, and Lance-Fort Union correlation of southeastern Montana were continued. Reports on Pioneer Gold district and on fossil plants of Fort Union and associated formations of Montana, North Dakota, and Wyoming were in preparation. Magnetometer surveys were conducted in Highwood Mountain area to locate and map possible feeders of two laccoliths, and paper on the results was prepared for outside publication.

Nevada.—Field and office work on general geology and ore deposits of Hawthorne and Tonopah quadrangles, resurvey of Comstock Lode district, and structure of Basin Range was continued; and general geologic and stratigraphic

study of Eureka district and reconnaissance study in Sonoma Range quadrangle were begun. Bulletin on Jurassic orogeny in west-central Nevada was completed. Report is in preparation on Reese River mining district that will include section on resistivity and magnetometer measurements. Investigation was made of Tertiary gravel channel at south end of Washoe Valley to evaluate magnetic and resistivity methods for locating buried channels and determining their sizes and depths. Studies of strategic minerals, financed by Public Works Administration, included Gold Banks quicksilver district in Pershing County, Table Mountain nickel deposits, Key West nickel district, nickel deposits in Cottonwood Canyon, Churchill County, Lovelock quadrangle tungsten area, and Majuba Hill tin district. Study of fresh-water diatoms in Mineral, Esmeralda, and Nye Counties was made; and papers on fresh-water invertebrates and land plants of Cretaceous age from Eureka, on Recent fault scarps in western part of Great Basin, and on relation of structure to earthquakes in Great Basin were submitted for outside publication. Studies of Ivanpah quadrangle are mentioned under California.

New Mexico.—Field work on east side of San Juan basin in Rio Arriba and Sandoval Counties was completed, and areal geologic map and report on geology, coal, gas, and oil resources are under way. Paper on intertonguing transgressive and regressive deposits by fill in a sinking trough, a study of Mancos and Mesaverde formations in southern San Juan Basin, is in preparation. Other reports in various stages of completion are: Geology and Ore Deposits of Magdalena district, Geology and Ore Deposits of Little Hatchet Mountains, and Potash Mines Quadrangle. Strategic minerals projects consisted of study of manganese deposits of Little Florida Mountains and Taylor Creek tin deposits. Brief papers on stratigraphy in Pecos Valley, on Basin and Range province, and on abutment problems at Zuni Dam, were prepared for outside publication.

New York.—Study of general geology of Millbrook quadrangle, New York and Connecticut, was continued. Report on subsurface structure in parts of western New York and mode of occurrence of Medina gas was completed for Survey publication.

North Carolina.—The tin belt of North Carolina near Lincolnton was studied in some detail as a Public Works project. Papers on Miocene diatoms from Hamilton Wharf, on Pleistocene fossils from well at Hatteras, and on gastropods from Miocene and Lower Pliocene of Virginia and North Carolina are in preparation.

Ohio.—Study of Devonian and Carboniferous faunas from Ohio and Pennsylvania was completed. Flood study is mentioned under Illinois.

Oklahoma.—Study of subsurface geology and oil and gas resources of Osage County was continued, and reports on a number of townships were submitted for publication by the Geological Survey. Geologic mapping in Ouachita Mountains was continued. Papers on relation of oil in Mississippian lime and shoestring sands of Cherokee shale in Osage County and on geologic interpretations of gravity anomalies in Atoka and Bryan Counties were presented for outside publication. Map of oil and gas fields of Oklahoma was issued. Studies of Morrow fauna and stratigraphy in Pennsylvanian series, of Moorefield fauna in Mississippian series, and of flora of coal fields of eastern Oklahoma are in preparation. Lead and zinc are mentioned under Tri-State district.

Oregon.—Paper on Salem Hills, North Santiam River section of Oregon Cascades, and revised geologic map of Sumpter quadrangle with accompanying

text are being prepared for publication by the State. Fresh-water diatoms near Dayville were studied. Paper on Permian Fusulinidae from eastern Oregon is in preparation. Fauna and stratigraphy of Carboniferous rocks near Paulina, Crook County, were studied.

Pennsylvania.—Detailed section of coal-bearing rocks in Pennsylvania across Appalachian coal basin was constructed from diamond-drill cores. Work was continued on report on regional metamorphism in lower Kittanning coal beds. Cooperative report on geology and mineral deposits of York County was completed for publication by the State, and one on Hanover and York quadrangles, for Survey publication, is well advanced. Field work on geology of Reading Hill was conducted. Devonian and Carboniferous faunas are mentioned under Ohio. Stratigraphic studies were made and specimens were collected of flora of Pottsville and post-Pottsville formation, of Mississippian age, in southern anthracite coal field. Papers are in preparation on stratigraphy and flora of Pocono and Pottsville of Virginia, West Virginia, Pennsylvania, Maryland, and on some structural features of Northern Anthracite Coal Basin, for professional paper.

Southern Appalachians.—Brief report on structural control and form of ore shoots in southern Appalachian gold deposits was submitted for outside publication. Report on gold deposits of southern Appalachians, including areas in Virginia, North Carolina, South Carolina, Georgia, and Alabama, is nearing completion.

South Carolina.—Search for tin deposits near Gaffney was conducted as a Public Works project. Paper on elliptical bays in Horry County was presented before the American Association for Advancement of Science. Report was made on geology of Rocky River dam site, Abbeyville, to Public Works Administration. Gold is mentioned under Southern Appalachians.

South Dakota.—Study of tin deposits near Tinton was in progress, as part of investigation of strategic minerals under Public Works allotment.

Tennessee.—Studies in cooperation with Tennessee State Geological Survey were continued on manganese ores in Perry and Lewis Counties and on stratigraphy of Mascot area, in Jefferson City zinc district. Brief examination of Co-op coal bed at Cumberland Homesteads was made for Farm Security Administration. Fossils were collected and stratigraphic studies were made of Chazyan rocks, of lower Paleozoic age, in Appalachian Valley and of Carboniferous floras in northern and southern Tennessee coal fields. Brief paper on mineralization of Sweetwater barite deposits was submitted. Giles County is mentioned under Alabama.

Texas.—In Sierra Diablo area and vicinity geologic mapping was continued. Papers on relation of Permian sedimentation to tectonics in Guadalupe Mountain region and on older rocks of Van Horn region will be published by an outside journal. Comprehensive report on geology of southern Guadalupe Mountains has been completed for Survey publication. Professional Paper 187, on geology of Marathon region, was published. Bentonite and fullers' earth deposits in Jasper, Newton, and Sabine Counties were studied. Reports on Shafter silver district, Presidio County; on Terlingua quicksilver district of Brewster County; and on stratigraphy and fossils of Navarro group were nearing completion. Paper on Terlingua quicksilver district was prepared. Examinations were made of tin and manganese deposits in Franklin Mountains and of manganese near Chispa Siding.

Stratigraphic and paleontologic studies were continued as follows: Carboniferous near Alpine; revision of Guadalupian fauna of Permian age; some

upper Permian Foraminifera from west Texas; new Fusulinidae from Cisco groups in Brazos River region; Eocene of southeastern Texas; and Cambrian and Ordovician in Central Hill district. New edition of map of oil and gas fields of Texas and report of results of geophysical survey of bolson deposits in El Paso area are in preparation. Report on brown iron ores of eastern Texas was published.

Tri-State district.—Field work for study of Tri-State zinc and lead district of Kansas, Oklahoma, and Missouri was completed, and report covering these investigations of several years is in preparation.

Utah.—Studies were resumed of geology and mineral resources of Henry Mountain region of southeastern Utah; and of Strawberry Valley and adjacent parts of Coalville quadrangle, which embrace the eastern flank of the Wasatch Mountains. Paper on Permian of parts of Rocky Mountain and Colorado Plateau regions was presented for outside publication. Geologic mapping with reference to alunite, gold, silver, and other mineral deposits was continued in region covered by topographic maps of Delano Peak, Beaver, Sevier (part), and Marysvale and vicinity, and of Hurricane fault zone. Papers are in preparation on Green River Desert-Cataract Canyon region, Emery, Wayne, and Garfield Counties; on late Mesozoic and early Cenozoic history of central Utah; and on Pennsylvanian and Permian Fusulinidae from Strawberry Valley area. Paper for Survey publication was prepared on geology of Bull Valley iron-ore district, with notes on iron-ore pits at Desert Mound and Iron Mountain, southwestern Utah. Memorandum for the press on geology and iron-ore deposits of Bull Valley district was issued. Studies of high plateaus in southwestern Utah were continued, especially with reference to supplying information to National Park Service on Zion and Bryce Canyon National Parks and Cedar Breaks National Monument. Papers were submitted for outside publication on glaciation in Wasatch Plateau, geographic and geologic sketch of Capitol Reef region, origin of pediments around Henry Mountains, Recent fault scarps in western part of the Great Basin, volcanic sequence in Marysvale region in southwest-central Utah, and manganese deposits of Drum Mountains.

Vermont.—Studies of commercial granites and mapping of granite quarries of New England, including Barre quadrangle, were continued.

Virginia.—Under Public Works allotment, studies were made of tin-bearing rocks in Irish Creek district and of nickel mine in Floyd County. Study of the great Gossan lead in cooperation with the Virginia Geological Survey was continued. Manuscript on Vaucluse gold mine, Orange County, was completed. Studies of the Pocono are mentioned under Pennsylvania; of Chazyan rocks, under Tennessee; of Mollusca (gastropods), under North Carolina; and of gold, under Southern Appalachians. Papers were prepared for outside publication on Pleistocene shore-line features of southeastern Virginia, a Tertiary marine formation in northeastern Tidewater Virginia and southern Maryland, and age relations of pre-Cambrian rocks in Catoctin Mountain-Blue Ridge and Mount Rovers anticlinoria in Virginia.

Washington.—Study of manganese deposits in Olympic Peninsula was begun under a Public Works allotment. General reconnaissance of manganese belt was made; studies of mines and examination of prospects were included. In connection with study of fresh-water diatoms, collections were made from several sections in Latah, Ellensburg, Ringold, Wahluke, and Columbia lava formations. Report is in progress on geology and ore deposits of Metaline district. Reconnaissance trip for study of glacial geology and physiography

was made by way of Mount Hood up Columbia River Valley to site of Coulee Dam, Spokane, and Metaline Falls.

West Virginia.—Ohio River flood studies are mentioned under Illinois. Study of the Pocono is mentioned under Pennsylvania. Stratigraphy and paleontology of Pennsylvania strata, chiefly Pottsville formation, along New River were studied.

Wyoming.—Studies of geology of west side of Big Horn Basin in northwestern Wyoming, including Badger Basin oil field, and of northeastern flank of Big Horn Basin, Big Horn and Park Counties, Wyo., and southern Carbon County, Mont., were continued. Preliminary map showing geologic structure of Byron-Frannie area, Big Horn and Park Counties, was issued. Paper on intrusive breccia along east margin of Absaroka Mountains was prepared for outside publication. Structure map and text on geologic structure of Shoshone anticline and area northwest of Cody was prepared for preliminary publication. Studies of Tertiary rocks of Green River and Bridger Basins and of Fossil syncline and of geology and mineral resources of Afton quadrangle were continued. Geologic field mapping in northwest corner of Cokesville quadrangle was begun in connection with study of geology and phosphate and other mineral resources of Afton quadrangle and vicinity. Work on Black Hills Rim and on Fort Union and associated formations is mentioned under Montana. Casper Mountain chromite deposits were surveyed by magnetometer.

ALASKAN BRANCH

The work of the Geological Survey in Alaska, although embracing many activities similar to those performed in the States, presents aspects that call for somewhat specialized treatment, so that it can be administered on a geographic basis rather than through the other Geological Survey units. In a pioneer country like Alaska, the call for information is related more to exploration and reconnaissance than to the intensive, detailed studies that are in demand in the States. Even now, more than 300,000 square miles of the Territory has not been surveyed even on exploratory standards. The need is urgent to reduce the extent of this vast unsurveyed domain. Then too, in the areas that are slightly known there are problems requiring more thorough examination if the national resources of the country are to be wisely administered and productively developed. At present considerably less than 1 percent of the area of Alaska has been mapped in adequate geological or topographic detail. Detailed studies would well repay their cost in delimiting areas of potential mineral value from those more suitable for other purposes and would also furnish guidance for development programs requiring the consideration of routes of transportation, settlement, power developments, and land utilization.

Although the work of the Geological Survey in Alaska contributes to widely diversified activities, its direct purpose is to aid in the wise development of the mineral resources of the country. Already these

resources have contributed minerals to the value of nearly $778,000,000, and to this total between $25,000,000 and $30,000,000 is added each year. About two-thirds of this mineral wealth has been recovered from the gold mines, but mines of copper, silver, coal, lead, platinum metals, tin, and a dozen other mineral commodities have contributed to this total. To help in the discovery of new deposits, as well as to furnish technical advice as to possible extension or development of those already found, has called for field investigations throughout the Territory, in the course of which nearly 300,000 square miles has been mapped topographically and geologically, and all of the known mining camps have been examined with varying degrees of thoroughness. The results of those investigations are made available to the public as printed reports and maps, and many additional data are available to the Government in the form of field notes and unpublished records:

Field work.—The field projects in Alaska are better described by field seasons than by fiscal years, because the field work is generally started in May of one fiscal year and continued as late as practicable into September or October the succeeding fiscal year. Thus the projects in the field season of 1938 were financed by funds appropriated for the fiscal years 1938 and 1939, and those in the season of 1939 were financed by funds for the fiscal years 1939 and 1940.

For the field season of 1938 eight field projects were carried on by the Alaskan Branch, of which four were principally geologic investigations of the mineral resources of the Territory and four were primarily topographic surveys. The surveys on Chichagof Island, in southeastern Alaska, were to obtain detailed information about the geologic conditions at the gold lode mines that have long been productive, so as to delimit areas in the vicinity that appear to be worth prospecting from the less promising areas. The work in the Alaska Range region, already in progress for a number of years, was aimed to acquire all pertinent facts regarding the prospective mineral resources of value in this extensive tract. The investigations in the Yukon Valley west of the international boundary covered part of the tract of old consolidated gravel deposits of Tertiary age that appear to have been the source from which has been derived much of the gold that was later concentrated by the present streams to form the workable placers that are now being profitably mined in adjacent areas. The fourth geologic project, undertaken after the close of the fiscal year 1937–38, was a general study of recent mineral developments in the principal producing camps of the Territory.

The four topographic projects include work on Chichagof Island, in parts of the Alaska Range in the northern part of the Copper River Valley, photographing from the air parts of the Tanana Valley east of Fairbanks, and photographing from the air certain tracts on Admiralty Island, southeastern Alaska, that cannot readily be covered by ground methods of survey. The topographic mapping on Chichagof Island was on detailed standards to serve the immediate needs of the geologic work in progress there. The work on Admiralty Island served to fill in several gaps in the completion of the mapping of the island, an undertaking that had been under way by ground methods in 1935 and 1936. Topographic mapping in the Alaska Range in 1938 covered

a considerable area in the valley of the Nabesna River and its neighborhood by reconnaissance surveys and a small tract in the vicinity of the Nabesna mine by detailed surveys. The aerial photographic work in the Tanana Valley connected with earlier photographic work done by the War Department from Fairbanks southward. This work resulted in obtaining photographs suitable for use in the cartographic representation of most of the lowland of the Tanana River from Fairbanks eastward to the international boundary, with the exception of that part from the Delta River to Tanana Crossing. In the course of this work some oblique views of parts of the Alaska Range were obtained, which have been useful in mapping the section of the Range that forms part of the watershed of the Copper and Tanana Rivers.

For the season of 1939 six field projects were carried on. Three were principally geologic investigations of mineral resources, one was a general field study of recent mining developments in the principal mining camps of the Territory, and two were primarily topographic surveys. As all of these projects are still in progress in remote areas, out of touch with ordinary means of communication, details as to their specific accomplishments are not now available. The areas in which the principal new geologic projects were undertaken were on Chichagof Island in southeastern Alaska, in the Alaska Range, at the head of the Copper River, and in the tin fields of western Seward Peninsula. The work on Chichagof Island aimed to expand to the north surveys begun in 1938, to disclose the extent of the potential mineral resources in that area. It is expected to reach the prospective nickel-bearing area on the north coast of Chichagof Island and Yakobi Island and to examine those deposits with especial care to determine their significance in affording a source of ore that might lessen the nation's dependence on foreign countries. The work in the Alaska Range is an extension of the work of the last few years. Its main purpose is to revise earlier work in the district and to cover hitherto unsurveyed tracts, so as to present an authoritative up-to-date statement regarding the mineral resources of several thousand square miles of country which contains deposits now being mined and which may contain others not yet developed. The work in the tin fields of western Seward Peninsula is to afford specific quantitative estimates as to the amount of tin that may reasonably be counted on. Solution of this question is of special importance because this is the only area in the United States that has produced significant amounts of tin mineral, and the dependence of many industries on foreign sources for their tin supply is a matter of concern in our national economy.

The two topographic projects cover work in the Alaska Range near the Wrangell Mountains at the head of the Copper River, including adjacent parts of the Nabesna River Valley, and parts of the Porcupine River Valley from the international boundary westward to the junction of the Porcupine and Yukon Rivers.

Office work.—After completion of field work each season much office and laboratory work is required in analyzing the specimens collected, identifying by microscopic and other means the rocks and minerals found, perfecting the field sketches and drawings, and interpreting the various geologic phenomena observed, so that the significant facts may be revealed and intelligibly expressed by maps and reports. It is usually reckoned that these office studies require about twice as long as the original field work.

An office project not directly related to new field work but requiring familiarity with the mining industry of Alaska is the annual canvass of the

production of minerals from the Territory. This project involves analysis and tabulation of returns from mine operators throughout the Territory as to their year's output of all minerals of value and the checking of these results with information from other sources, making possible complete and correct records of the amount of each kind of mineral produced, the districts from which it came, and the new developments that have taken place or are in prospect. This work has been completed for the year 1938 and the results prepared for publication; the canvass for 1939 is under way.

Reports and maps.—During the year six reports containing maps, six special maps (including two new editions and four reprints), and three press statements have been published. Nine reports containing maps, three special maps, and new editions of three maps are in course of publication. In addition, three reports, one map, and a reprint of one map are partly prepared. Three papers prepared by personnel of the Alaskan Branch were approved for outside publication.

TOPOGRAPHIC BRANCH

The headquarters office of the Topographic Branch and of the Atlantic and Central divisions is located at Washington; the headquarters office of the Pacific division is at Sacramento, Calif. Section offices were maintained at Denver, Colo., Rolla, Mo., and Chattanooga, Tenn.

GENERAL OFFICE WORK

Necessary office work incidental to the field work of the Topographic Branch consisted of the computation and adjustment of the results of control surveys, photoplanimetric compilation, and the inking, inspection, and editing of the completed topographic field sheets prior to their submission for reproduction.

Section of Computing.—In addition to the routine adjustment of primary control, the volume of which was above the average, owing to the demands for Public Works Administration projects, progress was made in a general readjustment of older control surveys to refer them to the standard datums of the United States.

During the year four bulletins reporting the results of control surveys were published, and manuscripts for six more were prepared. About 1,600 letters were written supplying engineers throughout the country with the description and figures for marks established by leveling, traverse and triangulation, and other miscellaneous correspondence.

Section of Photomapping.—Aerial photographs of which field interpretation had been made were used for the compilation of planimetric bases of fifteen 7½′ quadrangles or parts of quadrangles in Louisiana, fourteen 7½′ quadrangles or parts of quadrangles in Michigan, and ten 15′ quadrangles or parts of quadrangles in Wisconsin, covering a total of 2,180 square miles.

Line bases to assist in topographic mapping were compiled by the radial-line method of ten 7½′ quadrangles or parts of quadrangles in Michigan, covering in all 378 square miles. Four 7½′ quadrangles in Massachusetts and two in Rhode Island, covering in all 194 square miles, were compiled with the aerocartograph, making a grand total of 572 square miles covered by line map bases. Topographic mapping of 117 square miles in Montana was executed by the stereophotogrammetric method in the Washington office. Sixteen square miles in Virginia were likewise mapped for experimental purposes. Of the photographs used in photomapping, covering areas totaling 34,278 square miles, those covering 22,426 square miles were purchased from commercial firms, and those covering 11,852 square miles were purchased or borrowed from other Government agencies.

Cartographic Section.—Work on the United States part of the map of the world on the scale of 1:1,000,000 was continued. Sheet J18, Chesapeake Bay, is in progress. For the Bureau of Public Roads the work of preparing the Transportation Map of the United States was continued. Compilation and inking were in progress on 90 sheets. Proofreading and checking was done on 39 sheets. Maps of three States, comprising 25 sheets, were published or in proof, and maps for two States, comprising 16 sheets, were in course of publication.

Section of Inspection and Editing.—During the year, 51 new topographic maps were prepared for photolithographs as two-color advance sheets and 77 as planimetric maps. Ninety-eight new topographic maps were edited for publication, 38 of which were for three-color lithographs, and 60 for engraving. The preparation of quadrangle maps for reprinting is a large item in the work of the section. Three hundred and sixty quadrangle maps, 11 State maps, and eight State index maps were prepared and edited for reprint editions. Editing was also completed on 158 maps published as illustrations, a total of 635 maps edited.

First, second, combined, and woodland proofs of new topographic maps and reprints numbering 309 and proofs of maps reproduced by photolithography in one or more colors, numbering 166, were read. On June 30, 223 topographic maps were in process of engraving and printing, 57 were awaiting lithography, and 35 were in preparation; 79 were on the editing docket in different stages of editing.

For the Conservation Branch the work of preparing river surveys for publication was continued. Work was executed on 31 different projects. The maps of 22 projects, comprising 89 separate sheets, were transmitted for lithography during the year. For the Tennes-

see Valley Authority three maps were prepared and transmitted for reproduction and proofs of nine maps were read.

In addition to the routine work outlined above, many original sheets were inked for the Atlantic division, and about 1,400 replies to letters of inquiry were prepared.

MAP INFORMATION OFFICE

Since January 1920, when the Map Information Office, authorized by Executive Order of December 30, 1919, was organized, it has functioned entirely through Geological Survey personnel.

The files of the office contain samples of practically all types of maps published by the Federal mapping agencies, many maps of foreign governments and commercial map publishers, catalogs and index maps, and a card index for reference, which is much used by Government agencies and the general public. The office has also been given the task of collecting, classifying, and disseminating information concerning all aerial photography throughout the United States, of both Federal and non-Federal character.

Work done by the Map Information Office for the Federal Board of Surveys and Maps includes the writing of minutes of all its meetings and the handling of all correspondence relating to the Board.

FIELD SURVEYS

Work was done in 45 States and in Puerto Rico. Cooperative projects were conducted in 16 of these States, in Puerto Rico, and with the Tennessee Valley Authority.

The art of making topographic maps from aerial photographs by the use of stereophotogrammetric methods is gaining in favor. It has been proved conclusively that this method is adaptable, with added economy and speed, to areas of moderate to great relief. By a cooperative agreement with the Tennessee Valley Authority, the Geological Survey is mapping areas within the Tennessee River Basin by these methods. On June 30, 28 Geological Survey people were employed on this project. Fifteen complete stereophotogrammetric units are installed and in use at Chattanooga.

Of the total area of the United States, 45.4 percent has been covered by topographic maps.

WORK OF THE YEAR BY STATES

Alabama.—The 7½′ quadrangles Cleveland, Daphne, Duckers Bay, Hollingers Island, and Mobile completed and Theodore and Wheelerville begun.

Arizona.—The 15′ quadrangles Bitter Well, Galiuro Mountains, Ruby, and Twin Buttes completed and Chloride and Tubac begun.

Arkansas.—The 15′ quadrangles Snowball and Waldron completed and Antoine begun. In cooperation with the Geological Survey of Arkansas, the 15′ quadrangle Lonoke completed and the 7½′ quadrangle Scott No. 4 begun.

California.—The 15′ quadrangles Arroyo Grande and San Luis Obispo and the 7½′ quadrangles La Jolla Northeast, La Jolla Northwest, La Jolla Southwest, and San Diego Northwest completed, and the 15′ quadrangles Cayucos, Cuyamaca, El Cajon, Jamul, and Port San Luis and the 7½′ quadrangles La Jolla Southeast and San Diego Northeast begun. In cooperation with the State engineer of California, the 7½′ quadrangles Redlands Northwest, Redlands Southwest, Redlands Southeast, and Riverside Northeast completed and Riverside Northwest begun.

Colorado.—The 15′ quadrangles Mount Lincoln and Mount Gunnison completed, Castle Rock, Elbert, Elizabeth, and Palmer Lake resumed, and Garfield and Pitkin begun. An extension to the Black Canyon of the Gunnison National Monument was begun. In cooperation with the city of Denver, the cultural revision within the city limits of Denver, and the 7½′ quadrangles Diamond K Ranch, East Lake, Lafayette, Fitzsimons, Golden, Marshall, and Morrison completed and the Littleton continued.

Connecticut.—The 7½′ quadrangles Lyme completed and Essex begun.

Delaware.—The 7½′ quadrangle Marcus Hook (Pa.-N.J.-Del.) completed and the 15′ quadrangle Elkton (Md.-Del.) begun.

Florida.—The 15′ quadrangles Arran and Tallahassee begun.

Georgia.—The 15′ quadrangles Adairsville and Waleska and the Pine Log area begun.

Idaho.—The 30′ quadrangle Riggins completed. The 15′ quadrangles Headquarters and Pauline completed, Garns Mountain begun, and Wallace special area continued.

Illinois.—The 15′ quadrangles Milford completed and Cissna Park and Fithian begun. In cooperation with the Department of Registration and Education of Illinois, Geological Survey, the 15′ quadrangles Freeport, Ina, and Mulberry Grove continued.

Indiana.—The 7½′ quadrangles Lewis, Pimento, and Terre Haute completed and Marshall Northeast, Marshall Southeast, Seeleyville, and Sullivan Northeast begun. In cooperation with the Department of Conservation of Indiana, the 7½′ quadrangles Angola East, Bethlehem, Borden, Clear Lake, Coal City, Georgetown, Hamilton, Jasonville, Linton, Madison East, Madison West, Metz, and Switz City completed and Brooksburg, Turkey Lake Northeast, and Turkey Lake Southeast begun.

Iowa.—The 15′ quadrangles Centerville and Forbush begun.

Kansas.—The 15′ quadrangle Scott City completed and the 15′ quadrangles Modoc and Sandon and the 7½′ quadrangle Sandon Northwest begun. In cooperation with the Geological Survey of Kansas, the 15′ quadrangles Altoona completed and the Severy begun.

Kentucky.—The 7½′ quadrangles Hiatt completed and Fenton and Hico begun.

Louisiana.—The 15′ quadrangles Barataria, Cut Off, Dime, Dulac, Gibson, Houma, Lac des Allemands, Lake Felicity, Pointe a la Hache, Quarantine, and Shell Beach completed. In cooperation with the Louisiana Board of State Engineers, planimetric maps completed for the 7½′ quadrangles Chopin Northeast, Chopin Northwest, Chopin Southwest, Chopin Southeast, Crichton Northeast, Crichton Northwest, Crichton Southwest, Crichton Southeast, Hanna North-

east, Hanna Northwest, Hanna Southwest, Hanna Southeast and begun for the 15′ quadrangles Frierson and Poole.

Maine.—The 15′ quadrangles Grand Isle completed and Amity and Danforth begun. An extension and cultural revision completed for Acadia National Park.

Maryland.—The 15′ quadrangle Elkton (Md.-Del.) begun.

Massachusetts.—The 7½′ quadrangles Attleboro (Mass.-R. I.) and East Providence (Mass.-R. I.) begun. In cooperation with the Department of Public Works, Division of Waterways, the 7½′ quadrangles Cotuit, Fall River (Mass.-R. I.), Franklin (Mass.-R. I.), Hampden, Holliston, Hyannis, Ludlow, Medfield, Pawtucket (R. I.-Mass.), Sterling, Tiverton (R. I.-Mass.), Wachusett Mountain, and Wrentham completed and Belchertown 7½′ and Lowell 7½′ begun.

Michigan.—The 15′ quadrangles Blissfield and Dundee begun. In cooperation with the State Highway Department of Michigan, the 7½′ quadrangles Belle Isle, Detroit, Grosse Pointe, and Highland Park completed and Dearborn, Redford, and Royal Oak begun. In cooperation with the Department of Conservation of Michigan, planimetric maps completed for the 7½′ quadrangles Ballentine Southwest, Copper Harbor Northeast, Copper Harbor Northwest, Copper Harbor Southwest, Delaware Mine Northeast, Delaware Mine Northwest, Delaware Mine Southwest, Delaware Mine Southeast, Eagle River Northeast, Eagle River Southwest, Eagle River Southeast, Manitou Island, and Traverse Point.

Minnesota.—The 15′ quadrangles Drayton (N. Dak.-Minn.), Hallock, Kennedy, and Pembina (Minn.-N. Dak.) begun.

Mississippi.—The 15′ quadrangles Denmark and Oxford begun.

Missouri.—The 15′ quadrangles Kirksville, New Bloomfield, and Tarkio and the 7½′ quadrangle Jefferson City completed and the 15′ quadrangles Farragut and Hamburg begun. In cooperation with the Geological Survey and Water Resources of Missouri, the 15′ quadrangles Darlington, Doniphan, Fordland, Gatewood, Sweet Springs, Topaz, and Vera and the 7½′ quadrangles Caplinger Mills, Cedar Hill, Eldorado Springs, Eldorado Springs South, Eureka, Monegaw Springs, Osceola, Roscoe, Stockton 1c, Stockton 2c, Taberville, Vista, and Worland completed; the 15′ quadrangles Acorn, Bolckow, Brussels, Gentry, Stanberry, and Wellsville and the 7½′ quadrangles Moundville, Nevada 1b, and Nevada 1c begun and the 15′ quadrangle Long Lane continued.

Montana.—Revision of the Glacier National Park completed. Little Rocky Mountains area and Philipsburg District completed. The 15′ quadrangles Mount Cowen and Mount Wallace continued and Sunburst begun.

Nebraska.—An extension to Scotts Bluff National Monument completed and Republican River, Sheets 2, 3, 5, 6, and 7 completed and Sheets 8 and 9 begun.

Nevada.—The 15′ quadrangles Cortez completed and Owyhee continued and the Cosgrave area begun.

New Hampshire.—The 15′ quadrangle North Conway begun.

New Jersey.—The 7½′ quadrangles Marcus Hook (Pa.-N. J.-Del.) and South Amboy completed and New Brunswick begun.

New Mexico.—The 15′ quadrangles Carlsbad, Hackberry Lake, Jemez, Pajarito Peak, and Salt Lake completed and La Ventana and Nacimiento Peak begun.

New York.—The 15′ quadrangles Plattsburg (N.Y.-Vt.), Rouses Point (N.Y.-Vt.) and Willsboro (N. Y.-Vt.) begun. In cooperation with the Department of Public Works of New York, the 7½′ quadrangles East Syracuse and Haverstraw completed and Syracuse begun.

North Carolina.—Cape Hatteras National Park and the 15′ quadrangles Lake Drummond (Va.-N. C.), Moyock (Va.-N. C.), and Raleigh begun.

North Dakota.—The 15′ quadrangles Bathgate, Drayton (Minn.-N. Dak.), and Glasston begun. In cooperation with the Geological Survey of North Dakota, the 15′ quadrangles Aylmer completed and Selz begun.

Oklahoma.—The 15′ quadrangles Fort Reno completed and Geary begun; the 7½′ quadrangles Geary Northeast, Fort Reno Northeast, Fort Reno Northwest, Fort Reno Southwest, and Fort Reno Southeast begun.

Oregon.—The 15′ quadrangles Mount Popocatepetl completed and Yaquina begun.

Pennsylvania.—The 7½′ quadrangles Bridgeport and Marcus Hook (Pa.-N. J.-Del.) completed. In cooperation with the Department of Internal Affairs of Pennsylvania, Topographic and Geologic Survey, the 15′ quadrangles Mifflinburg completed, Orbisonia and Sayre begun, and the cultural revision completed for the 15′ quadrangles Punxsutawney and Smicksburg and begun for Curwensville.

Puerto Rico.—In cooperation with the Commissioner of the Department of the Interior of Puerto Rico, the 7½′ quadrangles Alto Sano, Camuy, Mayaguez, Rincon, and San Sebastian completed and Bayamon and Hormigueros begun.

Rhode Island.—The 7½′ quadrangles Fall River (Mass.-R. I.), Franklin (Mass.-R. I.), Pawtucket (R. I.-Mass.), Sakonnet Point, and Tiverton (R. I.-Mass.) completed and Bristol and Prudence Island begun.

South Carolina.—The 15′ quadrangles Florence and Timmonsville begun.

South Dakota.—The 15′ quadrangles Pukwana completed and Lyonville and Tinton and Vicinity begun.

Tennessee.—The 7½′ quadrangles Bulls Gap completed and Baileyton and Neddy Mountain begun. For the Tennessee Valley Authority, the 7½′ quadrangles Avondale, Benton, Blountville (Tenn.-Va.), Bluff City, Burem, Chuckey, Church Hill (Tenn.-Va.), Clevenger (Tenn.-Va.), Greeneville, Indian Springs (Tenn.-Va.), Jearoldstown, Jonesboro, Kingsport (Tenn.-Va.), Leesburg, Lee Valley, Lovelace, McCloud, Mohawk, Morristown, Mosheim, New Market, Plum Grove (Tenn.-Va.), Pressmans Home, Russellville, Springvale, Spurgeon, Stony Point, Sullivan Gardens, and Telford completed and Cedar Creek, Johnson City, Lake Davy Crockett, Parrotsville, Robbinsville, and Spring City begun.

Texas.—The 15′ quadrangles Big Spring South, Cline, Clint, Fort Bliss, Hueco Tanks, Morita, Tornillo, Turkey Mountain, and Ysleta and the 7½′ quadrangle El Paso completed.

Utah.—Zion National Monument and Bull Valley area completed. The 15′ quadrangles Monroe continued and Soldier Summit begun.

Vermont.—The 15′ quadrangles Plainfield, Plattsburg (N. Y.-Vt.), and Willsboro (N. Y.-Vt.) begun. In cooperation with the State geologist of Vermont, the 15′ quadrangle St. Johnsbury completed.

Virginia.—The 15′ quadrangles Lake Drummond (Va.-N. C.) and Moyock (Va.-N. C.) begun. For the Tennessee Valley Authority, the 7½′ quadrangles Blountville (Tenn.-Va.), Church Hill (Tenn.-Va.), Gate City, Hilton, Indian Springs (Tenn.-Va.), Kingsport (Tenn.-Va.), Mendota and Plum Grove (Tenn.-Va.) completed. In cooperation with the Conservation Commission of Virginia, Geological Survey, the 15′ quadrangles Front Royal completed and Berryville, Clarksville, Hightown, and Rustburg begun.

Washington.—Kittitas Drainage District completed. In cooperation with the Director of the Department of Conservation and Development, the 15′ quadrangles Yakima Northwest completed and Yakima Northeast begun.

Wisconsin.—The 15′ quadrangles Red Wing completed and Maiden Rock and Menomonie begun. In cooperation with the State Highway Commission of Wisconsin, planimetric maps completed for the 15′ quadrangles Alvin, Beechwood, Bessemer, Lac du Flambeau, Marenisco, Minocqua, Phelps, Star Lake, Trout Lake, and Winchester and begun for Pike Lake.

Wyoming.—The 15′ quadrangle Mount Bonneville and an extension to Grand Teton National Park completed. The 30′ quadrangle Big Piney continued. Fossil Special begun.

WATER-RESOURCES BRANCH

The importance of water and of systematic published records of the quantity, chemical quality, and availability of both surface and ground waters increases each year. The growth of the country in population, industry, and agriculture, with consequent increases in the demands for water, and especially the continued series of dry years that included the disastrous and widespread droughts of 1934 and 1936, and the many recently disastrous floods on streams, large and small, in different parts of the country, have impressed on the public the importance of water as a controlling factor in many of man's activities. The information collected by the Geological Survey is used extensively by numerous Federal and State agencies and by many private organizations and individuals, and is found to be invaluable in studies of projects of all classes and in all parts of the country. The work of the Water Resources Branch thus occupies a position of great importance in the economic affairs of the Nation.

As set forth below, the investigations by the Branch are conducted largely in cooperation with Federal bureaus, State, county, municipal, and other governmental agencies, and permittees and licensees of the Federal Power Commission.

Federal bureaus.—Water-resources investigations were conducted for the following Federal bureaus: The Bureau of Biological Survey, the Soil Conservation Service, the Weather Bureau, the Forest Service, the Bureau of Agricultural Economics, and the Flood Control Committee, of the Department of Agriculture; the Office of Indian Affairs, the Bureau of Reclamation, the National Park Service, the Division of Grazing, and the Division of Territories and Island Possessions, of the Department of the Interior; the Bureau of Prisons, of the Department of Justice; the Department of State; the Federal Power Commission; the Public Health Service; the National Resources Committee; the Securities and Exchange Commission; the Tennessee Valley Authority; the Office of the Chief of Engineers and

the Mississippi River Commission, of the War Department; and the Bureau of Naval Ordnance, of the Navy Department.

States.—Amounts aggregating approximately $870,000 were made available by States and municipalities for cooperative water-resources investigations. In addition to these amounts it is estimated that individuals and other organizations furnished data and records having an estimated value of more than $208,000.

Permittees and licensees of the Federal Power Commission.—At the request of the Federal Power Commission, 29 engineers of the Branch have been designated as representatives of the Commission to perform such field work as may be assigned to them by the Commission. About 295 gaging stations were operated by the Branch or by permittees and licensees under the supervision of the Branch in connection with 118 projects of the Federal Power Commission. Engineers of the Branch have had field supervision of the operation of 160 projects under permits and licenses of the Federal Power Commission.

Division of Surface Water.—The Division of Surface Water, through 37 district offices, conducts investigations of surface water, which consist in the measurement of the stages and discharges of rivers in all the States except Delaware, in the District of Columbia, and in Hawaii at selected gaging stations. In this work 45 States, the Territory of Hawaii, and several Federal bureaus cooperated in the maintenance of the 4,165 gaging stations, 2,992 of which are equipped with water-stage recorders, that were in operation at the end of the year. During the year 764 gaging stations were established and 430 were discontinued. The total number of gaging stations includes about 700 stations on canals, ditches, lakes, reservoirs, and rivers where stages only are measured, the records at these stations being of particular value in connection with water utilization, water storage, and flood protection. Some of these 700 stations are equipped with recorders. Records for 132 additional gaging stations were received from Federal Bureaus and from individuals. There were 47,894 regular and 4,621 miscellaneous discharge measurements made during the year, and 16 reports containing records of flow of streams in various sections of the United States and in Hawaii were completed and transmitted to the Government Printing Office. The printer delivered 4 of these reports and also 14 reports that were transmitted to him during the previous year.

Division of Ground Water.—The Division of Ground Water investigates the waters that lie below the surface in the zone of saturation, from which wells and springs are supplied; the source, occurrence, quantity, and head of these waters; their conservation; their avail-

ability and adequacy for domestic, industrial, irrigation, and public supplies and as watering places for livestock and desert travelers; and the methods of constructing wells and recovering water from them and of improving springs. The constantly increasing use of water supplies from wells is causing a greater demand each year for intensive studies of the quantities of ground water that are perennially available. Work was done in 37 States and in Hawaii and the Virgin Islands, nearly all in cooperation with Federal, State, Territorial, or local governmental agencies.

During the year about 75 technical reports or papers relating to ground water were released to the public in printed, mimeographed, or typewritten form. Twenty technical papers were presented by members of the Division before scientific societies and other organizations.

Periodic measurements of water levels or artesian pressure were made in about 5,000 observation wells, on about 200 of which recording gages were maintained. The report on water levels and artesian pressure in observation wells in the calendar year 1937 was published, and a similar report for 1938 is in press. Tests on 86 water-bearing materials were made in the hydrologic laboratory.

Division of Quality of Water.—The Division of Quality of Water analyzed water from surface and underground sources with reference to their suitability for industrial and agricultural uses and for domestic use (not related to questions of health) so far as such use is affected by the dissolved mineral matter. Analyses, partial or complete, of 1,895 samples of water were made in the laboratory in Washington, D. C. The analyses included some for many of the regular studies of ground water in the different States and for most of the special investigations on water supplies for specific projects. A laboratory was operated at Roswell, N. Mex., for work on the salt content of the Pecos River. One chemist was stationed at Austin, Tex., for analytical work and consultation on ground-water problems, and another for most of the year at a new laboratory set up in Boise, Idaho, for determination of suspended matter in samples collected for measurements of silt loads. Close cooperation was continued with the Division of Ground Water in the study of problems relating to quality of ground water and in the preparation of the parts of ground-water reports that involve consideration of the chemical character of the waters.

Studies of suspended and dissolved matter of the Colorado River and its tributaries were continued. Special attention was given to the composition of the water at different depths at points in Lake Mead. On four demonstration projects of the Soil Conservation

Service, studies of silt movement which were started as a Public Works project were continued. Studies of silt movement in streams in the Boise River Basin in Idaho and in the St. Francis River Basin in Missouri were started for the Flood Control Coordinating Committee of the Department of Agriculture.

During the year water analyses were made for the Conservation Branch and the Geologic Branch of the Survey, for the National Park Service of this Department, for the Department of Agriculture, the War Department, the Navy Department, the Public Health Service, the Securities and Exchange Commission, and the District of Columbia. The Division furnished information and advice on problems relating to quality of water to the Public Works Administration, the Reconstruction Finance Corporation, and the Federal Housing Administration.

During the year seven technical papers were presented by members of the Division before scientific societies.

In connection with the work of a committee of the American Water Works Association on the determination of fluoride, detailed analyses were made of 5 samples of water from three States, and the fluoride content was determined in 22 samples from 16 States.

Division of Power Resources.—The Division of Power Resources compiled, by States, information on the capacity of all water wheels in water-power plants in the United States of 100 horsepower or more as of January 1, 1939.

Information was prepared for the use of a subcommittee of the National Resources Committee appointed to prepare a report on national energy resources requested by the President.

Assistance was furnished to the Conservation Branch of the Survey in the preparation of a revision of the report on the potential water power of the world.

Division of Water Utilization.—The Division of Water Utilization conducted hydrologic studies and compiled data relating to the utilization and control of the waters of streams. The Division performed administrative functions for the supervision and investigation of hydrologic problems and for the work conducted by the field organization of this Branch pertaining to power projects of the Federal Power Commission and the Department of the Interior.

Through Public Works funds, special studies and compilations of information pertinent to floods and droughts were organized and supervised by the Division and conducted in the field offices of the Branch. Supervision was also provided for a project conducted by the Works Progress Administration at Pittsburgh, Pa., which in-

volved compilations of topographic characteristics that relate to flood flows from certain drainage basins.

The investigations of the water problems along the boundary between the United States and Canada were continued for the State Department and the International Joint Commission. The Division supervised and coordinated the collection by the district offices of the Division of Surface Water of special stage and discharge data relative to outstanding floods, particularly those of August 1935 in Ohio, of 1937–38 in California, and of September 1938 in the northeastern States. These flood data, with other information concerning notable floods, have been assembled and reports have been submitted for publication or are in preparation. The reports published during the year related to the major Texas floods of 1935, the floods of the Ohio and Mississippi Rivers in January and February 1937, floods in the Canadian and Pecos River Basins of New Mexico in May and June 1937. An inventory of unpublished hydrologic data was issued.

During the year a file or depository of information on floods was established in the Division in accordance with recommendations of the committee on flood-protection data of the American Society of Civil Engineers.

The activities of the Division have made possible the compiling and studying of hydrologic data, which have been collected predominantly by the Water-Resources Branch, in such a manner as to develop significant fundamental principles and facts regarding run-off and stream-flow characteristics. This information is essential and is being used currently in the determination of wise public policy in the application of flood-control measures and land-use practices.

WORK OF THE YEAR BY STATES

The work listed by States was done in part with funds appropriated to the Geological Survey, in part with funds furnished by cooperating States and municipalities, and in part with funds furnished by other Federal bureaus and agencies.

Alabama.—The State Geologist, the Mobile Army Engineer office, and licensees of the Federal Power Commission cooperated in operating 58 gaging stations. Analyses were made of well waters from Coffee County for a report on possible relation between the composition of water and the incidence of tuberculosis.

Arizona.—The State Water Commission and other agencies cooperated in operating 52 gaging stations. A report on ground water in the Holbrook region was published. Investigations of ground-water conditions were made in the upper Gila Valley for the Office of Indian Affairs and in the southeastern part of the State for the Division of Grazing. Water analyses and silt-load measurements were made for the Colorado River at Grand Canyon and at Willow

Beach; samples were obtained daily at both stations. Analyses were made of samples collected at regular intervals from Lake Mead.

Arkansas.—The State Geologist and other State and Federal agencies cooperated in operating 28 gaging stations. The study of the annual pumpage and resultant fluctuations in ground-water levels in the Grand Prairie region was continued. A study of 10 years of ground-water records was released.

California.—The State Department of Public Works and other State, municipal, and county agencies, and various Federal Bureaus cooperated in operating 290 gaging stations. Observation wells were maintained in different areas. A paper on infiltration from rain and irrigation water on the Victor alluvial plain in the Mokelumne area was released.

Colorado.—Work was continued in cooperation with the State Engineer, and 196 gaging stations were operated. Funds were also contributed by the Little Rock Army Engineer office. An investigation of the deep well in Mesa Verde National Park was made for the National Park Service. Ground-water investigations were made for the Grazing Division. Analyses were made of water samples from the Colorado River at Grand Junction and Cameo and from the Gunnison River at Grand Junction.

Connecticut.—The State Water Commission and various municipal and Federal agencies cooperated in operating 34 gaging stations. Records of water levels in observation wells and of the salt content of the water in wells near the coast were obtained and released. Supervision was maintained of an investigation and report on the salinity of the Connecticut River, including about 150,000 determinations of chloride in samples collected since 1934. Analyses were made of 24 samples of ground water from wells near the coast.

Florida.—The State Road Department and other State, municipal, and Federal agencies cooperated in operating 56 gaging stations. Ground-water investigations were continued, and progress was made on the reports on the Jacksonville area and the area west of the Suwannee River.

Georgia.—The State Department of Natural Resources and various Federal agencies cooperated in operating 68 gaging stations. Ground-water investigations were begun in the Savannah area and other parts of the Coastal Plain. Analyses were made of water samples collected at two gaging stations. Samples were collected, and substantial progress was made on the preparation of a report on the salinity of the water of the Savannah River.

Hawaii.—The Territory of Hawaii cooperated in surface-water and ground-water investigations and in the operation of 115 gaging stations. Special attention was given to the use of geophysical methods in connection with ground-water studies. Records of wells on Oahu, a geologic map and guidebook of the Island of Oahu, and a general paper on the ground-water resources of the Territory were prepared for publication.

Idaho.—The State Department of Reclamation, the State Water Conservation Board, and other State and Federal agencies cooperated in operating 302 gaging stations. Reports on the ground-water resources of the Snake River Plain and the Mud Lake and Island Park areas were published. A laboratory was set up at Boise and used for the determination of suspended matter in 10,232 samples collected between January 15 and June 30 in connection with measurements of silt loads for the Flood Control Coordinating Committee of the Department of Agriculture.

Illinois.—The State Department of Registration and Education and other State and Federal agencies cooperated in operating 50 gaging stations. A

reconnaissance was made of ground-water conditions in the East St. Louis area.

Indiana.—The State Department of Public Works and other State, municipal, and Federal agencies cooperated in operating 39 gaging stations. An investigation of ground water in the Indianapolis area was made, and a State-wide observation-well program was conducted.

Iowa.—The Iowa Geological Survey and other State and Federal agencies cooperated in operating 59 gaging stations. An investigation of the ground-water supplies of the State and a study of the effects of soil-conservation measures on the ground-water levels were undertaken.

Kansas.—The State Board of Agriculture and other State, municipal, and Federal agencies cooperated in operating 48 gaging stations. Ground-water investigations in the Wichita and Winfield areas and on the High Plains and water-level measurements in wells in the Mankato area were made. A report on the ground-water resources of the Arkansas Valley in Ford County and several brief papers on ground water were released.

Kentucky.—The State Department of Highways and the Huntington, Louisville, and Nashville Army Engineer offices cooperated, and 45 gaging stations were in operation at the end of the year.

Louisiana.—The State Department of Conservation, the State University, and the Mississippi River Commission cooperated in operating 34 gaging stations. An investigation of the ground-water resources was conducted in Rapides, Arcadia, Jefferson Davis, Avoyelles, Grant, and LaSalle Parishes. A general paper on ground-water supplies in Louisiana was prepared for publication. Partial analyses of 76 samples and detailed analyses of 10 samples of ground water were made.

Maine.—The Maine Public Utilities Commission cooperated in surface-water investigations and in the operation of 36 gaging stations.

Maryland.—The State Geologist and several municipal and Federal agencies cooperated in operating 29 gaging stations. An investigation and reports on the ground-water supply at Indian Head were made, including analyses of 9 samples of water from wells. Records of water levels in a well in Montgomery County were obtained. Three samples from wells at Laurel were analyzed.

Massachusetts.—The State Department of Public Works and other State and Federal agencies cooperated in operating 38 gaging stations in Massachusetts and 1 in Rhode Island. Ground-water investigations were made in the Lowell area.

Michigan.—The State Stream Control Commission cooperated in operating 45 gaging stations. Informal cooperation on the observation-well program was continued with the Geological Survey Division.

Minnesota.—The State Division of Drainage and Waters and several Federal agencies cooperated in operating 301 gaging stations.

Mississippi.—The Mississippi Geological Survey and several Federal agencies cooperated in operating 49 gaging stations. An investigation of ground-water resources was undertaken in the alluvial plain of the Mississippi Valley and in the coastal area.

Missouri.—The Missouri Geological Survey and Water Resources and other State, municipal, and Federal agencies cooperated in operating 102 gaging stations. The observation-well program in the Tarkio area was continued and 2,850 samples from 2 streams in and near the Tarkio project of the Soil Conservation Service were examined for silt content. The silt content was determined for 1,600 samples from streams in the St. Francis River Basin.

Montana.—The State Engineer, the State Water Conservation Board, and several Federal agencies cooperated in operating 155 gaging stations. The observation-well program was continued in the lowlands at the head of Flathead Lake.

Nebraska.—The State Engineer and other State and Federal agencies cooperated in operating 59 gaging stations. The State-wide observation-well program was continued, and ground-water investigations were made, chiefly in Box Butte County. A report on ground water in the Grand Island area and several brief papers on ground water were released. Analyses of 21 samples of ground water were made as part of the cooperative studies.

Nevada.—The State Engineer and municipal, county, and Federal agencies cooperated in operating 13 gaging stations. An investigation and a report were made on the artesian water supply in the Las Vegas area, with special reference to leakage of artesian wells.

New Hampshire.—The New Hampshire Water Resources Board cooperated in surface-water investigations and in the operation of 29 gaging stations.

New Jersey.—The State Water Policy Commission and other State and Federal agencies cooperated in operating 80 gaging stations. The program of observation wells begun in 1923 was continued, and intensive ground-water investigations were made, especially in regard to salt-water intrusion and artificial recharge. The regular semiannual examination of ground water from the Atlantic City region was continued, and the chloride content of 120 samples was determined. The chloride content of samples collected monthly from 10 wells in the Parlin area (90 samples) was determined.

New Mexico.—The State Engineer, the Interstate Stream Commission, and other State and Federal agencies cooperated in operating 160 gaging stations. Ground-water investigations were made and reports were released or prepared for publication on the shallow-water resources of the Roswell Basin, the ground-water supplies of the Middle Rio Grande, Mimbres, and Portales Valleys, Lea County, the Jicarilla and Zuni Indian Reservations, and the vicinity of Los Lunas. Ground-water investigations were conducted in the Hot Springs area and at the Conchas Dam. Analyses were made in the Washington laboratory of 42 samples from the Rio Grande and tributaries, of 14 samples collected at Conchas Dam, and of 386 samples from the Pecos River. In the Roswell laboratory analyses were made of 10-day composites of daily samples from 7 stations and of 1,277 single samples. In the Albuquerque laboratory analyses were made of 1,240 samples of water from the Pecos River. A preliminary statement on the chemical character of Pecos River in New Mexico, 1937–38, was prepared for use in connection with plans for further study of the river water.

New York.—The State Water Power and Control Commission and other State, county, municipal, and Federal agencies cooperated in operating 150 gaging stations. Ground-water investigations were continued on Long Island and in Croton Valley. Several reports on ground water were released.

North Carolina.—The State Department of Conservation and Development and several Federal and municipal agencies cooperated in operating 102 gaging stations. The study of methods of developing wells and the program of water-level measurements in wells in different parts of the State were continued. During the year 3,360 samples were collected for determination of silt in 3 streams near High Point in connection with the demonstration project of the Soil Conservation Service.

North Dakota.—The State Engineer and other State and Federal agencies cooperated in operating 31 gaging stations. A study of the Dakota artesian basin and a State-wide observation-well program were continued.

Ohio.—The Ohio Cooperative Topographic Survey and other State, municipal, county, and Federal agencies cooperated in operating 93 gaging stations. An investigation of ground-water supplies of Butler and Hamilton Counties, in the Cincinnati area, was continued, and records of water levels and pumpage from wells in the Canton area were obtained.

Oklahoma.—The Oklahoma Planning and Resources Board and other State, municipal, and Federal agencies cooperated in operating 30 gaging stations. A report on the ground-water resources of Texas County was released, and investigations were begun in Cimarron County. Water-level measurements were made in the three Panhandle counties and in the Stillwater area. Partial analyses were made of 44 samples, and detailed analyses were made of 4 samples of ground water collected in Cimarron County as a part of the cooperative studies.

Oregon.—The State Engineer and other State, municipal, and Federal agencies cooperated in operating 213 gaging stations. A report on the ground-water resources of the Willamette Valley was completed, and the program of water-level measurements in observation wells was continued. The geology of dam sites in the Willamette Valley was investigated for the Army Engineers.

Pennsylvania.—The State Department of Forests and Waters and other State, municipal, and Federal agencies cooperated in operating 114 gaging stations. Reports on ground water in the south-central and the north-central parts of the State were prepared for publication. The program of water-level measurements in observation wells was continued. At the request of the Pennsylvania Turnpike Commission a study was begun of the waters encountered in the tunnels of the old railroad line that is being generally followed by the turnpike to determine the chemical character in its relation to probable effects on construction materials, the results being used as a guide in the preparation of specifications for tunnel linings and grouting and for pipe.

South Carolina.—The State Highway Department and several municipalities and Federal agencies cooperated in operating 31 gaging stations. The study of ground-water levels in the Tyger River area was continued.

South Dakota.—The Kansas City Army Engineer office and the Department of Agriculture cooperated in surface-water investigations and in the operation of 22 gaging stations.

Tennessee.—The State Division of Geology and several Federal agencies cooperated in operating 104 gaging stations. Records were obtained of the current pumpage and water levels in observation wells in Memphis. Detailed analyses of 30 samples of well waters from Giles County were made in connection with a study by the Public Health Service of tuberculosis, and a report was prepared on the relation between the composition of water and the incidence of tuberculosis in the county.

Texas.—The State Board of Water Engineers and several municipalities and Federal agencies cooperated in operating 139 gaging stations. Ground-water investigations were continued and reports were released on ground water on the High Plains and in the Houston, San Antonio, Big Spring, Balmorhea, and Seadrift areas. A report on ground water in the Texarkana area was made for the Department of Justice. Reports giving the results of water-well and spring inventories in the following counties were prepared in cooperation with the Works Progress Administration: Hartley, Hidalgo, Hays, Oldham, Deaf

Smith, Dawson, Carson, Collingsworth, Waller, Montgomery, Harris, Grimes, Fort Bend (east of Brazos), Brazoria (east of Brazos), Galveston, Gonzales, Ochiltree, and Edwards. During the year 5,303 water samples were analyzed.

Utah.—Surface and ground-water investigations were continued in cooperation with the State Engineer, and 74 gaging stations were operated. In the ground-water studies special attention was given to the fluctuation of water levels in wells with precipitation and with pumpage or artesian flow, and to the effects of the conservation program administered by the State Engineer. Several papers relating to ground water in the State were released. Analyses were made of 36 composites of daily samples from the San Juan River near Bluff. Determinations were made of the total dissolved solids in composites of daily samples collected from the Colorado River at Cisco and from the Green River at Greenriver.

Vermont.—Surface-water investigations were continued in cooperation with the State, and 29 gaging stations were operated.

Virginia.—The State Department of Conservation and Development and other State and Federal agencies cooperated in operating 91 gaging stations. Studies of ground water were continued, chiefly on the Coastal Plain. A report on the ground-water resources of northern Virginia was prepared for publication, and a preliminary report on Sussex, Southampton, and Isle of Wight Counties was released. The program of observation wells near Washington, D. C., was continued. Analyses were made of 17 samples collected in connection with studies of ground water.

Virgin Islands.—A study was made of the ground-water conditions on the Island of St. Croix, and reports were made to the Division of Territories and Island Possessions on a program of test drilling on that island.

Washington.—The State Department of Conservation and Development and other State, county, municipal, and Federal agencies cooperated in operating 105 gaging stations. Ground-water studies were continued, and a report was released on the ground-water resources of the Tacoma area. Records were obtained on public water supplies and on water levels in observation wells in a State-wide program, with special attention to the Spokane area and the Pullman area of the Soil Conservation Service. During the year 2,250 samples from 3 streams in Pullman were examined for silt content in connection with the operation of the Pullman demonstration project of the Soil Conservation Service, and analyses were made of 13 samples of ground water collected near Tacoma.

West Virginia.—The State Public Service Commission and other State and Federal agencies cooperated in surface-water investigations and in the operation of 63 gaging stations.

Wisconsin.—The State Public Service Commission and other State and Federal agencies cooperated in surface-water investigations and in the operation of 89 gaging stations. Records of water levels in observation wells were obtained through informal cooperation with the Soil Conservation Service and the State Conservation Department. During the year 1,920 samples from 2 streams near LaCrosse were examined for silt content in connection with the operation of the LaCrosse demonstration project of the Soil Conservation Service.

Wyoming.—Surface-water investigations were continued in cooperation with the State Engineer, and 114 gaging stations were operated. Funds were also contributed by permittees of the Federal Power Commission and by the Kansas City Army Engineer office.

CONSERVATION BRANCH

The work of the Conservation Branch involves surveys and investigations for an inventory of the water and mineral resources of the public domain, supervision of private development of power and production of minerals from public and Indian lands and naval petroleum reserves, and supplying information and advice to numerous land-administrative agencies of the Government.

Although these activities were maintained throughout the year, inadequate funds precluded the comprehensive and detailed consideration that the work warranted. The amount of field supervision required, which has been increasing each year, again advanced materially. On public land alone 133 operating properties were added to the number under supervision. Mineral production during the year from public and Indian lands and naval petroleum reserves under supervision had an estimated value of $83,000,000, and the revenue accrued therefrom amounted to about $9,500,000. Cost of supervision is small compared with the substantial revenue that it assures.

Cases pending in the Branch at the end of the year decreased 79 percent, largely through completion of the classification of 7,952 oil and gas prospecting permits under the act of August 26, 1937, as required by Departmental Order No. 1240 of December 23, 1937. Work on unit plans was maintained on a current basis throughout the year, and at its close all of the 1,665 plans of development and operation received had been given original technical consideration.

In addition to their regular activities members of the Branch were engaged on related Public Works projects, thus accomplishing useful conservation work.

MINERAL CLASSIFICATION DIVISION

The office activities of the Mineral Classification Division were directed largely to determining the areas subject to inclusion in plans for unit or cooperative development submitted by holders of Government oil and gas prospecting permits and leases, to consideration of oil and gas leases to be exchanged for outstanding oil and gas permits, to preparation of reports on initial applications for oil and gas leases, and to classifying lands embraced in applications for surface rights under the nonmineral public-land laws.

For mineral classification, information on the occurrence of coal in Montana, New Mexico, Utah, Washington, and Wyoming; of oil and gas in Alabama, Arizona, Arkansas, California, Colorado, Florida, Louisiana, Montana, New Mexico, Oklahoma, and Wyoming;

and of phosphate in Florida was obtained either by the personnel of the Mineral Classification Division or through the Geologic Branch.

In the work of the Division, 9,222 cases requiring technical consideration were disposed of during the year. In addition, a revision of the definitions of the known geologic structure of 14 producing oil and gas fields and the initial definition of 10 new fields were prepared and promulgated as follows:

Definitions of Known Geologic Structure, Fiscal Year 1939

State	Field	Date promulgated	Field area (acres)
Colorado	Wilson Creek	Dec. 9, 1938	12,886
New Mexico	Artesia [1]	Oct. 29, 1938	22,093
Do	Baish [1]	do	4,800
Do	Black River	do	640
Do	Compton [1]	do	2,000
Do	Cooper-Lynn [1]	Nov. 17, 1938	29,378
Do	Eunice [1]	do	32,406
Do	Grayburg [1]	Oct. 29, 1938	3,342
Do	Hobbs [1]	Nov. 17, 1938	12,809
Do	Jackson [1]	Oct. 29, 1938	9,408
Do	Jal [1]	Nov. 17, 1938	17,139
Do	Leonard-Levers [1]	Oct. 29, 1938	5,120
Do	Mattix	Nov. 17, 1938	9,710
Do	Monument	do	32,404
Do	Pecos Valley [1]	Oct. 29, 1938	3,591
Do	Penrose-Hardy	Nov. 17, 1938	32,961
Do	Red Lake	Oct. 29, 1938	3,520
Do	Skaggs	Nov. 17, 1938	5,083
Do	Skelly [1]	Oct. 29, 1938	4,804
Do	Skelly-Sims	Nov. 17, 1938	6,849
Do	Stuart-Langlie	do	36,408
Do	South Eunice [1]	do	15,727
Do	Wills	Oct. 29, 1938	1,600
Utah	Clay Basin [1]	Sept. 15, 1938	6,728

[1] Revised.

The aggregate area of the outstanding definitions of the known geologic structure of oil and gas fields on June 30, 1939, amounted to 1,353,796 acres in California, Colorado, Montana, New Mexico, North Dakota, Oklahoma, Utah, and Wyoming.

WATER AND POWER DIVISION

The work of obtaining basic information on the water-power resources and storage possibilities of public land and of making it available for use in the administration of public-land laws and to Federal and other agencies engaged in planning, constructing, and operating water-power projects was continued in the field but on an increased scale through funds made available by the Public Works Administration. River utilization surveys covering 740 miles of streams and tributaries and detailed surveys at 12 dam sites were made. Surveys of mineral leaseholds embracing an area of 35 square miles were completed. The preparation was continued of reports on geologic conditions at dam sites examined in the field

during the preceding year. Field examinations of geologic conditions at 15 dam sites, geophysical examinations at 23 dam sites, and an experimental geophysical examination of one potash leasehold were made.

Office activities included action resulting in the addition of 19,924 acres to outstanding water-power reserves in 11 public-land States and Alaska and the elimination of 4,480 acres from such reserves in 7 States, with a net increase in the total reserved area in 22 States and Alaska to 6,690,576 acres. The addition of 3,199 acres to reservoir-site reserves made a total of 134,648 acres withdrawn. Field supervision, with the Water Resources Branch, of power projects for the Federal Power Commission involved supervision of construction and operation on 160 projects, continuation of studies of cost accounting on 9 of these projects, and investigations and reports on 5 of the projects. Field supervision of power projects holding permits and grants from the Department of the Interior involved 172 projects.

MINING AND OIL- AND GAS-LEASING DIVISIONS

The work of the Mining and Oil- and Gas-leasing Divisions consists of inspectional and regulatory supervision of mineral prospecting and development on public and Indian lands and naval petroleum reserves.

The Mining Division is charged with supervision of all operations for the discovery and development on public land of deposits of coal, potassium, sodium, phosphate, and oil shale; in New Mexico and Louisiana of sulfur; on certain land grants of gold, silver, and mercury; and on restricted, allotted, and tribal Indian lands of all minerals except oil and gas. This supervisory and regulatory work during the fiscal year was accomplished through six field offices at Denver, Colo., Billings, Mont., Carlsbad, N. Mex., McAlester and Miami, Okla., and Salt Lake City, Utah, and through a cooperative agreement approved May 4, 1935, with the Department of Mines, Territory of Alaska. During the year the territorial delineation of two mining districts was changed and a new mining district created, with headquarters at Carlsbad, N. Mex.

The work of the Oil- and Gas-leasing Division includes inspectional and regulatory supervision of all operations for the discovery, development, and production of petroleum and natural gas on public land of the United States, on naval petroleum reserves, and on all Indian land subject to departmental jurisdiction, both tribal and allotted, except the Osage Reservation, Okla. The work was accomplished during the year through 16 field offices and suboffices at Los

Angeles and Taft, Calif., Roswell and Farmington, N. Mex., Tulsa, Oklahoma City, Ardmore, Holdenville, and Drumwright, Okla., Denver, Colo., Casper, Midwest, and Thermopolis, Wyo., Billings and Great Falls, Mont., and Salt Lake City, Utah. During the year the supervisory headquarters in California was moved from Taft to Los Angeles, and the Casper subdistrict, comprising the southern part of Wyoming, was divided into two subdistricts.

Public land.—The number of public-land properties under supervision of the Mining Division at the end of the year was 683, a decrease of 60 since June 30, 1938. Coal properties in 14 States and Alaska decreased 51, to 575; potash properties in 2 States decreased 6, to 28; sodium properties in 8 States decreased 3, to 46; phosphate properties in 3 States were again 7; sulfur properties in 1 State were again 27. The relatively large decrease in coal properties resulted indirectly from the Secretary's instructions of January 24, 1934, and that in potash properties from the Secretary's Order No. 914 of April 5, 1935. The Secretary's Order No. 1294 of July 2, 1938, restricted further issuance of phosphate leases and permits. In prospecting for the above-named minerals 40 boreholes were drilled during the year.

Accidents to employees working in mines under departmental lease are generally fewer than in competitive mines not on Government land, and it is gratifying to note that of the 67 awards to coal and potash mines made by the Joseph A. Holmes Safety Association for the calendar year 1938, 7 were made to departmental lessees. The use of safety appliances and safety clothing is increasing generally throughout mines on Government land.

The number of public-land properties under supervision of the Oil and Gas Leasing Division decreased about 0.5 percent to a total of 8,560, involving 11,466,872 acres in 19 States and Alaska. Drilling activity on public land during the fiscal year included the commencement of 325 new wells and the completion of 301 wells, of which 224 were rated as productive of oil and gas and 77 as barren. The total number of wells under supervision on June 30, 1939, was 8,823, including 4,503 capable of oil or gas production. Production of petroleum from public land in the fiscal year 1939 was about 7 percent less than in the preceding year; production of gas increased about 6 percent; and production of natural gasoline decreased about 5 percent.

The personnel of the Division continued to assist in the preparation of unit or cooperative plans of operation and development and in reviewing and revising the engineering and royalty features of such plans after their submission. Approximately 250 outstanding

oil and gas prospecting permits were classified under the various extension provisions of the act of August 26, 1937 (50 Stat. 842). At the end of the year a total of 1,665 plans of unit or cooperative development for oil or gas pools, fields, or areas involving public land had been filed with the Geological Survey, of which 111 had been given final approval by the Secretary of the Interior, 1,527 had been rejected, withdrawn, or suspended, and 27 were pending final action. During the year 28 unit agreements were filed, 55 acted upon, and 20 approved by the Secretary of the Interior.

Indian land.—The number of Indian-land properties under supervision of the Mining Division during the year was 246 in 11 States. These properties involved 45 lead and zinc leaseholds in the Quapaw Reservation, Okla., with aggregate royalty accruals of $526,118.47, an increase of 7.96 percent over that of the preceding year; 56 coal leaseholds on segregated Choctaw and Chickasaw land and restricted allotted land in Oklahoma, with an aggregate production that decreased from 289,089.10 tons in 1938 to 268,503.78 tons in 1939, and revenue accruals from royalties, bonuses, and sale of coal lands amounting to $49,307.57; 4 unleased purchased tracts and 1 asphalt lease on segregated land in Oklahoma; and 140 properties in 10 western States, of which 14 were agency coal mines, 14 coal leases, 63 individual Indian coal mines, and 49 metalliferous leases and nonmetalliferous leases other than coal leases.

Oil and gas supervision involved 4,984 leaseholds, 4,039 wells, and aggregate bonus, royalty, and rental accruals estimated at $2,000,000 for Indian beneficiaries in 10 States and 33 different tribes. The cooperative duties involved royalty accounting; appraisals of bonuses, royalty offers, and pollution damages; assistance to lessees of Indian land on operating problems and in the preparation of unit plans of development; and assistance to agency officials and tribal councils on technical phases of leasehold development and administration.

Naval petroleum reserves.—On behalf of the Navy Department supervision was continued during the year over operations for the production of oil and gas within Naval Petroleum Reserves Nos. 1 and 2, in California, and for the conservation of shut-in production within Naval Petroleum Reserve No. 3, in Wyoming. Production from 514 wells on the reserves aggregated 3,874,995 barrels of petroleum, 2,260,305,000 cubic feet of natural gas, and 10,067,618 gallons of natural gasoline and had an aggregate royalty value of $947,268.19.

PUBLIC WORKS PROJECTS

Under the supervision of personnel of the Conservation Branch, expenditures aggregating $159,521.59 were made during the year

from Public Works funds allotted for field investigations and conservation work. On 10 projects $66,188.67 was expended for river-utilization surveys of power and storage resources of important streams in 10 States. On 11 projects $93,332.92 was expended in 8 States to plug and abandon or condition for use as a source of water numerous wells that had been drilled for oil and gas on public land and had theretofore been improperly abandoned or merely deserted; to fill, bulkhead, or otherwise safeguard abandoned mines or openings on Indian land; and for construction and repairs at 2 federally owned camps.

SUMMARY OF FIELD ACTIVITIES, BY STATES

Alabama.—Investigated oil- and gas-prospecting operations throughout the State and examined two tracts in Fayette County for mineral classification. Supervised one coal lease on public land.

Alaska.—Supervised 1 power project, 2 leases, 12 prospecting permits, 4 licenses for coal, and 146 prospecting permits for oil and gas on public land.

Arizona.—Examined 1 tract in Maricopa County for mineral classification and 19 dam sites for geologic conditions, 13 of these by geophysical methods. Supervised 23 power projects, 2 prospecting permits for coal and 3 for sodium, and 8 leases and 59 prospecting permits for oil and gas on public land, 7 Indian agency coal mines, and 6 asbestos leases, 1 gold lease, and 1 guano lease on Indian land. Surveyed 40 linear miles of river basin and 2 dam sites under Public Works allotments.

Arkansas.—Investigated oil- and gas-prospecting operations in the northeastern, central, and southwestern parts of the State for mineral classification. Supervised 1 power project and 9 prospecting permits for oil and gas on public land.

California.—Investigated oil and gas development in the southern part of the State for mineral classification. Supervised 93 power projects, 2 prospecting permits for coal and 32 for sodium, 1 sodium lease, 1 potash lease, and 406 leases and 885 prospecting permits for oil and gas on public land, 1 coal lease, 2 gold leases, and 1 copper-lead lease on Indian land, and 22 oil and gas leases on naval petroleum reserves. Conditioned 1 oil and gas well for abandonment, salvaged equipment from naval petroleum reserves, and renovated 1 federally owned camp under Public Works allotments.

Colorado.—Completed structural and stratigraphic investigations of the Black Canyon structure, Mesa County; of the Piceance Creek and Wilson Creek structure, Rio Blanco County; and of the Powder Wash structure, Moffat County, for mineral classification. Examined 10 dam sites by geophysical methods. Supervised 12 power projects, 91 leases, 19 prospecting permits, 7 licenses for coal, 1 sodium lease, and 90 leases and 577 prospecting permits for oil and gas on public land, and 2 coal leases and 1 vermiculite lease on Indian land. Surveyed 10 square miles of mineral leaseholds, 100 linear miles of river basin, and 2 dam sites, and conditioned 5 oil and gas wells for abandonment under Public Works allotments.

Florida.—Investigated phosphate and oil and gas prospecting operations throughout the State, and examined 1 tract in Alachua County, 1 tract in High-

lands County, 1 tract in Manatee County, 1 tract in Polk County, and 3 tracts in Taylor County, for mineral classification.

Idaho.—Supervised 38 power projects, 2 leases and 15 prospecting permits for coal, 1 phosphate lease, and 1 lease and 68 prospecting permits for oil and gas on public land, and 1 limestone lease on Indian land. Surveyed 70 linear miles of river basin and 4 dam sites under Public Works allotments.

Kansas.—Supervised 26 leases and 3 prospecting permits for oil and gas on public land and 5 leases for oil and gas on Indian land.

Louisiana.—Investigated oil and gas prospecting operations throughout the State for mineral classification. Supervised 52 leases for oil and gas on public land.

Michigan.—Supervised 1 lease for oil and gas on public land and 7 leases for oil and gas on Indian land.

Mississippi.—Supervised 1 power project.

Montana.—Continued an areal stratigraphic and subsurface structural investigation in Glacier, Toole, Liberty, and Pondera Counties, and completed a reconnaissance geologic survey of the Cascade-Augusta region in Cascade and Lewis and Clark Counties, for mineral classification. In cooperation with the Geologic Branch completed an investigation of the coal resources of the Otter Creek district in Big Horn, Powder River, and Rosebud Counties. Supervised 43 power projects, 93 leases, 17 prospecting permits, and 45 licenses for coal, 5 phosphate leases, and 199 leases and 673 prospecting permits for oil and gas on public land, and 3 agency coal mines, 7 coal leases, 4 silver-lead-gold leases, 1 bentonite lease, and 51 leases for oil and gas on Indian land. Examined 2 applications for complex-metal leases and 1 group of complex-metal mining claims on Indian land. Surveyed 150 linear miles of river basin and 2 dam sites, conditioned 4 oil and gas wells on Indian land for abandonment, and repaired and conditioned 2 water wells on public land under Public Works allotments.

Nebraska.—Supervised 2 leases for oil and gas on public land.

Nevada.—Supervised 28 power projects, 5 coal prospecting permits, 8 sodium permits, and 2 leases and 63 prospecting permits for oil and gas on public land and 11 marl leases on Indian land. Examined 6 dam sites for geologic conditions and surveyed 60 linear miles of river basin under Public Works allotments.

New Mexico.—Examined 1 tract in Colfax County and continued an areal, stratigraphic, and subsurface structural investigation in Lea and Eddy Counties, for mineral classification. Completed a stratigraphic and structural investigation of the Bueyeros carbon-dioxide area in Harding County. Supervised 3 power projects, 23 leases, and 18 prospecting permits for coal, 17 permits for sodium, 15 leases and 26 permits for potash, 27 permits for sulphur, and 677 leases and 1,354 prospecting permits for oil and gas on public land, and 4 agency coal mines, 2 coal leases, 63 individual Indian coal mines, and 5 leases for oil and gas on Indian land. Examined 1 potash leasehold by geophysical methods, conditioned 2 oil and gas wells for abandonment, and surveyed 1 square mile of mineral leasehold and 80 linear miles of river basin under Public Works allotments.

New York.—Supervised 2 leases for oil and gas on Indian land.

North Dakota.—Supervised 60 leases and 19 licenses for coal, 3 prospecting permits for sodium, and 5 leases and 23 prospecting permits for oil and gas on public land.

Oklahoma.—Investigated oil and gas prospecting operations in the southern part of the State for mineral classification. Supervised 3 power projects, 68

leases, and 38 prospecting permits for oil and gas on public land; 29 leases, 25 mining permit leases, 1 leased purchased tract, and 4 unleased purchased tracts for coal, 1 asphalt lease, and 1 right-of-way lease on segregated tribal and restricted allotted Indian lands; 45 zinc-lead leases on Quapaw Indian land; and 4,832 leases for oil and gas on Indian land. Conditioned 1 oil and gas well for abandonment, and filled, bulkheaded, or otherwise safeguarded 475 abandoned mines or openings on Indian land under Public Works allotments.

Oregon.—Examined 2 dam sites for geologic conditions. Supervised 36 power projects, 2 coal prospecting permits, and 1 lease and 68 prospecting permits for oil and gas on public land.

South Dakota.—Supervised 5 leases, 3 prospecting permits, and 1 license for coal, and 18 leases and 29 prospecting permits for oil and gas on public land and 6 leases for oil and gas on Indian land.

Utah.—Began a topographic survey and a geologic and structural investigation of the coal resources in the vicinity of Sunnyside, in Carbon County. Supervised 15 power projects, 61 leases, 32 prospecting permits, and 2 licenses for coal, 3 sodium permits, 1 phosphate lease, and 53 leases and 852 prospecting permits for oil and gas on public land and 6 gilsonite leases on Indian land. Surveyed 4 square miles of mineral leasehold and 50 linear miles of river basin, conditioned 2 oil and gas wells for abandonment on public land, and filled 6 surface openings on Indian land under Public Works allotments.

Washington.—Investigated geologic conditions in the Glacier coal field, in Whatcom County, and economic conditions affecting the Big Four coal lease, in King County. Examined 1 dam site for geologic conditions. Supervised 23 power projects, 1 lease and 10 prospecting permits for coal, and 8 prospecting permits for oil and gas on public land and 5 silver-lead-gold leases, 6 tungsten leases, and 31 leases for oil and gas on Indian land. Surveyed 2 dam sites and 80 linear miles of river basin under Public Works allotments.

Wisconsin.—Supervised 2 power projects.

Wyoming.—Continued a topographic, structural, and stratigraphic investigation of the Lance Creek oil field, in Niobrara County, and of an area in the eastern part of Niobrara County. Completed a structural investigation of the western part of the Dewey area, in Weston and Niobrara Counties, for mineral classification. Investigated the coal resources of an area in the Hanna Basin, in Carbon County. Supervised 10 power projects, 62 leases, 47 prospecting permits, and 22 licenses for coal, 1 lease and 1 permit for sodium, and 805 leases and 1,291 prospecting permits for oil and gas on public land and 2 coal leases and 43 leases for oil and gas on Indian land. Tested shut-in pressures on Naval Petroleum Reserve No. 3 for the purpose of conserving shut-in production. Performed technical supervision at Emergency Conservation Camp 858, established for conserving coal deposits. Surveyed 19 square miles of mineral leasehold and 110 linear miles of river basin, conditioned for abandonment 3 oil and gas wells on public land and 29 oil and gas wells on Indian land, repaired 2 water wells on public land and 2 water wells on Indian land, and renovated 1 federally owned camp under Public Works allotments.

WORK ON PUBLICATIONS

Texts.—The book publications of the year numbered 63 in the regular series and 21 pamphlets and circulars for administrative use. The total number of pages was 12,713. Besides these printed publi-

cations 55 brief papers were issued in mimeographed form as memoranda for the press or as informative circulars. During the year 18,932 pages of manuscript were edited and prepared for printing, 1,070 galley proofs were read, and 7,761 page proofs were revised. Indexes were prepared for 31 publications, covering 3,264 pages. Copy and proof or stencils for 473 pages of multigraph and mimeograph matter were read.

Illustrations.—The illustrations prepared consisted of 1,121 drawings and photographs. Six hundred and forty-six illustrations to accompany 30 reports were transmitted to the printer, and 463 proofs and 46 edition prints were examined.

Geologic map editing and drafting.—The preliminary geologic map of Leadville, Colo., and vicinity was drawn, engraved, and printed. Color proof of the geologic map of the Front Range, Colo., was read and the map prepared for printing. A total of 170 drawings, chiefly geologic maps, sections, and diagrams, were made and edited, to illustrate scientific papers prepared by geologists of the Survey to be published as State Geological Survey reports or in other scientific journals. The drawings for 17 papers were edited, and proofs of geologic maps and other illustrations for 8 reports were read.

Distribution.—A total of 642 publications, comprising 63 new books and pamphlets, 124 new or revised topographic and other maps, 33 Tennessee Valley Authority maps with contours, 226 reprinted topographic and other maps, and 144 new advance sheets and 52 reprinted advance sheets were received during the year. A number of special pamphlets and forms for administrative use were also delivered and distributed. The total units of all publications received numbered 139,892 books and pamphlets and 1,151,049 topographic and other maps, a grand total of 1,290,941. There were distributed 110,233 books and pamphlets, 3,731 geologic folios, and 803,368 maps, a grand total of 917,332, of which 3,596 folios and 678,374 maps were sold. The net proceeds (gross collections less copying fees and amounts refunded) from the sales of publications were $38,137.22, which included $37,615.89 for topographic and geologic maps, and $521.33 for geologic folios. In addition to this amount, $11,495.46 was repaid to the Survey by other establishments of the Federal Government at whose request maps or folios were furnished. The total net receipts, therefore, were $49,632.68.

Engraving and printing.—During the year 86 newly engraved topographic maps, including 4 revised maps, were printed, and also 38 special maps. Of the newly engraved maps, 58 were completed under Public Works allotment. Corrections were engraved on the

plates of 350 maps. Reprint editions of 213 engraved topographic maps and 13 photolithographed State and other maps were printed and delivered. In addition, 39 new topographic maps had been engraved and were in press June 30, including 20 under Public Works allotment, and the engraving of 123 other new topographic maps was in hand, including 47 under Public Works allotment. Of new and reprinted maps, 350 different editions, amounting to 1,003,609 copies, were delivered.

A large amount of work was done for 71 other units of the Federal Government and State governments, and the charge for it was about $174,000, for which the appropriation for engraving and printing geologic and topographic maps was reimbursed.

Transfer impressions numbering 543 were made during the year, and the amount turned over to miscellaneous receipts was $420.83.

Of topographic maps and contract and miscellaneous work of all kinds, a grand total of 3,152,546 copies was printed and delivered.

The photographic laboratory made 10,709 negatives (including 3,567 wet plates for photolithographs, 889 wet plates for photographic prints, 43 paper negatives, 242 dry plates, 623 lantern slides, 207 half-tone negatives, and 5,138 field negatives), 23,393 prints (including 11,008 maps and diagrams, 35 celluloid positives, 11,661 photographs for illustrations and records, and 689 bromide enlargements), 3,033 zinc plates, 285 intaglio etchings, and 29 celluloid prints and mounted 1,753 prints.

LIBRARY

The total number of books and separate items circulated by the library amounted to 40,000. Books borrowed from other libraries for the use of the Geological Survey numbered 727, and books loaned to other libraries numbered 2,347. More than 2,100 new books, periodicals, maps, and other items were received, and more than 9,000 new cards were filed in the catalog. About 1,275 books were bound at the Government Printing Office.

The consolidated volume of the bibliography of North American geology for 1929–38 is 46 percent complete.

APPROPRIATIONS AND EXPENDITURES

The appropriation made directly for the work of the Geological Survey for the fiscal year 1939 included 10 items, amounting to $3,164,680, of which $50,608.38 remained unobligated on June 30, 1939. In addition, $7,000 was allotted from the appropriation for contingent expenses of the Department of the Interior for miscellaneous supplies.

Financial Statement of the Geological Survey for the Fiscal Year 1939

	Funds available				Obligations			Balance
	Amounts appropriated or transferred	Repayments and adjustments		Total	Disbursements	Outstanding liabilities	Total	
		Made	To be made					
Salaries	$144,680.00	$228.05		$144,908.05	$144,907.24		$144,907.24	$0.81
Topographic surveys	725,000.00	436,647.67	$82,867.94	1,244,515.61	966,036.74	$263,374.56	1,229,411.30	15,104.31
Geologic surveys	500,000.00	49,383.77	10,087.45	559,471.22	541,692.47	13,927.02	555,619.49	3,851.73
Alaskan mineral resources	60,000.00	8.50		60,008.50	50,981.83	8,594.36	59,576.19	432.31
Gaging streams	1,050,000.00	493,405.06	278,453.62	1,821,858.68	1,725,840.49	70,379.87	1,796,220.36	25,638.32
Classification of lands	105,000.00	4,459.82	346.96	109,806.78	108,371.98	783.11	109,155.09	651.69
Printing and binding	120,000.00			120,000.00	18,055.50	99,444.50	117,500.00	2,500.00
Preparation of illustrations	25,000.00	484.02		25,484.02	25,389.30	40.50	25,429.80	54.22
Geologic and topographic maps	120,000.00	121,021.43	54,633.20	295,654.63	280,930.76	13,213.53	294,144.29	1,510.34
Mineral leasing	315,000.00	8,358.31	376.73	323,735.04	318,936.66	3,933.73	322,870.39	864.65
Total	[1]3,164,680.00	1,113,996.63	426,765.90	4,705,442.53	4,181,142.97	473,691.18	4,654,834.15	50,608.38
Central Valley reclamation project, California (reimbursable) (transfer to Geological Survey), 1939	19,235.00			19,235.00	15,673.99	1,058.49	16,732.48	2,502.52
Construction, etc., irrigation systems Indian reservations (reimbursable) (transfer to Geological Survey), 1938-39	1,250.00			1,250.00	802.99	385.88	1,188.87	61.13
Federal Power Commission (transfer to Interior, Geological Survey), 1939	350.00			350.00	350.00		350.00	
Flood Control, general (transfer from Agriculture to Interior, Geological Survey)	52,300.00			52,300.00	28,075.03	3,881.65	31,956.68	20,343.32
Flood control, general (transfer to Interior, Geological Survey)	[2]48,937.95	15.56		48,953.51	32,963.48	3,930.78	36,894.26	12,059.25
Flood control, Mississippi River and tributaries (transfer to Interior, Geological Survey)	[3]4,106.49			4,106.49	3,393.87	704.28	4,098.15	8.34
Irrigation, Indian reservations (reimbursable) (transfer to Geological Survey) 1939	15,000.00	54.65		15,054.65	10,217.36	4,726.71	14,944.07	110.58
Maintenance and improvement of existing river and harbor works (transfer to Interior, Geological Survey)	[4]232,380.68	226.52		232,607.20	136,346.36	36,532.96	172,879.32	59,727.88
Maintenance and improvement of existing river and harbor works (transfer to Interior, Geological Survey, act of Aug. 9, 1937)	[5]1,941.11			1,941.11	1,941.11		1,941.11	
Maintenance and improvement of existing river and habor works (transfer to Interior, Geological Survey, act of June 22, 1936)	[5]63.79			63.79	63.79		63.79	
Maintenance, Wapato irrigation and drainage system, etc., Yakima Reservation, Wash. (receipt limitation) (transfer to Geological Survey), 1939	500.00			500.00	153.53	346.47	500.00	
Operation and conservation of Naval Petroleum reserves (transfer to Interior, Geological Survey), 1939	38,000.00	1,182.57		39,182.57	39,099.82		39,099.82	82.75
Public Works Administration, act of 1938 (allotment to Interior, Geological Survey), 1938-40	2,665,000.00	5,949.83	32.33	2,670,982.16	1,936,974.48	35,052.86	1,972,027.34	698,954.82

Public Works Administration, allotment to Interior, Geological Survey, 1935-41	[5] 105,479.09	3,788.93		109,268.02	83,566.26	2,011.93	85,578.19	23,689.83
Special and technical investigations, International Joint Commission United States and Great Britain (transfer to Interior), 1939	47,800.00	2.63		47,802.63	45,354.52	2,290.61	47,645.13	157.50
Supervising mining operations on leased Indian lands (reimbursable) (transfer to Interior, Geological Survey), 1939	95,000.00	956.27		95,956.27	95,592.68	360.00	95,952.68	3.59
Tennessee Valley Authority fund (transfer to Interior, Geological Survey), 1939	107,500.00	913.18	225.00	108,638.18	97,753.82	8,119.24	105,873.06	2,765.12
Working fund, Interior, Geological Survey (Agriculture, highway funds, act of June 16, 1933, National Industrial Recovery)	[5] 23,394.10			23,394.10	9,573.30		9,573.30	13,820.80
Working fund, Interior, Geological Survey (cooperative construction of rural post roads)	[5] 19,133.89	2,876.02	286.66	22,296.57	20,330.25	906.65	21,236.90	1,059.67
Working fund, Interior, Geological Survey (General Land Office, maps) 1938-39	8,000.00			8,000.00	4,964.31	3,035.69	8,000.00	
Working fund, Department of the Interior (transfer from Army engineers to Geological Survey for topographic mapping, fiscal year 1935)	[5] 5,935.69	14.00		5,949.69	1,670.79		1,670.79	4,278.90
Transfer total	3,491,307.79	15,980.16	543.99	3,587,831.94	2,564,861.74	103,344.20	2,668,205.94	839,626.00
Grand total	6,655,987.79	1,129,976.79	427,309.89	8,213,274.47	6,746,004.71	577,035.38	7,323,040.09	890,234.38

[1] In addition to these appropriations there was an allotment of $7,000 for miscellaneous supplies from the appropriation for contingent expenses of the Interior Department.

[2] Includes $2,267.95 unobligated on June 30, 1938, and continued available for expenditure during the fiscal year 1939.

[3] Includes $106.49 unobligated on June 30, 1938, and continued available for expenditure during the fiscal year 1939.

[4] Includes $7,915.68 unobligated on June 30, 1938, and continued available for expenditure during the fiscal year 1939.

[5] Balance unobligated on June 30, 1938, and continued available for expenditure during the fiscal year 1939.

Classification of Obligations Incurred by the United States Geological Survey During the Fiscal Year Ended June 30, 1939

	Salaries	Topographic surveys	Geologic surveys	Alaskan mineral resources	Gaging streams
Salaries of permanent employees	$144,907.24	$803,793.20	$450,803.87	$35,408.61	$1,101,409.57
Wages of temporary employees		601,146.00	55,317.10	9,711.56	522,136.99
Supplies and materials		25,225.90	9,418.64	2,680.87	37,130.28
Dead storage of passenger-carrying vehicles					
Other storage and pasturage of animals		542.38	277.46		521.15
Communication services		1,594.80	437.14	22.10	7,197.90
Travel expenses		168,480.91	37,743.35	6,842.43	159,421.39
Hire, maintenance, repair, and operation of passenger-carrying vehicles		1,567.16	3,239.63	18.45	30,913.03
Transportation of things		14,827.10	3,729.06	1,981.33	16,528.86
Hire, maintenance, repair, and operation of freight-carrying vehicles		70,789.75	10,358.11		61,812.31
Printing and binding		109,634.34	9,484.09	1,242.39	6,753.30
Furnishing of heat, light, power, water, and electricity		4.00			467.38
Rents		11.80			3,856.03
Repairs and alterations		9,794.94	4,656.35	138.76	66,157.15
Special and miscellaneous current expenses		22.56	35.92		74.58
Purchase of passenger-carrying vehicles		1,745.93	1,066.91		20,108.94
Purchase of freight-carrying vehicles		121,342.37	17,028.18		48,070.00
Purchase of scientific instruments and parts		198,388.80	6,716.94	65.95	177,161.03
Other equipment		19,123.06	10,569.71	1,455.24	46,307.65
Structures and parts					241,133.69
Miscellaneous refunds, adjustments, and transfers		305,742.30	26,435.15	8.50	298,540.20
Total	144,907.24	2,453,777.24	647,317.61	59,576.19	2,845,701.43

	Classification of lands	Printing and binding	Preparation of illustrations	Geologic and topographic maps	Mineral leasing	Total
Salaries of permanent employees	$92,462.88		$24,664.04	$237,528.02	$392,263.50	$3,283,240.93
Wages of temporary employees	56,536.78			77.77	30,454.16	1,275,380.36
Supplies and materials	1,347.03		366.69	35,617.31	4,137.18	115,923.90
Dead storage of passenger-carrying vehicles						
Other storage and pasturage of animals					3.50	1,344.49
Communication services	373.18			5.52	3,111.12	12,741.76
Travel expenses	11,747.02		2.75	857.21	17,961.10	403,056.16
Hire, maintenance, repair, and operation of passenger-carrying vehicles	1,903.86				13,661.17	51,303.30
Transportation of things	421.65			275.62	3,772.67	41,536.29
Hire, maintenance, repair, and operation of freight-carrying vehicles	2,190.64				582.24	145,733.05
Printing and binding	978.29	$117,500.00	249.59	8,886.35	688.04	255,416.39
Furnishing of heat, light, power, water, and electricity	19.70				4,711.89	5,202.97
Rents					562.50	4,430.33
Repairs and alterations	647.82		32.09	13,853.59	56,652.70	151,933.40
Special and miscellaneous current expenses					335.63	468.63
Purchase of passenger-carrying vehicles	1,372.79				5,265.94	29,560.51
Purchase of freight-carrying vehicles	650.27				543.63	187,634.45
Purchase of scientific instruments and parts	345.44		30.08	245.89	124.41	383,078.54
Other equipment	614.24		84.56	4,797.01	6,083.22	89,034.69
Structures and parts	4,149.83					245,283.52
Miscellaneous refunds, adjustments, and transfers	21.66				9,988.61	640,736.42
Total	175,783.08	117,500.00	25,429.80	302,144.29	550,903.21	7,323,040.09

In addition to the above amounts, there was expended directly by cooperating agencies $53,954.44 for topographic surveys and $505,393.25 for stream gaging.

APPENDIX

Summary of Outstanding Mineral Withdrawals, and Classifications

[June 30, 1939, in acres]

State	Coal		Oil		Oil shale		Phosphate		Potash
	Withdrawn	Classified as coal land	Withdrawn	Classified as oil land	Withdrawn	Classified as oil-shale land	Withdrawn	Classified as phosphate land	Withdrawn
Alaska		56,993							
Arizona	139,415								
Arkansas		61,160							
California	17,603	8,720	1,178,392						90,324
Colorado	4,142,223	3,082,272	215,370		1,172,778	952,239			
Florida							66,796	120	
Idaho	11,520	4,603					276,239	270,036	
Louisiana			466,990	4,233					
Montana	6,044,408	[1] 9,373,884	1,336,697	67,651			280,089	3,833	
Nevada	83,673								39,422
New Mexico	4,119,616	1,074,723							9,282,160
North Dakota	5,954,364	11,178,286	84,894						
Oregon	4,361	18,887							
South Dakota		250,093							
Utah	3,404,043	1,267,697	[2] 1,035,034		2,737,274	2,703,755	277,344	2,937	
Washington	691,801	141,444							
Wyoming	2,143,991	[3] 6,847,235	541,777		2,079,897	425,214	989,133	25,293	
Total	26,757,028	33,365,997	4,859,154	71,884	5,989,949	4,081,208	1,889,601	302,219	9,411,906

[1] Includes 3,151 acres of coal land reserved for use of the United States (coal reserve No. 1).
[2] Includes 13,578 acres withdrawn as helium reserve.
[3] Includes 2,078 acres of coal land reserved for use of the United States (coal reserve No. 2).

General Summary of Cases Involving Land Classification

Class of cases	Record for fiscal year 1938–39						Record since receipt of first case	
	Pending prior to July 1, 1938	Received during fiscal year	Total	Acted on during fiscal year	Pending June 30, 1939	Gain or loss during fiscal year	Received	Acted on
Mineral leasing laws:								
Permit applications	10	185	195	174	21	−11	62,700	62,679
Lease applications	833	3,455	4,288	4,261	27	+806	10,546	10,519
Committee cases		1	1	1			13,222	13,222
Concurrence	32	2,557	2,589	2,537	52	−20		
Interference (surface rights)	3	214	217	212	5	−2		
Unit operation plans	54	28	82	55	27	+27	1,665	1,638
Cases involved in unit plans	409	249	658	526	132	+277	5,641	5,509
Development (drilling operations, etc.)	4	48	52	47	5	−1	17,680	17,675
Miscellaneous	222	33	255	255		+222	7,952	7,952
Mineral classification: Oil and gas (including "349")	60	1,198	1,258	1,221	37	+23	32,155	32,118
Water and power:								
Federal Power Commission:								
Preliminary permits	6	55	61	59	2	+4	570	568
Licenses							28	28
Determinations under sec. 24	8	61	69	54	15	−7	752	737
Classification	1	3	4	1	3	−2	565	562
Rights-of-way	15	81	96	84	12	+3	7,535	7,523
Irrigation project reports	1		1		1		945	944
General information:								
General Land Office (co-ops., etc.)	13	145	158	151	7	+6		
Indian Office							9,549	9,549
Total	1,671	8,313	9,984	9,638	346	+1,325		

Mineral Production From Public Land and Revenues Accrued Therefrom, Fiscal Year 1939

State	Petroleum (barrels)	Natural gas (M cubic feet)	Gasoline (gallons)	Coal (short tons)	Potassium salts (short tons)	Sodium salts (short tons)	Phosphate rock (long tons)	Accrued revenues
Alabama				18,445				$1,844.48
Alaska				150,073				7,140.87
Arizona								557.00
California	15,671,430	41,418,716	3,960,182			69,923		2,831,606.69
Colorado	885,373	1,460,934	55,868	579,083		360		142,095.93
Idaho				1,479				573.17
Louisiana	289,035	1,239,785	9,718					67,556.32
Montana	484,497	2,521,542	16,600	525,059			26,017	131,581.86
Nebraska								140.00
Nevada				2		305		155.48
New Mexico	8,416,341	20,952,400	8,394,276	55,466	477,920	7,065		878,177.73
North Dakota		94,229		531,329				34,083.86
Oklahoma	128,547		144,015					16,291.37
South Dakota				3,021				1,262.40
Utah	392	3,598,499	418,877	968,721				136,088.38
Washington				31,880				3,187.33
Wyoming	12,035,654	13,709,756	24,228,526	1,239,768				1,716,228.85
Total	37,911,269	84,995,861	37,228,062	4,104,326	477,920	77,653	26,017	5,968,571.72
Total, 1938	41,630,368	79,932,430	39,509,893	3,794,641	572,307	69,305	20,291	7,228,492.12

Topographic mapping by the Geological Survey in the United States, Puerto Rico, and Hawaii, to June 30, 1939

State	Total area mapped during fiscal year 1939 (square miles)										Types of standard surveys, with contours, fiscal year 1939 (square miles)			Total area mapped to June 30, 1939 (square miles)	Percentage of total area of State mapped to June 30, 1939	Control, fiscal year 1939		
	Planimetric on scale of 1 to—[1]		For publication on standard scales, with contour intervals from 2 to 100 feet; mapped on field scale of 1 to—													Spirit levels (miles)	Transit traverse (miles)	Triangulation stations occupied
	48,000	24,000	10,000 or less	12,000	15,840	20,000	24,000	31,680	48,000	96,000	New survey	Resurvey	Revision					
Alabama							337				337			22,320	42.9	24	271	
Arizona									1,136		1,136			30,136	26.4	531		28
Arkansas							55		489		185	359		24,231	45.4	136	202	10
California							291	96	831			1,218		129,143	81.6	709		
Colorado			[2] 29				291		427		242	475	30	57,524	55.3	241		10
Connecticut							59					59		4,965	100.0	76		
Delaware							13		10			23		2,370	100.0			
District of Columbia														70	100.0			
Florida									222		222			6,595	11.2	193	380	
Georgia									123			120	3	25,202	42.5	333	74	
Idaho							24		286	842	1,134	18		37,127	44.3	290		30
Illinois									691		629	51	11	41,518	73.3	168	418	
Indiana							747				747			5,387	14.8	251	787	
Iowa									150		150			13,860	24.7	75	130	
Kansas							46		741		466	321		64,912	79.0	1,597	246	
Kentucky							88				88			27,446	67.6			
Louisiana		923							2,849			2,849		11,330	23.4	385	542	
Maine							42		99		99	4	38	21,975	66.5	91		
Maryland									184			184		12,327	100.0	439	268	
Massachusetts							561					561		8,266	100.0	45		
Michigan		357					201		213		213	201		15,394	26.6	94	315	28
Minnesota									266		266			9,156	10.8	298	183	
Mississippi									70		70			7,581	16.2	311	379	
Missouri							713		2,271		1,521	1,463		54,825	79.0	405	8	
Montana				4	[3] 121				558		228	4	451	37,306	25.4			4
Nebraska				2			264				120	146		28,051	36.2			
Nevada									300		260	40		43,440	39.2	174	13	22
New Hampshire														9,302	100.0	32		
New Jersey							92					92		8,224	100.0	104	73	
New Mexico									1,137		353	784		33,131	27.0	130		48
New York							98		86			184		49,204	100.0	203	218	
North Carolina							20		185		182	23		19,222	36.7	469	6	
North Dakota									646		646			15,403	21.7	241	268	

See footnotes at end of table.

Topographic mapping by the Geological Survey in the United States, Puerto Rico, and Hawaii, to June 30, 1939—Continued

State	Total area mapped during fiscal year 1939 (square miles)										Types of standard surveys, with contours, fiscal year 1939 (square miles)			Total area mapped to June 30, 1939 (square miles)	Percentage of total area of State mapped to June 30, 1939	Control, fiscal year 1939		
	Planimetric on scale of 1 to— [1]		For publication on standard scales, with contour intervals from 2 to 100 feet; mapped on field scale of 1 to—													Spirit levels (miles)	Transit traverse (miles)	Triangulation stations occupied
	48,000	24,000	10,000 or less	12,000	15,840	20,000	24,000	31,680	48,000	96,000	New survey	Resurvey	Revision					
Ohio														41,040	100.0			
Oklahoma							131		188		86	233		[4] 41,185	58.8	251	67	
Oregon									76		76			33,636	34.8	135	42	30
Pennsylvania							38		841		299	38	542	40,884	90.6	88	113	
Rhode Island							113					113		1,248	100.0	92		
South Carolina									222		222			15,500	50.0			
South Dakota							5		344		344	5		20,231	26.1	129	197	5
Tennessee			[3] 1,884		[3] 16							1,900		23,633	56.2			
Texas							62		1,632		506	1,188		90,934	34.2	461	158	
Utah								164	190		354			19,676	23.2	201	22	21
Vermont									84		72	12		8,936	93.4	93		
Virginia			[3] 188						632		86	734		37,983	89.1	296	192	4
Washington				52					334		318	50	18	42,510	61.4	144		25
West Virginia														24,170	100.0			
Wisconsin	900								200		200			20,017	35.7	57	193	
Wyoming									200	535	698	37		34,942	35.7	187		
Total	900	1,280	2,101	58	137		4,291	260	18,913	1,377	12,555	13,489	1,093	1,373,468	45.4	10,179	5,765	265
Hawaii														6,435	100.0			
Puerto Rico						[5] 198					198			713	20.8	86		28

[1] Compiled from aerial photographs with field examination. Show culture, drainage, and woodland, but no contours.
[2] Mapped on scale of 1:2,400.
[3] Mapped from aerial photographs by stereophotogrammetric methods.
[4] Previous figures given overstated 1,073 square miles and here corrected.
[5] Contour interval 5 meters.

BOARD OF GEOGRAPHICAL NAMES

George C. Martin, *Executive Secretary*

THE UNITED STATES BOARD ON GEOGRAPHICAL NAMES is the organization through which the Federal Government provides for uniform usage in the form, spelling, and application of those geographic names that are used on maps and charts and in publications issued by the Government.

The Board is continuing work begun in 1890, when an informal interdepartmental committee was organized for the purpose of bringing about uniformity in geographic names used in the publications of the bureaus represented. That committee was given legal status in 1890, when President Harrison designated its members as a Board on Geographic Names and defined its authority. The name of the organization was changed in 1906 to the United States Geographic Board. It operated under that name until 1934, at which time it was transferred to the Department of the Interior.

The present Board is essentially a cooperative organization. In it the Department of the Interior furnishes administrative and investigative facilities through which representatives of the various Government departments that make and use maps, and certain geographic societies, determine policy in the use of geographic names and render decisions on such names as are submitted for decision.

The Board consists of an advisory committee, in which various governmental departments and geographic societies are represented, which acts chiefly through its executive committee, and of an administrative and investigative unit, called the Division of Geographic Names, in the office of the Secretary of the Interior. The personnel of the advisory and executive committees, on June 30, 1939, was as follows:

ADVISORY COMMITTEE

(Personnel, June 30, 1939)

Lt. Comdr. K. T. Adams, Assistant Chief, Division of Charts, Coast and Geodetic Survey, Department of Commerce.

Mr. Roscoe E. Baber, foreign-language editor and translator, member Style Board, Government Printing Office.

Mr. Clarence Batschelet, geographer, Bureau of the Census, Department of Commerce.

Mr. Albert H. Bumstead, chief cartographer, National Geographic Society.

Mr. E. E. Carter, Forest Service, United States Department of Agriculture.

Mr. William J. Dixon, Superintendent, Division of Postmasters, Post Office Department.
Dr. William H. Haas, professor of geology and geography, Northwestern University, representing the Geographic Society of Chicago.
Commander W. G. B. Hatch, officer in charge, Division of Maritime Security, Hydrographic Office, Navy Department.
Mr. W. L. G. Joerg, Chief, Division of Maps and Charts, The National Archives.
Lt. Col. Lawrence Martin, Chief, Division of Maps, and Incumbent, Chair of Geography, Library of Congress.
Dr. W. C. Mendenhall, Director, Geological Survey, United States Department of the Interior.
Mr. Raye R. Platt, secretary, American Geographical Society of New York.
Mrs. Sophia A. Saucerman, assistant geographer, Department of State.
Dr. John R. Swanton, Bureau of American Ethnology, Smithsonian Institution.
Dr. Frank E. Williams, professor of geography, Wharton School of Finance and Commerce, University of Pennsylvania, representing the Geographical Society of Philadelphia.

EXECUTIVE COMMITTEE

Dr. W. C. Mendenhall, *Chairman*

Mr. E. E. Carter — Mr. W. L. G. Joerg

The advisory committee held 2 meetings during the year, and the executive committee held 20 meetings at which 398 names were approved. Decisions on those names are printed in a pamphlet entitled "Decisions of the United States Board on Geographical Names, rendered between July 1, 1938, and June 30, 1939," which can be obtained without charge from the Superintendent of Documents, Government Printing Office, Washington, D. C. The locations of the features thus named, and the sources of the requests for decisions, are as follows:

Geographic Distribution of Names

Alaska	113	Tennessee	6	Kansas	2
Texas	62	Washington	5	Nevada	2
Louisiana	42	Arizona	4	West Virginia	2
Florida	24	Georgia	4	Wyoming	2
California	20	New Jersey	4	Idaho	1
Foreign	13	Virginia	4	Kentucky	1
Missouri	12	Connecticut	3	Maryland	1
New York	11	Massachusetts	3	New Hampshire	1
Wisconsin	10	North Carolina	3	Ohio	1
Maine	9	South Carolina	3	Utah	1
New Mexico	8	Vermont	3		
Oregon	7	Arkansas	2	Total	398
Pennsylvania	7	Iowa	2		

Sources of Requests for Decisions

U. S. Coast and Geodetic Survey	175	Individuals	3
U. S. Geological Survey	102	Bureau of Reclamation	2
National Park Service	58	U. S. Biological Survey	2
U. S. Forest Service	23	State Department	1
State Organizations	12		
Soil Conservation Service	8	Total	398
U. S. Hydrographic Office	6		
U. S. Board on Geographical Names	6		

BUREAU OF RECLAMATION

John C. Page, *Commissioner*

EVIDENCE of the worth and need of Federal Reclamation works in the growing West continued to pile up during the fiscal year. Once again, despite steady and swift progress being made by the Bureau of Reclamation in the largest construction program of its 37-year history, the demand for the benefits of the Bureau's self-liquidating irrigation works outran the capacity to supply them.

New lands opened for farm settlement on the Owyhee reclamation project in Oregon and Idaho were quickly taken up during the year. On the last area opened for homestead entry four times as many applications were received as there were farm units offered, and inquiries from other eager farm home seekers continued to accumulate.

Still insufficient to meet heavy demands was water storage, even though at a peak; no sooner were storage and diversion dams completed than they were called upon to fill real need. A typical instance was the Bartlett Dam in Arizona, which within 120 days of its completion in May 1939, helped to offset a partial water shortage and promised to save valuable crops on the Salt River reclamation project.

In power, too, an important byproduct of reclamation, demand exceeded the ability to supply. Installation of a seventh great generator at Boulder Dam, making its power plant the largest operating in the world, met a critical need in the system of the Southern California Edison Co. The company reported the greatest peak load in its history on the very day the new generator went into steady operation.

Repayment Legislation

Repayment problems, arising from lack of flexibility in construction repayment contracts, received the thoughtful attention of the Bureau of Reclamation, western irrigation leaders, and the Congress, with the result that the Reclamation Project Act of 1939 was enacted. This law, perhaps the most important in this field since the original Reclamation Act of June 17, 1902, will make it possible to adjust many difficulties of the water users, to draft new contracts gearing repay-

Conservation Through Irrigation.

Upper: First test operation of the All-American Canal headworks at Imperial Dam, California and Arizona.

Lower: Acres of lettuce get water from an irrigation project in the Southwest.

ments to the ability year by year of the farmers to make payments, to reclassify lands from time to time, and to accomplish other needed reforms.

The new legislation should obviate the necessity in the future of extending blanket moratoria, even under severely depressed conditions, on repayments.

Of particular interest also is that section of the act which authorizes the construction, on sound business principles, of multiple-purpose projects involving irrigation. Through this section a fine conservation doctrine has been established. Conscientiously followed it will mean that conservation of the West's limited water resources on broad, related fronts will be achieved through coordinated use without waste and with maximum economy in construction. It will result, also, in a wider spread of public benefits from these useful works.

The Congress also heeded the Bureau's pleas for a more comprehensive investigation program, and appropriated $900,000 for studies of water resources and proposed developments. This will enable employment of sounder practices in the approach to the future development of western streams. It will be possible to study river basins instead of sections of streams and should result in better planning.

New Homes Sought

The demand for new farms on Federal reclamation projects continued at the high level established several years ago as a result of continued drought in the Great Plains area. Settlement was completed on new areas of the Owyhee project, Oregon, for example, at the time water was available. About 35 percent of new settlers placed during the year were from the Dust Bowl.

In order to increase the service of new irrigated areas in the general program for rehabilitation of drought victims and other migrant farm folk, the Bureau sponsored with the Farm Security Administration a bill, enactment of which now makes it possible through cooperation for the Farm Security Administration to assist in financing needy but otherwise qualified homeseekers on Federal reclamation projects. This is a noteworthy advance in the approach to a problem of increasing gravity in the West. At the close of the fiscal year preparations were being made to undertake the first test of the new cooperative method of settlement on the Sun River project in Montana.

Arizona Power Shortage

Near the end of the fiscal year a serious situation was developing in central Arizona, where continued drought and low run-offs in several streams were creating a critical power shortage. A plan was worked

out by which power could be supplied, temporarily through an interconnection at Parker Dam with a line from Boulder Dam, and on a more permanent basis directly from the plant at Parker Dam when that plant shall have been completed. An appropriation was made and construction of the transmission line from Parker Dam to Phoenix was begun. Preparation also was made at the close of the year to start work on the Parker Dam power plant. In the autumn of 1939 it was expected that power would be delivered to the Salt River Valley Water Users Association and to a utility serving central Arizona over the new line on terms which would repay the cost of new construction within 20 years.

Migratory Fish Control

A major program for control of migratory fish in the Columbia River was launched this year in connection with the Grand Coulee Dam project. The height of the dam makes it impossible for salmon and steelhead trout to return for spawning to areas above the dam. Fish returning upstream to spawn, therefore, are trapped at Rock Island Dam, below and near Grand Coulee Dam, and are transported in specially designed tank trucks to spawning grounds in tributaries entering the river below Grand Coulee Dam. While the 1939 runs were being handled in this manner, a series of hatcheries were being constructed to take care of future runs. The United States Bureau of Fisheries will operate this control program for 6 years at the expense of the project. By that time it is anticipated that the migratory fish will be reestablished, probably with the result that runs will be increased.

Stored Water

A fivefold increase within 6 years in water stored by Reclamation dams was recorded this year when the total amount so conserved exceeded 35,000,000 acre-feet. This increase reflects the addition of 24 new reservoirs, including Lake Mead, created by Boulder Dam, the largest in the world.

Boulder Power

During the year the Bureau of Reclamation paid into the United States Treasury $5,400,000 received from the Boulder Dam and power plant. Part of this sum, however, had been collected during the previous fiscal year. The gross income during the year, including power receipts and payments on power machinery by the lessees, totaled $4,321,000.

On June 1, 1939, the city of Los Angeles began paying at the firm power rate, under the terms of its contract, for virtually all the

energy it received from the project. For that month, the last of the fiscal year, the city alone paid $157,105.

Safety Programs

In conformity with policies established by the President, safety programs on all construction projects of the Bureau were strengthened. While the changing nature of the work in progress makes comparisons difficult, it was felt that good results were being obtained. During the coming year this program will be further strengthened and vigorously prosecuted.

CONSTRUCTION PROGRAM

The Bureau of Reclamation continued its major construction program during the fiscal year. Work was in progress on 30 projects in 12 States.

One major dam was undertaken, bringing to 10 the number of storage dams under construction, and also one diversion dam. The following dams were completed during the year: Island Park on the Upper Snake River project in Idaho, Caballo on the Rio Grande project in New Mexico, Bartlett on the Salt River project in Arizona, Moon Lake on the Moon Lake project in Utah, Bull Lake on the Riverton project in Wyoming, Parker on the Parker Dam project in Arizona-California, Imperial on the Boulder Canyon project (All-American Canal System) in Arizona-California, and the Fruit Growers on the Fruit Growers Dam project in Colorado.

Work done during the year brought to a grand total of 156 the number of storage and diversion dams which have been completed by the Bureau since its origin in 1902. Of these, Shoshone, Arrowrock, Owyhee, and Boulder were each, at the time of completion, the highest in the world. Shasta, now under construction on the Central Valley project in California, will be 560 feet in height and rank next to Boulder, and Grand Coulee Dam, under construction on the Columbia Basin project in Washington, follows closely with a maximum height of 553 feet above foundation.

The Bureau's construction program was continued at an accelerated rate with appropriations from the Reclamation fund, the general funds of the Treasury, and carry-over Public Works Administration allotments and allocations under the Emergency Relief appropriation acts.

In November 1938 work was started on the Green Mountain Dam and power plant on the Colorado-Big Thompson project in Colorado, the dam site being located on the Blue River about 16 miles south of

Kremmling. The dam will be an earth and rock-fill structure, with a maximum height of 270 feet above the bed of the river, a crest length of 1,300 feet and volume of 4,366,000 cubic yards. It will be the highest and also the largest dam of its type ever constructed by the Bureau. The reservoir will have a capacity of 152,000 acre-feet and its purpose is to protect the water users in the Colorado River Basin against any depletion of their water supply by diversions through the Continental Divide Tunnel to the South Platte River Basin. The power plant will be equipped with two main generating units of 12,000-kilovolt-ampere capacity, with 14,100-horsepower turbines.

During the 1939 year the Bureau constructed 356.2 miles of canals, 138.8 miles of drains, 32 tunnels with a total length of 31,783 feet, 753.6 miles of roads, 12.8 miles of railroad, 357.8 miles of transmission lines, 71.7 miles of pipe lines, 11,307 canal structures, 290 bridges, 992 culverts, and 96 flumes. There were placed in dams 3,622,208 cubic yards of concrete, 5,257,400 cubic yards of earth, and 1,484,976 cubic yards of rock; and 40,260,162 cubic yards of earth and rock were excavated. The Bureau used 3,842,175 barrels of cement.

During the fiscal year 6,527 contracts were made, including 94 for labor and construction work amounting to $51,746,564.28; 791 for equipment involving $14,889,015.32; 1,565 for materials costing $5,635,191.71; and 1,562 for supplies amounting to $664,193.67, in addition to contracts for rental and sale of water, and various miscellaneous services.

Grand Coulee Dam

The second major contract at Grand Coulee for completion of the dam, left power house, and foundation for pumping plant, awarded late in the previous fiscal year was in progress and was 38 percent completed at the end of the year. Contract earnings were $13,431,687 on a contract value of $35,399,340. There were placed in the dam and appurtenant works 2,198,225 cubic yards of concrete, 18,399,783 pounds of reinforcing steel, 9,887,566 pounds of outlet-conduit gates and linings, and 9,600,000 pounds of bulkhead gates, penstocks, trash racks, pipe, tubing, and miscellaneous metalwork.

The ultimate installation in the Grand Coulee power plant will comprise eighteen 108,000 kilovolt-ampere main generating units, of which three were ordered in August, the contract price being $2,627,900. Contracts were also placed for turbines and governors to cost $1,552,259.

Excellent progress was made on the economic investigations and soil surveys of the 1,200,000 acres of irrigable lands. At the end

of the year retracement surveys were 80 per cent complete, topography 65 per cent, classification 50 percent, and appraisal about 30 per cent. Clearing of the Columbia River reservoir site was started with three 375-man permanent camps, one 80-man tent camp, and one 75-man floating camp in operation by the Work Projects Administration.

On the work in connection with migratory fish control, fish traps were installed at the Rock Island Dam on the Columbia River and the fish were transported to tributaries in specially-designed tank trucks for propagation. Work has started on the Leavenworth fish hatchery and 2,166 feet of the Snow Lakes tunnel was driven. A temporary warehouse was completed at the Leavenworth station.

Grand Coulee Dam, with a maximum height of 553 feet, will be the third highest concrete dam in the world, and its 10,200,000 cubic yards of concrete makes it the largest concrete structure.

Central Valley Project

On July 6, 1938, a contract was awarded to the Pacific Constructors, Inc., on their bid of $35,939,450, for constructing the Shasta Dam and power plant on the Sacramento River, about 9 miles north of Redding. The dam is of the massive concrete gravity type with a central spillway section. It will have a maximum height of 560 feet, ranking next to Boulder among the Reclamation dams. It will be 3,500 feet in over-all length and will contain 5,400,000 cubic yards of concrete. The power plant will have an ultimate installed capacity of 375,000 kilovolt-amperes, with five 75,000 kilovolt-ampere units, four of which were ordered in May 1939. Contract earnings to the end of the fiscal year were $9,174,213, with 25.5 percent completion. The contractor excavated 1,350,000 cubic yards of earth and 1,400,000 cubic yards of rock at both abutments and in the spillway channel and diversion tunnel. On June 10, 1939, a contract was awarded to the Permanente Corporation for furnishing 5,800,000 barrels of low-heat portland cement, the contract price being $6,902,000 f. o. b. mill.

The Shasta dam and reservoir of 4,493,000 acre-feet capacity in the Sacramento, Pit, and McCloud Rivers are the principal features of the project, which is designed to alleviate critical water shortage and problems in three important agricultural areas in California, through the conservation of waste flood waters of the State's major rivers. In size and importance the Central Valley project is without precedent among the remedial projects undertaken by the Bureau.

By means of Shasta Dam in the north and Friant Dam in the south, regulation of both the Sacramento and the San Joaquin Rivers

will provide adequate water to supplement the irrigation supply of a large area of highly improved orchard and farm lands in the southern San Joaquin Valley; reestablish navigation to Red Bluff on the Sacramento River; prevent salt water intrusion in the irrigation channels of the delta of the Sacramento-San Joaquin Rivers; provide supplemental water for irrigation, domestic and industrial uses in the Walnut Creek-Martinez area, south of Suisun Bay; and make possible the generation of 350,000 kilowatts of water power at Shasta Dam.

The 1,600-foot diversion tunnel to bypass temporarily the Southern Pacific Railroad around the Shasta dam site, and later to divert the flow of the Sacramento River, was practically completed at the end of the year. The substructure of the Sacramento River bridge, first crossing, was also completed and the superstructure was 60 percent complete. Contracts were awarded for earthwork, tunnels, and structures on 19.97 miles of relocation of the Southern Pacific Railroad around the Shasta reservoir site. This will require 30 miles of relocation and the construction of eight bridges. Other contracts were awarded for superstructures of bridges at the second, third, and fourth crossings of the Sacramento River, and also the Doney Creek bridge.

At Toyon, the Government camp, building operations were practically completed, but an additional contract was awarded for 18 duplex cottages.

On the Delta division a contract for earthwork and structures on the first 3.9 miles of the Contra Costa Canal was completed. Two additional contracts for 18.1 miles of canal work were awarded, and work was started on pumping plants Nos. 1, 2, 3, and 4.

On the Friant division the Friant camp was completed large enough for present requirements. All surveys and testings at the Friant dam site were completed. Specifications and plans were prepared in the Denver office covering construction of the dam, and the work was advertised for bids on June 26, 1939. The dam will be of the concrete gravity type, approximately 300 feet in height, 3,430 feet long, and containing 1,900,000 cubic yards of concrete. Surveys were in progress on the Friant-Kern and Madera Canals during the year and were completed for 72 miles and 13 miles respectively.

Boulder Canyon Project

Construction at Boulder Dam during the year consisted of the erection of machinery and the installation of electrical equipment. The dam, spillways, outlet works, and diversion works were complete except for some supplemental drilling and grouting along the dam abutments and foundation; construction of a building to house an

exhibit and rest rooms; construction of aprons below the tunnel outlets; and improvements of the river channel below the dam.

The power-plant building is complete with the exception of the construction of wheel pits, machinery foundations, switch houses, and barrier operations. Installation of generating units N–6 and A–7 was completed and the two units placed in operation during the year. Units N–1 to N–6 inclusive, A–7 and A–8 were in operation at the close of the year, making the installed capacity of the plant 860,000 horsepower. Boulder thereby becomes the largest power plant in the world, overtopping the Dnieperstroy plant in Russia with a capacity of 746,000 horsepower. The installation of unit A–6 was in progress, and contracts were awarded for units A–1 and A–2. Work was continued on switchyards for the City of Los Angeles and the Metropolitan Water District. On June 30 Lake Mead contained 24,362,000 acre-feet and extended 115 miles upstream.

Excellent progress was made on the All-American canal system and the 80-mile All-American Canal from the Imperial Dam to the West Main Canal in the Imperial Valley was practically complete except for some structure work. Power drop No. 4 was completed and drop No. 5 was 95.5 percent completed. Work was in progress on drop No. 1 and the Coachella Canal turn-out, the Alamo River crossing, New Briar Canal crossing, Central Main Canal check and turn-out and on miscellaneous structures on the New Briar Canal and the lower 30 miles of the All-American Canal. All of this work was nearing completion at the end of the year.

The first 43-mile section of the Coachella Canal, a 130-mile branch of the All-American Canal to the Coachella Valley, was 55 percent complete on June 30. The contract calls for the excavation of 9,030,000 cubic yards of earth. On June 1 bids were opened for the construction of earthwork and structures on additional 47 miles of the Coachella Canal, the low bid of $2,279,212.31 being submitted by the Morrison-Knudsen Co., Inc., and M. H. Hasler. A contract will be awarded for this work in July 1939. Surveys were in progress on the Coachella Canal and topography was taken in the Coachella Valley and on the East Mesa.

The All-American Canal is by far the largest irrigation ditch in the United States. It is 80 miles long and has an initial capacity of 15,000 cubic feet of water per second. The maximum section has a width of 232 feet at the water surface and a bottom width of 162 feet, with a water depth of 21 feet. Power will be developed on the canal by the Imperial Irrigation District at four points. Earth excavation has amounted to approximately 65,000,000 cubic yards. The Coachella branch will have an initial capacity of 2,500 second-feet.

185642—40——15

In July 1938 the Imperial Dam on the Colorado River, about 15 miles northwest of Yuma, Arizona, was completed. On the California side, diversion will be made into the All-American Canal and on the Arizona side into the Gravity Main Canal of the Gila project. The structure is of the slab-and-buttress type, with a total length of 3,430 feet, inclusive of non-overflow sections, headworks, gate structures, sluiceway, and overflow spillway. The maximum height of the dam is 45 feet and the normal water surface will be raised 27 feet. At the site of the diversion dam the Colorado River carries large quantities of suspended silt. To decrease the amount of silt entering the canals, desilting works have been constructed, which consist of four basins, three on the California and one on the Arizona side. The California basins are each approximately 500 feet by 800 feet in plan and 12.5 feet deep with an influent channel through the center, while the Arizona basins are 1,200 feet long and about 150 feet wide. Provision has been made for the addition of a fourth basin for the All-American Canal and two for the Gravity Main Canal. Silt deposited in the basins will be removed by means of motor-driven rotating scraper mechanisms, and sluiced into the river below the dam.

Colorado-Big Thompson Project

The Colorado-Big Thompson project will provide a supplemental water supply for 615,000 acres of land now under cultivation, situated east of the Rocky Mountains in Colorado, with water collected and stored on the western slope of the mountains in the headwaters of the Colorado River. Stored water will be transported through the Continental Divide in a tunnel to the headwaters of the Big Thompson River, a tributary of the South Platte River, where it will be restored for release as needed for irrigation. Lands to be irrigated are situated within the Northern Colorado Water Conservancy District in Larimer, Boulder, Weld, Morgan, Logan, Washington, and Sedgwick Counties.

Principal construction features are the Continental Divide tunnel, the Green Mountain dam and power plant on the Blue River; Granby Reservoir on the Colorado River; Willow Creek diversion canal; North Fork diversion dam forming Shadow Mountain Lake, an extension of Grand Lake; Carter Lake, Arkins, and Horsetooth reservoirs; and several canals, power plants, and pumping plants.

On November 15, 1938, a contract was awarded to the Warner Construction Co. on its bid of $4,226,206.20 for the construction of the Green Mountain Dam and power plant on Blue River, 16 miles south of Kremmling. On June 30 the contract was 15.2 percent completed. An order for turbines and generators for the power plant was placed in November 1938.

On June 7 bids were opened for construction of the Continental Divide Tunnel, which will be 13.1 miles long and 9 feet 9 inches in inside diameter. A contract had not been awarded at the end of the year. Work was in progress on Government camps at Green Mountain, Shadow Mountain, and Estes Park headquarters. On June 30 the Green Mountain camp was nearly completed. Shadow Mountain and Estes Park were 9 and 50 percent complete, respectively. Other work under way with percentages of completion were as follows: Roads to east and west portals of Continental Divide Tunnel, 16 percent; transmission line from Loveland to east portal of tunnel, 75 percent; transmission line from Green Mountain Dam to Grand Lake, 82 percent.

The cost of the project will be divided between irrigation and power. The Northern Colorado Water Conservancy District has contracted to repay the portion of the cost chargeable to irrigation, but not to exceed $25,000,000. The remainder, on the power features, will be repaid from the sales of electrical energy, of which it is possible to produce as much as 900,000,000 kilowatt-hours annually. The estimated cost of the project is $44,000,000.

Other Construction

Other important dams under construction during the fiscal year were the following: Marshall Ford Dam, 270-foot, concrete, straight-gravity type, on the Colorado River project in Texas; Vallecito Dam, 150-foot, earth-fill type, on the Pine River project in Colorado; Grassy Lake Dam, 120-foot, earth-fill type, on the Upper Snake River storage project in Idaho; Boca Dam, 110-foot, earth-fill type, on the Truckee River storage project, Nevada-California; Seminoe Dam, 296-foot, concrete arch, on the Kendrick project in Wyoming; Fresno Dam, 77-foot, earth-fill type, on the Milk River project in Montana; Deer Creek Dam, 240-foot, earth-and-rock-fill type, on the Provo River project in Utah; and the Roza diversion dam, a concrete gravity weir, 55 feet in height, on the Roza division of the Yakima project in Washington.

The Seminoe Dam and power plant building on the Kendrick project were 99 percent complete on June 30. Installation of power-plant machinery and equipment was in progress. Construction work was under way on the Casper main canal, which was 98 percent complete to mile 62, while the First Unit lateral system was 17 percent complete. Transmission lines were under construction from Seminoe to Rawlins, Wyoming, Laramie to Cheyenne, and from Cheyenne, Wyoming, to Gering, Nebraska, and Greeley, Colorado; also transformer and switching stations at Casper, Rawlins, Cheyenne, Gering, and Greeley.

The first development at Marshall Ford Dam on the Colorado River project in Texas, consisting of a concrete section 190 feet high and 2,302 feet long at the crest, and an earth embankment section 35 feet high and 1,100 feet long were practically complete at the end of the year. In addition, a base for the enlarged dam, to be 270 feet in height, was placed in the river blocks to elevation 520, except penstock blocks which were raised to elevation 670. About 20,000 cubic yards of concrete were also placed in enlargement blocks 1 to 5.

The Bartlett Dam, on the Verde River in Arizona, completed in May, has a maximum height of 287 feet and is the highest multiple-arch dam in the world. The Parker Dam on the Colorado River, Ariz.-Calif., was completed in September. It is 325 feet in height, of the concrete, variable radius arch type, and was built by the Bureau for the Metropolitan Water District of Southern California to divert water into the Colorado River-Los Angeles aqueduct. On June 21 a contract was awarded for construction of transmission lines from Parker Dam to Phoenix and Blaisdell, Ariz. There is an acute water shortage in the Salt River Valley and the 161,000-volt line to Phoenix, 136 miles in length, will transmit Boulder power to that area, connecting with the Central Arizona Light and Power Co. plant about 6 miles west of Phoenix. The estimated cost of the line is $1,500,000, which will be paid for by the power users. The 120-mile line to Blaisdell, also 161,000 volts, will be constructed after the Phoenix line is completed, and will transmit power to a pumping station on the Gila project; its estimated cost is $1,200,000.

On June 30 approximately 27 miles of the Yakima Ridge Canal, 99 miles in length, the main canal of the Roza division, Yakima project in Washington, was completed. This work included two 17-foot diameter tunnels, 18,000 feet in length; a 1,500-foot concrete siphon, 15 feet 4 inches in diameter, under the Yakima River; and 1.3 miles of bench flume, 28 feet wide. An additional stretch of 12.6 miles of main canal was 29 percent complete and Tunnel No. 5, a 4,000-foot structure, was practically completed. The Roza diversion dam, including railroad revision, was 86 percent completed.

Seventeen miles of the 28-mile Heart Mountain Canal on the Shoshone project were completed at the end of the year. Work was in progress on the Shoshone Canyon conduit, the Shoshone River siphon, and the Buck Springs Creek siphon.

Construction of the Deer Creek Dam on the Provo River project in Utah was started in July 1938 and was in progress during the year, the contract being awarded to the Rohl-Connolly Co. at its bid of $2,189,096. In December a contract was awarded for construction of the Olmsted and Alpine-Draper tunnels, the first work to be undertaken on the Aqueduct division.

The first unit of the Gila project in Arizona, comprising 150,000 acres, was 20.5 percent complete on June 30. Work was in progress on the Gravity Main Canal, between stations 30 and 946+70, and on the Fortuna spillway.

On the Payette division of the Boise project in Idaho, the main canal, which includes nine tunnels and extensive bench flume and lined sections, was complete except for wasteways. Work was in progress on branch canals and laterals under four contracts.

A power-plant building at the Elephant Butte Dam on the Rio Grande project in New Mexico was started in October by Government forces. The power plant will have a capacity of 34,500 horsepower with three units. Orders for the turbines and generators were placed in November. The Boca Dam on the Truckee Storage project in Nevada-California was 98 percent completed at the end of the year. On the Upper Snake River project in Idaho the Island Park Dam was completed during the year and construction of the Grassy Lake Dam was 61 percent completed on June 30. Work was in progress on the Glendive unit of the Buffalo Rapids project in Montana with Emergency Relief funds during the year, the work consisting of canals, laterals, structures, and pumping plant. Minor construction work was under way on the Sun River project in Montana, Deschutes project in Oregon, Owyhee project in Oregon-Idaho, Carlsbad in New Mexico, and the Riverton project in Wyoming.

CUMULATIVE CONSTRUCTION RESULTS

In the 37 years the following construction has been completed by the Bureau of Reclamation: 156 storage and diversion dams; 48 powerhouses; 2,812 buildings; 20,101.4 miles of canals, ditches, and drains; 81.8 miles of tunnels; 4,661.6 miles of telephone lines; 285.4 miles of dikes; 6,337 flumes; 20,597 culverts; 13,738 bridges; 198,521 other irrigation structures.

Reservoirs of the Bureau of Reclamation now have a combined capacity of 47,121,170 acre-feet of water.

POWER

Twenty-three power plants were operated on 13 Federal reclamation projects during the 1939 fiscal year. Their total output was 2,212,568,189 kilowatt-hours of energy.

The sixth and seventh of the great generators at Boulder Dam were placed in service during the year, in August 1938 and June 1939. The eighth generator was practically ready for operation and was to be placed in service shortly after the close of the fiscal year. Generators for the ninth and tenth units were ordered in May. With one smaller unit, two station service units, and the seven large gen-

erators in operation, a total of 1,676,946,245 kilowatt-hours of electrical energy were generated at Boulder Dam. Of this amount 1,646,046,171 kilowatt-hours were sold for a gross revenue of $2,388,995.90.

Gross sales of energy from all project plants totaled $5,610,847.14. Some of the plants are operated and controlled by the water users' organizations.

Projects under construction which include power developments are the Grand Coulee Dam-Columbia Basin project in Washington, the Central Valley project in California, the Colorado-Big Thompson project in Colorado, the Elephant Butte power development of the Rio Grande project in New Mexico and Texas, and the Kendrick project in Wyoming. The power plant of the latter, located at Seminoe Dam, was nearly ready to commerce operation at the end of the fiscal year.

RECLAMATION FUND

Except for payment into the reclamation fund of $29,778,300.23 as provided in the Hayden-O'Mahoney amendment to the departmental appropriation bill last year, accretions to the fund remained at a low level as will be indicated by the table below:

Accretions to Reclamation Fund, by States

States	Sale of public lands		Proceeds from Oil Leasing Act		Total to June 30, 1939
	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939	
Alabama			$2,754.86	$188,165.41	$188,165.41
Arizona	$19,937.03	$2,725,264.44		160.20	2,725,424.64
California	25,484.90	8,230,535.23	1,505,555.06	17,328,502.14	25,559,037.37
Colorado	15,470.39	10,298,773.35	57,850.21	765,052.43	11,063,825.78
Idaho	10,699.05	7,029,622.43	171.27	20,947.79	7,050,570.22
Kansas	249.66	1,033,426.39	94.50	115.50	1,033,541.89
Louisiana			41,230.60	237,284.89	237,284.89
Mississippi				11.55	11.55
Montana	10,293.79	15,369,380.88	55,788.75	1,311,543.74	16,680,924.62
Nebraska	308.27	2,094,739.41	73.50	73.50	2,094,812.91
Nevada	7,282.48	1,033,529.16	.28	5,531.65	1,039,060.81
New Mexico	25,777.75	6,708,211.52	445,199.46	1,799,791.59	8,508,003.11
North Dakota	608.97	12,219,820.63	10,582.88	179,802.42	12,399,623.05
Oklahoma	187.99	5,929,732.57			5,929,732.57
Oregon	13,594.72	11,994,427.88		186.82	11,994,614.70
South Dakota	764.32	7,734,177.34	664.81	2,808.77	7,736,986.11
Utah	114,292.97	4,363,571.79	63,862.03	681,007.36	5,044,579.15
Washington	11,135.25	7,462,007.93		33,749.63	7,495,757.56
Wyoming	25,712.87	8,691,203.81	908,456.08	36,173,417.89	44,864,621.70
Total	281,800.41	112,918,424.76	3,092,284.29	58,728,153.28	171,646,578.04
Proceeds, Federal water power licenses					[1] 802,590.91
Proceeds, potassium royalties and rentals					[2] 500,755.58
Receipts from Naval Petroleum Reserves, 1920 to 1938, Act of May 9, 1938					29,778,300.23
Grand total					202,728,224.76

[1] Proceeds for fiscal year, $22,323.94.
[2] Proceeds for fiscal year, $89,800.32.

The effect of the provision that repayments of allotments made from emergency funds to reclamation projects be deposited in the reclamation fund has not as yet been felt, and it is not expected to be felt for several years, owing to the fact that the projects on which this money was expended, for the most part, are not completed.

As a consequence, it is anticipated that by the close of the 1941 fiscal year the reclamation fund will be so depleted that it will be unable to carry the construction of all the projects now being financed from the fund. Two means of correcting this situation, which soon may become critical, are suggested. Either the reclamation fund should be increased by an advance from the General Fund of the Treasury, or certain of the more costly of the projects now being constructed by appropriations from the fund should be financed by appropriations from the General Fund of the Treasury or in other ways.

Repayments

Construction payments during the year totaled $2,165,934.97; operation and maintenance collections amounted to $1,164,932.67; and water rental receipts made up $363,377.89. Arrearages at the close of the fiscal year were: Construction, $1,580,864.76; operation and maintenance, $208,653.46; and water rental, $150,444.99, amounts which represent slight increases over comparable figures for the previous year. Operation of the Reclamation Project Act of 1939 in future years should correct situations resulting in such delinquencies.

Status of Reclamation Fund

Accretions to the fund:	
Sales of public lands	$112, 918, 424. 76
Royalties and rental under Mineral Leasing Act	58, 728, 153. 28
Potassium royalties and rentals	500, 755. 58
Federal water-power licenses	802, 590. 91
Receipts from Naval Petroleum Reserves, 1920 to 1938, Act of May 9, 1939	29, 778, 300. 23
Total accretions	202, 728, 224. 76
Collections—construction and operation and maintenance repayments, water rents, power, and light, etc	124, 620, 828. 20
Total cash available	327, 349, 052. 96
Disbursements	305, 486, 685. 78
Balance in fund June 30, 1939	21, 862, 367. 18

Accounts Receivable, Construction Water-Right Charges

State and project	Due		Collected			Uncollected June 30, 1939
			Cash		Other credits to June 30, 1939	
	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939		
Arizona:						
Salt River	$217,796.90	$7,399,318.81	$217,796.90	$7,399,318.81		
Yuma Auxiliary	[1] 2,893.75	576,018.62	[1] 4,393.17	573,275.49	$1,744.57	$998.56
Arizona-California: Yuma	227,979.75	4,497,624.66	166,246.74	3,728,838.16	712,670.14	56,116.36
California: Orland	27,405.26	854,423.13	26,507.16	827,250.73		27,172.40
Colorado:						
Grand Valley	55,503.11	308,766.32	25,953.97	141,853.53	160,261.25	6,651.54
Uncompahgre	98,525.88	695,610.52	18,525.19	482,434.43	65,727.24	147,448.85
Idaho:						
Boise	304,245.56	4,646,702.63	312,325.30	4,612,286.76	27,193.29	7,222.53
Minidoka	367,503.21	8,913,852.48	217,082.48	7,746,642.98	931,208.13	236,001.37
Montana:						
Bitter Root	36,122.26	108,366.78	18,061.13	54,111.97		54,254.81
Huntley	17,691.68	606,782.61	16,376.61	508,752.11	97,225.40	805.10
Milk River	44,053.14	171,964.02	31,692.10	58,604.96		113,359.06
Sun River	33,521.42	345,552.32	24,226.83	292,665.85	44,931.87	7,954.60
Montana-North Dakota: Lower Yellowstone	72,482.77	465,233.37	64,681.56	428,244.22	1,722.75	35,266.40
Nebraska-Wyoming: North Platte	309,518.00	4,841,647.60	134,071.90	3,068,241.70	1,715,226.67	58,179.23
Nevada: Newlands	86,022.36	1,372,135.49	74,667.05	1,277,242.79	89,703.19	5,189.51
New Mexico: Carlsbad	14,966.48	918,083.85	17,996.38	909,641.80	81.25	8,360.80
New Mexico-Texas: Rio Grande	274,427.09	3,773,029.26	208,106.01	3,287,670.94	485,358.32	
Oregon:						
Baker	5,769.50	14,423.75	5,769.50	14,423.75		
Umatilla	15,482.98	649,870.72	3,435.44	412,086.35	5,607.95	232,176.42
Oregon-California: Klamath	89,245.98	1,355,211.70	83,746.01	1,307,577.20	7,245.12	40,389.38
South Dakota: Belle Fourche	57,716.09	755,837.20	19,157.00	589,676.79	82,913.03	83,247.38
Utah:						
Hyrum	23,250.00	23,250.00				23,250.00
Salt Lake Basin	88,192.90	304,663.49	88,192.90	304,663.49		
Strawberry Valley	82,155.06	1,554,556.91	81,405.06	1,541,418.69	13,138.22	
Washington:						
Okanogan	10,000.00	158,327.74		138,327.74		20,000.00
Yakima	352,695.28	7,744,602.39	239,584.00	7,241,669.20	86,668.41	416,264.78
Wyoming: Shoshone	46,832.56	1,100,414.26	44,720.92	933,346.06	166,512.57	555.63
Total	2,956,211.47	54,156,270.63	2,165,934.97	47,880,266.50	[2] 4,695,139.37	1,580,864.76
Paid in advance of due dates			[1] 35,912.37	361,688.46	[3] 227,706.98	
Refunds				100,225.10	3,212.84	
Total collections			2,130,022.60	48,342,180.06		
Contributed funds applying to construction cost not included in above table			79,563.73	1,946,358.83		

[1] Contra. [2] Other credits for fiscal year, $378,899.90. [3] Decrease for fiscal year, $9,041.62.

Accounts Receivable, Operation and Maintenance Charges (After Public Notice)

State and project	Due		Collected			Uncollected June 30, 1939
			Cash		Other credits to June 30, 1939	
	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939		
Arizona: Yuma Auxiliary	$15,861.86	$533,452.10	$14,894.05	$516,050.19	$13,816.35	$3,585.56
Arizona-California: Yuma	178,604.81	4,333,271.04	170,172.67	4,131,093.33	196,973.93	5,203.78
California: Orland	32,346.02	743,335.03	32,851.65	701,885.80	25,757.82	15,691.41
Colorado:						
Grand Valley	49,963.81	556,995.38	49,963.81	523,995.38	33,000.00	
Uncompahgre		1,008,683.69		977,809.79	30,873.90	

Accounts Receivable, Operation and Maintenance Charges (After Public Notice)—Continued

State and project	Due		Collected			Uncollected June 30, 1939
			Cash		Other credits to June 30, 1939	
	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939		
Idaho:						
Boise	$14,774.49	$2,225,127.29	$14,774.49	$2,172,477.57	$52,649.72	
King Hill		60,711.27		59,192.22	1,519.05	
Minidoka	47,265.31	2,320,886.25	34,036.04	2,160,510.92	141,715.43	$18,659.90
Montana:						
Huntley		554,787.34		543,594.31	11,193.03	
Milk River	50,661.94	523,126.74	47,355.86	493,525.31	1,662.25	27,939.18
Sun River		168,718.50		164,366.28	4,352.22	
Montana-North Dakota:						
Lower Yellowstone		338,562.56		338,557.93	4.63	
Nebraska-Wyoming:						
North Platte	27,328.82	2,003,109.00	24,361.95	1,925,712.55	66,542.32	10,854.13
Nevada: Newlands		1,174,581.57		1,135,901.55	38,680.02	
New Mexico: Carlsbad	56,769.01	1,085,824.69	56,769.01	1,068,951.98	16,872.71	
New Mexico-Texas: Rio Grande	348,980.00	5,296,381.19	343,287.49	5,029,517.87	266,863.32	
North Dakota:						
Buford-Trenton		2,317.41		2,317.41		
Williston		34,042.75		34,042.75		
Oregon:						
Umatilla	3,427.49	398,775.69	2,783.35	390,877.59	7,253.96	644.14
Vale	24,058.83	84,415.39	24,058.83	84,415.39		
Oregon-California: Klamath	65,240.00	1,502,381.29	65,304.55	1,467,711.01	30,536.22	4,134.06
Oregon-Idaho: Owyhee	[1] 4,309.23	46,560.65	[1] 4,309.23	46,560.65		
South Dakota: Belle Fourche	61,870.43	1,385,787.28	61,870.43	1,376,411.29	9,375.99	
Utah: Strawberry Valley		376,880.88		365,022.21	11,858.67	
Washington:						
Okanogan		371,441.72		368,788.67	2,653.05	
Yakima	237,187.58	6,295,512.93	223,735.02	6,100,700.39	74,191.97	120,620.57
Wyoming: Shoshone	2,797.80	564,048.67	3,022.70	539,022.51	23,705.43	1,320.73
Total	1,212,828.97	33,989,718.30	1,164,932.67	32,719,012.85	[2] 1,062,051.99	208,653.46
Paid in advance of due dates			[1] 28,518.36	164,960.21	[3] 14,870.71	
Penalties and interest			6,136.09	542,200.80	[4] 20,499.89	
Refunds				38,241.47	156.00	
Total collections			1,142,550.40	33,464,415.33		

[1] Contra.
[2] Other credits for fiscal year, $18,467.35.
[3] Increase for fiscal year, $3,887.89.
[4] Increase for fiscal year, $19.89.

Accounts Receivable, Rentals of Irrigation Water

State and Project	Due		Collected			Uncollected June 30, 1939
			Cash		Other credits to June 30, 1939	
	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939		
Arizona:						
Salt River		$2,246,726.01		$2,246,726.01		
Yuma Auxiliary	$1,944.43	16,928.46	$1,187.00	16,171.03		$757.43
Arizona-California: Yuma	7,518.84	584,495.87	7,964.84	571,794.68	$12,654.19	47.00
California: Orland	193.44	121,683.17	193.44	121,683.17		
Colorado:						
Grand Valley	10,912.60	555,536.06	10,912.60	549,035.39	6,500.67	
Uncompahgre	1,537.47	1,235,781.32	50.02	1,222,711.98		13,069.34

Accounts Receivable, Rentals of Irrigation Water—Continued

State and Project	Due		Collected			Uncollected June 30, 1939
			Cash		Other credits to June 30, 1939	
	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939		
Idaho:						
Boise	$8,050.00	$830,188.57	$8,050.00	$825,468.07	$4,720.50	
Boise-Payette	1,488.55	1,488.55	1,305.55	1,305.55		$183.00
Minidoka	57,935.42	913,619.00	56,279.62	908,510.99	3,383.01	1,725.00
Montana:						
Huntley	506.35	14,118.83	506.35	14,118.83		
Milk River	109.82	239,072.70	509.96	229,126.06	1,208.14	8,738.50
Sun River	13.03	132,669.93	56.30	130,759.22	1,366.62	544.09
Montana-North Dakota: Lower Yellowstone	561.60	138,209.00	198.00	137,150.78		1,058.22
Nebraska-Wyoming: North Platte	4,303.70	354,168.17	4,303.70	354,158.17	10.00	
Nevada: Newlands		28,291.16		22,114.31	6,176.85	
New Mexico:						
Carlsbad	551.31	41,292.59	551.31	41,292.59		
Hondo		9,129.70		9,129.70		
New Mexico-Texas: Rio Grande	86,878.35	1,693,751.31	86,859.54	1,672,974.94		20,776.37
North Dakota:						
Buford-Trenton		31.75		31.75		
Williston		2,117.28		2,117.28		
Oregon:						
Umatilla	1,974.00	104,703.77	1,974.00	78,426.97		26,276.80
Vale	10.66	21,572.21	58.66	21,417.38		154.83
Oregon-California: Klamath	55,663.57	562,878.41	54,615.76	557,046.35	25.00	5,807.06
Oregon-Idaho: Owyhee	92,527.50	230,213.92	68,799.88	196,714.27		33,499.65
South Dakota: Belle Fourche	709.71	12,145.45	439.41	11,857.35	17.80	270.30
Utah: Strawberry Valley		17,596.13		17,596.13		
Washington:						
Okanogan		110,645.28		108,061.09	2,584.19	
Yakima	596.53	225,703.02	2,493.90	184,476.17	4,032.69	37,144.16
Wyoming:						
Riverton	44,156.88	174,963.41	41,766.62	161,904.88	12,677.17	381.36
Shoshone	14,327.29	137,855.50	14,301.43	133,953.77	3,889.85	11.88
Total	392,471.05	10,757,576.53	363,377.89	10,547,834.86	[1] 59,296.68	150,444.99

[1] Other credits for fiscal year, $2,310.74.

POPULATION OF THE PROJECTS

At the close of the fiscal year there was reported for the Federal reclamation projects a total population of 903,897 persons. Of this number 226,969 persons lived on 52,552 irrigated farms, and 676,928 resided in 258 towns and cities located on the projects or in the immediate vicinity and largely dependent on the irrigated areas for their prosperity. Notable increases over 1937 are found in all of these figures.

Within the areas thus developed as the result of the construction of the Federal irrigation systems there have been established 944 schools and 1,133 churches. There were 112 banks serving the settlers of the project farms and towns, with $226,645,573 in deposits made by approximately 245,000 depositors.

Settlement and Economic Data, Fiscal Year 1939

State	Project	Irrigated farms		Towns		Number of schools	Number of churches	Bank deposits
		Number	Population	Number	Population			
Arizona	Salt River	[1] 9,000	68,000	12	95,000	91	152	$59,256,800
Arizona-California	Yuma	1,606	3,127	5	8,700	13	27	1,603,460
California	Orland	668	2,024	1	1,200	9	10	1,030,108
Colorado	Grand Valley	526	1,625	6	19,950	17	38	4,709,960
	Uncompahgre	1,683	6,083	3	8,600	28	35	3,993,027
Idaho	Boise	4,025	15,800	16	48,980	128	118	[2]
	Minidoka	3,479	11,335	[3] 6	[3] 8,040	[3] 22	[3] 54	[2]
Montana	Bitter Root	331	1,257	6	4,500	10	13	1,741,464
	Frenchtown	30	141	3	17,150	15	23	8,764,093
	Huntley	628	1,846	5	702	8	6	180,292
	Milk River	719	2,716	17	11,694	32	36	3,882,654
	Sun River	798	2,298	5	943	9	10	257,687
Montana-North Dakota	Lower Yellowstone	673	3,657	7	4,050	18	22	1,007,600
Nebraska-Wyoming	North Platte	2,822	9,656	17	22,496	69	54	6,874,276
Nevada	Humboldt	63	200	1	1,350	4	4	895,506
	Newlands	698	3,160	4	2,200	16	12	840,136
	Truckee River Storage	400	1,700	2	29,000	24	17	17,429,089
New Mexico	Carlsbad	449	2,146	4	8,500	9	12	1,933,009
New Mexico-Texas	Rio Grande	5,460	25,820	36	133,829	88	128	35,134,090
Oregon	Umatilla	459	1,631	5	1,655	7	12	[4] 415,591
	Vale	430	1,680	3	1,600	5	12	366,857
Oregon-California	Klamath	919	3,923	5	17,735	30	35	[2]
Oregon-Idaho	Owyhee	1,630	6,340	5	6,900	28	24	[2]
South Dakota	Belle Fourche	900	2,381	5	3,600	28	17	2,300,000
Utah	Hyrum	425	1,500	3	3,500	5	6	[5]
	Moon Lake	600	2,550	10	4,500	17	15	555,000
	Ogden River	1,230	4,900	4	54,000	25	56	26,903,000
	Sanpete	[1] 210	1,160	2	1,950	7	6	1,038,000
	Strawberry Valley	2,200	5,550	12	25,000	27	26	1,163,300
	Weber River	2,100	10,000	10	48,000	46	50	26,798,000
Washington	Okanogan	414	937	3	4,700	9	8	1,231,074
	Yakima	5,506	17,844	23	51,090	78	62	6,737,184
Wyoming	Kendrick	0	0	4	20,000	17	19	9,005,164
	Riverton	400	1,400	3	2,564	2	4	[5]
	Shoshone	1,071	2,582	5	3,250	3	10	599,152
Total, fiscal year 1939		52,552	226,969	258	676,928	944	1,133	226,645,573

[1] Estimated.
[2] Not reported.
[3] Gooding division not included.
[4] West division not included.
[5] No banks on project or in project towns.

OPERATION AND MAINTENANCE

The care and operation of 16 completed projects or divisions of projects have remained under the direct supervision of the Bureau with annual charges fixed by public notices issued by the Secretary. The water users are required to advance sufficient funds to cover the annual cost of operation and maintenance with no water delivered until the charges have been paid. There are 25 projects or divisions of projects where the canal systems have been completed and turned over to organized water users for operation and maintenance under contracts. With few exceptions the care and operation of storage dams and reservoirs have been retained by the Bureau.

There are two major problems confronting the Bureau in the operation and maintenance of the projects. The first is to bring about more economical use of water in the irrigation of crops. Relatively

high charges per acre-foot where excessive quantities of water are used is a deterrent. More effective is an educational campaign demonstrating benefits that follow economical use of water, among which are the reduction of seepage, prevention of soil erosion, and leaching of valuable plant food. Crop production has been increased rather than diminished through reducing the amount of water applied in irrigation in many areas.

Educational work is carried on by the Operation and Maintenance Division in cooperation with water users' organizations, State colleges, county agricultural agents; through the use of lectures, illustrated by both motion pictures and slides; and by conducting field tours of project water users to selected farms. Printed information was prepared during the year concerning the practical use of soil and water for dissemination to farmers on the projects and to other interested persons. Many requests have been received for this material.

The second problem demanding attention is the reduction of canal losses in carrying water from the point of diversion to the land. The conditions vary widely on the different projects and will require intensive study to determine how excessive losses can best be reduced, whether the results that can be expected will justify the probable cost, and how the work can be financed. On several of the projects good results have been obtained on canals constructed in porous material by lining with concrete or blanketing with clay or other tight material.

The control of noxious weeds continued to be a serious matter on several projects, but through the cooperative efforts of State, county, and district officials, the Bureau has obtained encouraging results in many places. Weed surveys have been continued and maps prepared showing the location and extent of noxious weeds. On projects recently completed the water users were shown through illustrated lectures the several varieties of noxious weeds that may become a serious menace and were instructed in preventing their growth.

The Bureau has continued to act as a clearing house for the dissemination of information concerning improved methods of maintaining canal systems and improved types of machinery and farm implements used in cleaning canals and preparing land for irrigation.

One public land opening on the Succor Creek division of the Owyhee project, Oregon, made 29 farm units available for homestead entry. For these units there were 109 applications received and considered. Development of the farms was progressing at a satisfactory rate. Many demands for public-land farms continued to be received throughout the year, and preparations were being made to open to settlement in the immediate future 81 farm units on the Sun River project in Montana and 39 units on the Riverton project in Wyo-

ming. Of importance in connection with these two openings are arrangements that have been made, following interdepartmental negotiations and subsequent congressional authorization, for the cooperation of the Farm Security Administration in furnishing certain financial assistance to prospective settlers who are otherwise qualified under Bureau regulations to enter a reclamation farm unit. Constant efforts are being made to improve the procedure for selecting settlers.

On May 31, 1939, Congress passed an act (Public No. 97, 76th Cong.) granting the Secretary authority to extend relief to projects, by postponement, where warranted, of construction payments due for 1938, as well as other unpaid construction charges required to be paid before the delivery of water in 1939. Pursuant to this act a field investigation was made of the conditions on all the projects and reports were submitted to the Secretary with recommendations for relief in certain deserving cases. The construction payments for 1938, due under the provisions of repayment contracts, totaled approximately $3,000,000. Extensions were granted on about 7 percent of this sum. In accordance with provisions contained in the New Reclamation Act of August 4, 1939, a similar procedure may be carried out for the benefit of projects unable to meet the 1939 construction installments.

CROP RESULTS

Prevailing low prices for farm commodities during the irrigation season of 1938 resulted in lowered crop values, although production was generally good. The total irrigable area in Federal and Warren Act projects was 3,766,212 acres, or an increase of 16,721 acres over 1937. The net area in cultivation increased from 3,034,761 acres in 1937 to 3,040,695 in 1938. Total values for all crops for the 1938 season amounted to $113,463,460 which was a decrease of $5,194,812, as compared with the previous year.

With decreased prices, the average crop value on 1,764,363 acres on the Federal reclamation projects was $38.47 per acre. An additional 1,276,332 acres receiving water under Warren Act contracts had an average per acre crop value of $35.73. Together, the crop value averaged $37.31 per acre, as compared with $39.09 for 1937.

The production of sugar beets on many of the projects has been found a profitable cash crop but expansion has been curtailed on practically all projects by the restrictions imposed by the Sugar Act, administered by the Department of Agriculture.

The only serious water shortage in 1939 was on the Belle Fourche project in South Dakota. On a few projects it was not possible to deliver a full supply but the shortage was not serious and did not reduce crop production.

Irrigation and Crop Results on Government Projects, 1938

State	Projects and divisions	Lands on projects covered by crop census					Other lands served by Government works, usually by a partial water supply through private canals under Warren Act or other water-service contracts. (See Reclamation table No. 23 for detailed break-down.)				
		Irrigable acreage [1]	Irrigated acreage	Area in cultivation [2]	Crop value		Irrigable acreage	Irrigated acreage	Area in cultivation [2]	Crop value	
					Total	Per acre				Total	Per acre
Arizona	Salt River	242,925	225,420	229,425	$18,460,319	$80.46	90,943	55,363	55,363	$2,953,952	$53.36
Arizona-California	Yuma	71,360	52,558	54,000	2,115,251	39.17					
	Valley Division	52,378	43,964	44,763	1,642,574	36.70					
	Reservation Division	7,743	2,355	2,355	59,576	25.30					
	Bard Division	7,257	4,827	5,470	176,488	32.26					
	Yuma Auxiliary (Mesa)	3,982	1,412	1,412	236,613	167.59					
California	Orland	20,410	14,978	14,978	495,176	33.06					
Colorado	Grand Valley	30,513	18,343	18,393	666,654	36.24	18,427	15,500	15,500	1,634,800	105.44
	Uncompahgre	91,393	60,677	60,288	1,278,971	21.21	3,846	3,314	3,314	69,855	21.08
Idaho	Boise	166,030	150,152	150,337	3,662,294	24.36	126,955	118,790	112,690	2,489,839	22.09
	New York Irrigation District	16,344	14,822	14,960	232,703	15.55					
	Nampa-Meridian Irrigation District	36,944	34,454	34,454	798,770	23.18					
	Boise-Kuna Irrigation District	47,739	43,990	43,990	948,965	21.57					
	Wilder Irrigation District	56,436	49,044	49,091	1,458,084	29.70					
	Big Bend Irrigation District	1,715	1,417	1,417	26,820	18.93					
	Black Canyon Irrigation District (Notus Division).	6,852	6,425	6,425	196,952	30.65					
	Minidoka	180,100	168,887	168,887	5,005,547	29.64	739,148	694,150	656,099	20,581,232	31.37
	Minidoka Irrigation District	70,011	60,567	60,567	2,035,913	33.61					
	Burley Irrigation District	47,938	46,169	46,169	1,645,989	35.65					
	Gooding Division	62,151	62,151	62,151	1,323,645	21.30					
Montana	Bitter Root	16,532	15,841	15,841	316,922	19.89					
	Frenchtown	4,878	1,327	1,743	26,239	15.05					
	Huntley	29,501	23,262	16,613	673,218	40.53					
	Milk River	136,704	59,712	57,199	1,289,027	22.54					
	Malta Division	58,799	24,285	17,855	422,820	23.68					
	Glasgow Division	22,133	8,707	8,258	130,718	15.83					
	Chinook	55,772	26,720	31,086	735,489	23.66					

Montana	Sun River	71,655	50,903	58,668	672,831	11.47					
	Fort Shaw Division	13,902	8,111	8,074	98,188	12.16					
	Greenfields Division	57,753	42,792	50,594	574,643	11.36					
Montana-North Dakota	Lower Yellowstone	57,211	43,723	43,723	1,303,684	29.82					
	District No. 1 (Montana)	37,242	30,223	30,223	914,832	30.27					
	District No. 2 (North Dakota)	19,969	13,500	13,500	388,852	28.80					
Nebraska-Wyoming	North Platte	236,463	193,839	176,466	5,274,672	29.89	121,082	[3] 110,700	101,757	3,152,898	30.98
	Pathfinder Irrigation District	112,959	83,174	71,710	1,767,364	24.65					
	Gering and Fort Laramie Irrigation District.	54,846	51,332	50,268	1,976,413	39.32					
	Goshen Irrigation District	52,488	47,153	44,236	1,310,977	29.64					
	Northport Irrigation District	16,170	12,180	10,252	219,918	21.45					
Nevada	Newlands	66,743	51,016	49,958	615,389	12.32					
New Mexico	Carlsbad	25,055	19,126	19,126	790,308	41.32					
New Mexico-Texas	Rio Grande	175,675	137,354	138,442	7,661,281	55.34	17,128	11,253	11,253	557,685	49.56
	Elephant Butte Irrigation District	101,461	78,237	75,861	4,226,864	55.72					
	El Paso County Water Improvement District No. 1.	74,214	59,117	62,581	3,434,417	54.88					
Oregon	Umatilla	18,576	11,261	11,461	200,613	17.50	905	775	768	16,836	21.34
	East Division	10,996	7,049	7,084	121,971	17.22					
	West Division	7,580	4,212	4,377	78,642	17.96					
Oregon-California	Vale	30,000	20,791	20,791	721,935	34.72					
	Klamath	66,702	57,537	55,460	3,229,260	58.23	65,718	39,247	38,805	1,338,745	34.50
	Main Division	41,046	33,982	31,505	1,491,502	47.34					
	Tule Lake Division	25,656	23,555	23,955	1,737,758	72.54					
Oregon-Idaho	Owyhee	95,511	64,109	64,560	1,767,297	27.37	[4] 13,960	[4] 11,700	[4] 11,700	[4] 409,500	[4] 35.00
	Advancement Irrigation District	683	595	596	15,636	26.23					
	Bench Irrigation District	2,394	2,185	2,185	117,358	53.71					
	Crystal Irrigation District	1,120	977	983	28,484	28.98					
	Owyhee Irrigation District (including former Kingman Colony).	55,000	32,078	32,394	625,029	19.29					
	Payette-Oregon Slope Irrigation District.	4,432	3,669	3,730	181,140	48.56					

[1] Area for which the Bureau was prepared to supply water in 1938.
[2] See interpretation of Subsection F of Act of December 5, 1924 (43 Stat. 672) as outlined in Circular Letter No. 2324, February 15, 1937.
[3] Estimated.
[4] Owyhee Ditch Co. lands.

Irrigation and Crop Results on Government Projects, 1938—Continued

State	Projects and divisions	Lands on projects covered by crop census					Other lands served by Government works, usually by a partial water supply through private canals under Warren Act or other water-service contracts. (See Reclamation table No. 23 for detailed break-down.)				
		Irrigable acreage	Irrigated acreage	Area in cultivation	Crop value		Irrigable acreage	Irrigated acreage	Area in cultivation	Crop value	
					Total	Per acre				Total	Per acre
Oregon-Idaho	Ontario-Nyssa Irrigation District	5,690	5,181	5,236	$209,311	$39.98					
	Gem Irrigation District	25,872	19,188	19,200	581,480	30.29					
	Slide Irrigation District	320	236	236	8,859	37.54					
South Dakota	Belle Fourche	72,572	40,612	40,612	901,302	22.19					
Utah	Weber River (Salt Lake Basin)						86,756	84,256	84,256	$3,418,046	$40.57
	Hyrum	8,324	5,934	5,934	207,705	35.00					
	Ogden River						18,259	12,788	13,141	532,150	40.49
	Sanpete (Ephraim Division)						6,750	5,861	6,162	119,385	19.37
	Strawberry Valley	42,433	39,466	39,370	932,527	23.69					
	Highline Division	19,011	17,853	17,757	323,492	18.22					
	Spanish Fork Division	14,327	13,608	13,608	351,836	25.86	8,224	7,813	7,813	210,097	26.89
	Springville-Mapleton Division	9,095	8,005	8,005	257,199	32.13					
Washington	Okanogan	7,739	3,773	3,742	447,366	119.54					
	Yakima	205,161	163,831	166,347	7,569,036	45.50	188,677	157,332	157,438	8,115,154	51.55
	Sunnyside Division	105,438	81,800	83,863	3,242,351	38.66					
	Tieton Division	29,537	25,322	25,202	3,064,908	121.61					
	Kittitas Division	70,186	56,709	57,282	1,261,777	22.03					
Wyoming	Riverton	32,000	25,905	26,095	471,773	18.08	273	273	273	3,482	12.75
	Shoshone	73,716	57,247	55,904	1,103,207	19.73					
	Garland Division (Shoshone Irrigation District).	41,902	33,805	33,386	777,915	23.30					
	Frannie Division (Deaver Irrigation District).	20,041	13,686	12,863	181,257	14.09					
	Willwood Division	11,773	9,756	9,655	144,035	14.92					
	Total, all regular projects 1938	2,275,882	1,777,584	1,764,363	67,859,804	38.47	1,507,051	1,329,115	1,276,332	45,603,656	35.73
	Warren Act lands, 1938	1,507,051	1,329,115	1,276,332	45,603,656	35.73					
	Grand total regular projects and Warren Act.	3,782,933	3,106,699	3,040,695	113,463,460	37.31					
	Grand total, 1937	3,766,212	3,114,801	3,034,761	118,658,272	39.09					
	+ Increase or − decrease	+16,721	−8,102	+5,934	−5,194,812	−1.78					

Irrigated and Cropped Acreages and Accumulated Crop Values by Years, 1906–38

Year	Federal irrigation projects				Warren Act lands				Entire area			
	Irrigated acreage	Cropped acreage	Crop value		Irrigated acreage	Cropped acreage	Crop value		Irrigated acreage	Cropped acreage	Crop value	
			For year	Cumulative total			For year	Cumulative total			For year	Cumulative total
1906	22,300	[1] 20,100	$244,900						22,300	[1] 20,100	$244,900	
1907	187,628	[1] 169,000	4,760,460	$5,005,360					187,628	[1] 169,000	4,760,460	$5,005,360
1908	289,549	[1] 260,500	7,635,888	12,641,248					289,549	[1] 260,500	7,635,888	12,641,248
1909	410,628	[1] 369,500	11,920,663	24,561,911					410,628	[1] 369,500	11,920,663	24,561,911
1910	471,423	413,000	12,944,639	37,506,550					471,423	413,000	12,944,639	37,506,550
1911	562,311	470,100	13,086,441	50,592,991					562,311	470,100	13,086,441	50,592,991
1912	614,477	540,000	16,007,134	66,600,125					614,477	540,000	16,007,134	66,600,125
1913	694,142	637,227	15,676,409	82,276,534					694,142	637,227	15,676,409	82,276,534
1914	761,271	703,424	16,475,517	98,752,051					761,271	703,424	16,475,517	98,752,051
1915	810,649	760,035	18,164,452	116,916,503					810,649	760,035	18,164,452	116,916,503
1916	922,821	858,291	32,815,972	149,732,475					922,821	858,291	32,815,972	149,732,475
1917	1,026,663	966,784	56,462,313	206,194,788					1,026,663	966,784	56,462,313	206,194,788
1918	1,119,566	1,051,193	66,821,396	273,016,184	[1] 501,100	[1] 481,600	$35,000,000		[1] 1,620,666	1,532,793	101,821,396	308,016,184
1919	1,187,255	1,113,469	88,974,137	361,990,321	916,313	880,613	64,368,468	$99,368,468	2,103,568	1,994,082	153,342,605	461,358,789
1920	1,223,480	1,153,820	66,171,650	428,161,971	981,940	950,890	47,836,750	147,205,218	2,205,420	2,104,710	114,008,400	575,367,189
1921	1,227,500	1,157,900	49,620,300	477,782,271	1,001,250	969,550	45,288,630	192,493,848	2,228,750	2,127,450	94,908,930	670,276,119
1922	1,202,130	1,169,100	50,360,850	528,143,121	983,290	951,270	33,240,840	225,734,688	2,185,420	2,120,370	83,601,690	753,877,809
1923	1,213,700	1,179,870	65,046,300	593,189,421	1,051,380	993,040	37,557,860	263,292,548	2,265,080	2,172,910	102,604,160	856,481,969
1924	1,290,890	1,216,610	66,488,560	659,677,981	930,670	889,460	43,237,470	306,530,018	2,221,560	2,106,070	109,726,030	966,207,999
1925	1,320,300	1,242,750	77,608,880	737,286,861	1,019,170	951,250	53,655,850	360,185,868	2,339,470	2,194,000	131,264,730	1,097,472,729
1926	1,411,020	1,328,810	60,369,620	797,656,481	1,097,190	949,590	49,750,040	409,935,908	2,508,210	2,278,400	110,119,660	1,207,592,389
1927	1,378,990	1,326,810	70,985,450	868,641,931	1,148,115	1,072,486	61,160,010	471,095,918	2,527,105	2,399,296	132,145,460	1,339,737,849
1928	1,442,080	1,385,560	80,238,800	948,880,731	1,235,020	1,192,030	62,495,320	533,591,238	2,677,100	2,577,590	142,734,120	1,482,471,969
1929	1,483,900	1,420,070	87,559,670	1,036,440,401	1,234,230	1,192,990	72,720,490	606,311,728	2,718,130	2,613,060	160,280,160	1,642,752,129
1930	1,504,810	1,467,097	64,418,940	1,100,859,341	1,286,046	1,254,493	54,654,550	660,966,278	2,790,856	2,721,590	119,073,490	1,761,825,619
1931	1,522,718	1,462,565	40,121,089	1,140,980,430	1,293,889	1,251,830	33,406,340	694,372,618	2,816,607	2,714,395	73,527,429	1,835,353,048
1932	1,555,144	1,506,320	31,165,752	1,172,146,182	1,214,461	1,196,400	18,627,219	712,999,837	2,769,605	2,702,720	49,792,971	1,885,146,019
1933	1,589,770	1,529,903	48,138,576	1,220,284,758	1,239,017	1,199,113	35,425,870	748,425,707	2,828,787	2,729,016	83,564,446	1,968,710,465
1934	1,552,124	1,464,405	59,628,327	1,279,913,085	1,285,081	1,229,594	40,160,676	788,586,383	2,837,205	2,693,999	99,789,003	2,068,499,468
1935	1,640,936	1,604,166	63,601,663	1,343,514,748	1,294,680	1,256,970	43,179,631	831,766,014	2,935,616	2,861,136	106,781,294	2,175,280,762
1936	1,702,192	1,629,174	78,902,818	1,422,417,566	1,335,995	1,272,745	57,599,662	889,365,676	3,038,187	2,901,919	136,502,480	2,311,783,242
1937	1,725,463	1,700,969	72,893,649	1,495,311,215	1,389,338	1,333,800	45,764,623	935,130,299	3,114,801	3,034,769	118,658,272	2,430,441,514
1938	1,777,584	1,764,363	67,859,804	1,563,171,019	1,329,115	1,276,332	45,603,656	980,733,955	3,106,699	3,040,695	113,463,460	2,543,904,974

[1] Estimated.

Does not include acreages of lands cropped without irrigation and crop values therefrom.

SECONDARY AND GENERAL INVESTIGATIONS

Investigations of 79 potential projects were in progress during the fiscal year by the Bureau of Reclamation. Allotments of emergency funds and regular appropriations were being used.

The investigations are generally limited to (*a*) examinations of individual projects, including land classification, reservoir and canal surveys, economic and water-supply studies, (*b*) reconnaissance surveys of stream basins to determine irrigation potentialities within those basins, and (*c*) basin-wide surveys, including reconnaissance and examination of individual projects within the basin. The largest and practically the only basin-wide survey undertaken by the Bureau is that of the Colorado River Basin, the examination of which was authorized by section 15 of the Boulder Canyon Project Act approved December 21, 1928, which directs that investigation and public reports be made of the feasibility of projects for irrigation, generation of electrical power, and other purposes in the States of Arizona, Nevada, Colorado, New Mexico, Utah, and Wyoming.

Arizona

Colorado Basin surveys:

Little Colorado River: Land classification completed; reservoir and canal surveys and water-supply and economic studies in progress.

Hassayampa River: Classification completed; reservoir and canal surveys and water-supply and economic studies in progress.

Williams River: Land classification completed; reservoir and canal surveys and water-supply and economic studies in progress.

Arizona-California

Colorado Basin surveys: Palo Verde and Cibola Valleys: Land classification in progress.

California

Colorado Basin surveys:

Palo Verde flood conditions report completed.

Chuckawalla Valleys: Land classification in progress.

Kings River: Field work completed and report in preparation.

Colorado

Colorado Basin surveys:

Western slope surveys:

Mancos (Mesa Verde National Park water supply): Field surveys in progress.

Florida Mesa: Preliminary draft of report completed.

Paonia (North Fork): Report completed.

Silt: Land classification completed; field surveys and water-supply and economic studies in progress.

Roan Creek: Field surveys practically completed; water-supply and economic studies in progress.

Colorado Basin surveys—Continued.

Western slope surveys—Continued.

Troublesome: Field surveys practically completed; water-supply and economic studies in progress.

Piceance: Field surveys practically completed; water-supply and economic studies in progress.

Collbran: Field surveys practically completed; water-supply and economic studies in progress.

Rifle: Field surveys practically completed; water-supply and economic studies in progress.

La Plata: Field surveys practically completed; water-supply and economic studies in progress.

Yampa below Yampa, Colorado: Land classification completed; field surveys, water-supply and economic studies in progress.

Blue River-Platte River transmountain diversions: All field surveys and water-supply and economic studies completed; report in preparation.

Eastern slope surveys:

North Republican: Report in preparation.

Arikaree: Field surveys practically completed; water-supply and economic studies in progress.

South Republican: Field surveys practically completed; water-supply and economic studies in progress.

Smoky Hill: Field surveys practically completed; water-supply and economic studies in progress.

Huerfano: Field surveys practically completed; water-supply and economic studies in progress.

Apishapa River: Field surveys practically completed; water-supply and economic studies in progress.

Hugo and Chivington: Report completed.

Trinidad (Purgatoire): Preliminary draft of report completed.

Colorado-Kansas

Arkansas Valley: Field surveys and water-supply and economic studies in progress.

Colorado-New Mexico

San Juan Basin surveys: Field surveys and water-supply and economic studies in progress.

Idaho

Southwestern Idaho investigations: Detailed surveys of Twin Springs reservoir site in progress; progress report on Payette watershed completed; field surveys of Weiser Basin in progress; land classification of Mountain Home area practically completed.

South Fork of the Snake River: Field surveys and water-supply and economic studies completed; report in preparation.

Salmon River reconnaissance: Report submitted.

Rathdrum Prairie: Supplemental report completed.

Cabinet Gorge power: Report submitted.

Idaho-Montana

Madison River-Snake River diversion: Studies in connection with Madison River irrigation in progress.

Montana

Gallatin Valley: Water-supply and economic studies in progress; all field work except that in connection with the Canyon Ferry dam site completed.
Marias: Report completed.
Rock Creek (Valley County): All field work completed; water-supply and economic studies in progress.
Fort Peck pumping: Land classification and canal surveys practically completed; water-supply studies, transmission-line surveys and economic studies in progress.

Nebraska

Mirage Flats project: Field work and the studies of water-supply and economic condition completed; structural designs and report in preparation.

Nevada

Humboldt River: Water-supply studies in progress.
Quinn Valley Reconnaissance: Examination in progress.

Nevada-Arizona

Bullshead Reservoir: Topographic surveys and geological explorations in progress.

North Dakota

Missouri River tributaries: Field work and water-supply and economic studies in progress.

North Dakota-South Dakota

Missouri River pumping projects: Field surveys of several individual areas in progress; water-supply and economic studies in progress; report on Bismarck area in progress.

Oklahoma

Lugert-Altus: Economic survey and report by Department of Agriculture completed; flood-control studies by Corps of Engineers completed; studies in connection with correlation of the reports by the Bureau of Reclamation, Department of Agriculture, and the Corps of Engineers in progress.
Kenton project: Preliminary report submitted.
North Canadian River Investigations (includes Fort Supply, Optima, and Canton areas): All field work completed; economic and water-supply studies in progress; a preliminary progress report on the Fort Supply area submitted.
Mangum project: A reconnaissance report in cooperation with the Corps of Engineers submitted.
Washita reconnaissance: Field work in progress.

Oregon

Grande Ronde project: All field work practically completed; water-supply and economic studies in progress.
Medford project: All field work completed; draft of report completed.
Canby project: Preliminary report completed.

South Dakota

Rapid Valley project: Supplemental field work in progress.
Angostura project: Supplemental field work in progress.

Gavins Point project: Reconnaissance with Corps of Engineers report submitted.

Shadehill project: Water-supply quality investigation completed; project progress report submitted.

Buffalo Gap (Beaver Creek): Field work and water-supply and economic studies in progress.

Texas

Balmorhea project: Detailed field surveys and water-supply and economic studies in progress.

Robert Lee project: Detailed surveys and water-supply and economic studies in progress.

Lower Colorado River flood survey: Report submitted.

Pease River-Cap Rock project: Reconnaissance with Corps of Engineers report submitted.

Utah

Colorado River Survey:

Price-Gooseberry, Blue Bench, and Ouray projects: Field surveys and water-supply and economic studies in progress.

Salt Lake Basin cooperative surveys—Weber River, Woodruff, Newton, Big Creek, Otter Creek, and Beaver Creek projects: Field work and water-supply and economic studies in preparation.

Washington

Columbia Basin project: Land classification and land-appraisal surveys in progress.

Wyoming

Colorado Basin surveys:

Green River projects including Lyman, Pinedale, and Seedskadie: Field work and water-supply and economic studies in progress.

Wyoming-Utah-Idaho

Green River-Bear River diversion: Reservoir and canal surveys practically completed; water-supply and economic studies in progress.

CIVILIAN CONSERVATION CORPS

During the fiscal year 10 additional C. C. C. camps were allocated to the Bureau of Reclamation, bringing to 44 the total number of camps engaged on work programs directly related to the western irrigation developments of the Federal Government. The increase in the number of camps, although small, has permitted the program of rehabilitation of reclamation projects to proceed and has provided the facilities to undertake new projects of importance.

C. C. C. camps were established for the first time on an all-year basis on the Milk River and Sun River projects, Montana; Orland project, California; and the Yakima project, Washington. Construction of the Deschutes reclamation project in central Oregon began in July 1938 with the assignment of three C. C. C. camps to aid the regular service in development of the project. The 5-year program

of cleaning the reservoir area, upstream from Shasta Dam on the Central Valley project in northern California, was started in the fall of 1938 with the establishment of two C. C. C. camps at Baird.

Reconstruction of the upper embankment of the Deer Flat Reservoir on the Boise project concluded the rehabilitation, begun in 1936, of this important water-storage basin. The new C. C. C. camp at Malta, Mont., restored the irrigation system of the Milk River project following the record Milk River flood in March. Salvage of the old Government-constructed railroad to the Owyhee Dam in eastern Oregon was completed during the year with C. C. C. forces, the railroad right-of-way being regraded for highway use to permit access to this important structure by Government employees.

Permanency has characterized the type of work comprising the C. C. C. program on reclamation projects. Many small but essential water-control structures varying from concrete farm turn-outs to concrete-pipe siphons were built by the enrollees. Demonstrations of practical methods of weed control to eliminate the noxious varieties from the Federal projects were continued. Public buildings at the large recreational development at Elephant Butte Reservoir in New Mexico were placed in service.

The training of C. C. C. enrollees to fit them for gainful employment in civilian life was given particular attention during the year. A complete job-training program was secured by instruction on the job, supplemented by related classroom work held in the camps in the evenings.

ORGANIZATION

The Commissioner, appointed by the President and under the supervision of the Secretary, is in administrative charge of the Bureau of Reclamation. He is supported by a staff of 121 officers and employees in Washington. The Chief Engineer at Denver, Colo., assisted by 967 employees, is in general supervision of the engineering and construction activities. Twenty-two construction engineers in charge of projects now under construction, 4 engineers, a director of power at Boulder City, Nev., and 3 supervising engineers, located at Coulee Dam, Wash., Sacramento, Calif., and Estes Park, Colo., report to the Chief Engineer. Seventeen superintendents and engineers in charge of completed projects report to the Supervisor of Operation and Maintenance at Washington. The 53 field offices, including the Denver office and 5 field legal offices, have a combined personnel of 6,148.

Harry W. Bashore was appointed Assistant Commissioner during the fiscal year to succeed Roy B. Williams, who left Washington to become construction engineer at Friant Dam, Calif.

RECLAMATION TABLE 1.—Consolidated Financial Statement, June 30, 1939

DEBIT SIDE

Construction account:		
Primary projects:		
Cost of irrigation works:		
Original construction	$381,467,881.95	
Supplemental construction	12,718,343.22	
Value of works taken over	2,220,891.21	
Total construction cost	396,387,116.38	
Operation and maintenance prior to public notice, net	$3,147,094.48	
Operation and maintenance deficits and arrearages funded with construction	5,855,823.45	
Penalties on water-right charges funded with construction	3,247,972.23	
	12,250,890.16	
Total	408,638,006.54	
Less income items:		
Construction revenues	$7,792,641.58	
Contributed funds	1,946,358.83	
Nonreimbursable appropriation, Rio Grande Dam	1,000,000.00	
	10,739,000.41	
	397,899,006.13	
Less abandoned works, nonreimbursable cost and charge-offs	17,133,900.70	
Balance payable		$380,765,105.43
Palo Verde flood protection, cost of construction and repairs		48,806.46
Secondary projects and general investigations:		
Cost of surveys and investigations	$4,881,956.59	
Less contributed funds	620,838.41	
		4,261,118.18
General offices expense undistributed		2,085,952.73
Plant and equipment		2,501,755.66
Materials and supplies		5,331,954.52
Accounts receivable:		
Current accounts	$2,102,190.89	
Deferred accounts	247,815,754.31	
		249,917,945.20
Undistributed clearing cost accounts		932,712.01
Unadjusted debits, disbursement vouchers in transit		34,956.88
Cash:		
Balance on hand:		
Reclamation fund	$21,862,367.18	
General fund	66,923,142.24	
National Industrial Recovery and P. W. A. allotments	10,703,468.30	
Emergency Relief allotments	1,490,295.76	
Funds transferred from other departments	27,544.75	
Contributed funds	92,935.28	
	101,099,753.51	
In special deposit account	46,655.50	
		101,146,409.01
Total debits		747,026,716.08

CREDIT SIDE

Security for repayment of cost of irrigation works: Contracted construction repayments	$299,726,969.80
Current accounts payable	7,590,304.65
Deferred and contingent obligations	1,092,269.46
Reserves and undistributed profits	11,128,048.47

RECLAMATION TABLE 1.—Consolidated Financial Statement, June 30, 1939—Con.

CREDIT SIDE—Continued

Operation and maintenance results, surplus			$816,795.39
Unadjusted credits, collection vouchers in transit			[1] 4,851.28
Government aid for reclamation of arid lands:			
Reclamation fund		$202,728,224.76	
Advances to reclamation fund:			
Treasury loan (Act of June 25, 1910)	$20,000,000.00		
Less amount repaid	20,000,000.00		
Treasury loan (Act of Mar. 4, 1931)	5,000,000.00		
Less amount repaid	5,000,000.00		
National Industrial Recovery and P. W. A. allotments		73,421,000.00	
Emergency Relief allotments		48,372,012.28	
Funds transferred from other departments		4,092,738.05	
General fund:			
Central Valley project		38,400,000.00	
Grand Coulee Dam		69,750,000.00	
Water Conservation and Utility projects		5,000,000.00	
Other appropriations		7,598,666.12	
		449,362,641.21	
Less nonreimbursable appropriation, Rio Grande Dam		1,000,000.00	
		448,362,641.21	
Less impairment of funds:			
Abandoned works	$2,829,884.62		
Nonreimbursable construction cost	881,647.73		
Operation and maintenance cost uncollectible	453,272.39		
Attendance at meetings	1,815.90		
Giving information to settlers, cost	11,238.17		
Prepaid civil service retirement funds	2,340.33		
Operation and maintenance administration	39,541.39		
Washington office cost since Dec. 5, 1924	2,504,732.15		
Charge-offs (Act of May 25, 1926)	14,699,308.24		
Returned to Treasury, miscellaneous receipts	128.65		
		21,423,909.57	
		426,938,731.64	
Less impounded funds, economy acts		261,552.05	
			426,677,179.59
Total credits			747,026,716.08

[1] Contra.

RECLAMATION TABLE 2.—Consolidated Statement by Projects of Construction Cost of Irrigation Works, Other Items Reimbursable With Construction, and Amounts Repayable

State and project	Construction cost		Operation and maintenance before public notice (net)		Operation and maintenance deficits and arrearages and penalties		Construction revenues, contributed funds, and nonreimbursable appropriation (contra)		Abandoned works, nonreimbursable cost and authorized charge-offs	Total repayable	
	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939		Fiscal year 1939	To June 30, 1939
Arizona:											
Gila	$1,157,133.84	$4,192,411.36								$1,157,133.84	$4,192,411.36
Salt River	1,944,439.31	19,961,193.89		$115,993.50		$1,023,020.02		$2,312,096.81	$382,097.31	1,944,439.31	18,406,013.29
Yuma Auxiliary		902,060.50				590.36		1,085.47			901,565.39
Arizona-California: Yuma		9,373,406.10		388,934.62		207,063.71	$14,941.32	246,264.37		[1] 14,941.32	9,723,140.06
California:											
Central Valley	14,854,275.81	17,624,335.46								14,854,275.81	17,624,335.46
Orland	47,620.14	2,448,669.71		[1] 11,432.99	$1,763.49	59,345.09		28,414.77		49,383.63	2,468,167.04
Colorado:											
Colorado-Big Thompson	2,179,322.25	2,402,394.51					478.42	478.42		2,178,843.83	2,401,916.09
Fruit Growers Reservoir	122,667.28	152,298.47								122,667.28	152,298.47
Grand Valley	321.39	5,020,612.73		138,621.28		4,529.40		269,692.83	812,374.64	321.39	4,081,695.94
Pine River	1,008,187.00	1,263,595.22					520.00	520.00		1,007,667.00	1,263,075.22
Uncompahgre	216,213.62	8,582,682.62		311,103.02		196,503.91		25,063.87	1,260,791.93	216,213.62	7,804,433.75
Idaho:											
Boise	113,383.54	16,799,780.25		422,283.48		903,699.42	75,599.22	867,599.70	82,393.84	37,784.32	17,175,769.61
Boise-Payette	1,083,431.19	2,870,036.40	[1] $1,488.55	[1] 1,488.55						1,081,942.64	2,868,547.85
King Hill		1,905,918.80				110,122.51		28,187.27	1,987,854.04		
Minidoka	[1] 1,712.96	19,230,344.94	[1] 231.36	318,021.74	11,631.61	622,668.51	[1] 1,723.96	2,022,574.18	2,288.15	11,411.25	18,146,172.86
Upper Snake River	518,153.57	2,524,798.60					290.66	1,223.98		517,862.91	2,523,574.62
Kansas' Garden City		342,963.68		52,868.10				61,356.82	334,474.96		
Montana:											
Bitter Root		947,641.05				516,637.95					1,464,279.00
Buffalo Rapids	921,102.75	1,107,369.17								921,102.75	1,107,369.17
Chain Lakes	461,589.57	1,229,805.25					40,000.00	40,000.00		421,589.57	1,189,805.25
Frenchtown	886.88	264,159.65	2,042.21	5,475.60						2,929.09	269,635.25
Huntley		1,559,590.46		[1] 1,000.16		391,067.46		24,803.01	62,049.83		1,862,804.92
Milk River	699.56	6,924,891.06	[1] 30.94	436,996.80		101,062.03		74,400.81	1,735,969.31	668.62	5,652,579.77
Sun River	345,681.73	8,907,493.76	[1] 13.03	132,651.38	[1] 86.91	103,106.42		47,371.42	89,650.57	345,145.69	9,006,229.57
Montana-North Dakota:											
Lower Yellowstone		3,685,433.14	[1] 561.60	[1] 6,916.72		922,893.29	2,508.56	108,254.69	382,254.00	[1] 3,070.16	4,110,901.02
Nebraska-Wyoming:											
North Platte	51,396.86	19,383,100.98		743,294.42		1,516,486.08	57,683.03	676,728.28		[1] 6,286.17	20,966,153.20

RECLAMATION TABLE 2.—Consolidated Statement by Projects of Construction Cost of Irrigation Works, Other Items Reimbursable With Construction, and Amounts Repayable—Continued

State and project	Construction cost		Operation and maintenance before public notice (net)		Operation and maintenance deficits and arrearages and penalties		Construction revenues, contributed funds, and nonreimbursable appropriation (contra)		Abandoned works, nonreimbursable cost and authorized charge-offs	Total repayable	
	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939	Fiscal year 1939	To June 30, 1939		Fiscal year 1939	To June 30, 1939
Nevada:											
Humboldt	$31,709.69	$1,192,351.46								$31,709.69	$1,192,351.46
Newlands		7,947,282.86		[1] $2,155.44		$44,976.32		$52,347.53	$4,437,820.00		3,499,936.21
Truckee River Storage	605,933.18	1,037,142.10						20,003.00		605,933.18	1,017,139.10
New Mexico:											
Carlsbad	95,501.58	3,664,159.10		[1] 17,751.77		93,395.50		29,108.08	374,883.58	95,501.58	3,335,811.17
Hondo		339,491.68		32,952.01				656.03	371,787.66		
Tucumcari	96,717.83	96,717.83								96,717.83	96,717.83
New Mexico-Texas:											
Caballo Dam	287,817.08	2,099,000.12					$12,413.73	12,413.73		275,403.35	2,086,586.39
Rio Grande	49,262.52	15,411,681.76	$313,628.94	15,771.13		364,531.65	53,931.96	1,205,290.59	361,900.97	291,959.50	14,224,792.98
Rio Grande Power	316,595.59	316,595.59								316,595.59	316,595.59
North Dakota											
Buford-Trenton		223,423.06		[1] 31.75				1,967.62	221,423.69		
Williston		517,630.09		[1] 165.00			1,050.00	105,656.76	411,808.33		
Oregon:											
Baker		281,591.64						5,003.00			276,588.64
Burnt River	4,490.73	603,288.07						1,290.82		4,490.73	601,997.25
Deschutes	159,746.92	218,178.91								159,746.92	218,178.91
Stanfield		97,830.24									97,830.24
Umatilla		5,138,949.61				230,536.78	1,890.44	95,572.70	888,340.82	[1] 1,890.44	4,385,572.87
Vale	45,777.79	4,769,803.88	[1] 10.66	39,710.50		3,027.24	866.68	11,282.96		44,900.45	4,801,258.66
Oregon-California: Klamath	91,207.52	6,643,272.00	1,615.20	92,699.99	[1] $0.32	85,433.09	8,605.88	287,791.57	7,499.72	84,216.52	6,526,113.79
Oregon-Idaho: Owyhee	306,853.60	17,620,176.49			[1] 4,676.84	61,633.87	1,286.18	10,511.03		300,890.58	17,671,299.33
South Dakota: Belle Fourche	829.89	4,528,975.40		[1] 1,989.03		676,577.53	456.00	27,839.80	379,031.58	373.89	4,796,692.52
Utah:											
Hyrum	1,358.28	922,941.64						9,971.13		1,358.28	912,970.51
Moon Lake	111,767.49	1,528,500.96						8,093.18		111,767.49	1,520,407.78
Ogden River	22,916.54	4,003,500.71		2,361.87			10.00	12,876.97		22,906.54	3,992,985.61
Provo River	1,332,344.52	2,030,933.54						30,897.67		1,332,344.52	2,000,035.87
Salt Lake Basin	[1] 190,000.00	2,725,885.40				5,897.20	25.00	46,185.77		[1] 190,025.00	2,685,596.83
Sanpete	95,072.63	365,964.49						1,284.40		95,072.63	364,680.09
Strawberry Valley		3,507,423.49		10,744.06		89,635.49		258,379.12			3,349,423.92

Washington:											
Grand Coulee	21,086,422.31	81,700,287.76					45,009.68	188,603.06		21,041,412.63	81,511,684.70
Okanogan		1,452,129.45		[1] 47,766.87		26,882.64		7,496.28	997,861.70		425,887.24
Yakima	[1] 5,386.93	26,254,774.75		[1] 64,357.08	[1] 4,155.00	150,219.40	27,427.50	538,618.51	4,214.60	[1] 36,969.43	25,797,803.96
Yakima-Roza	2,201,794.52	5,858,257.15								2,201,794.52	5,858,257.15
Wyoming:											
Kendrick	4,793,281.02	15,211,009.61	4,919.27	4,919.27			3,058.19	9,014.03		14,795,142.10	5,206,914.85
Riverton	430,972.04	5,790,640.44			[1] 4,035.79	125,016.93	1,160.00	23,899.65		425,776.25	5,891,757.72
Shoshone	2,339.32	10,096,465.86	1,502.70	36,747.07		467,235.88	58,790.56	705,446.52	1,545,129.47	[1] 54,948.54	8,349,872.82
Shoshone-Heart Mountain	791,144.92	2,583,871.48					[1] 120.00			799,264.92	2,583,871.48
Total	57,799,263.91	396,387,116.38	321,372.18	3,147,094.48	440.24	9,103,795.68	406,159.05	10,543,618.21	17,133,900.70	57,698,531.18	380,960,487.63

[1] Contra.

BOULDER CANYON PROJECT

RECLAMATION TABLE 3.—Financial Statement June 30, 1939

ASSETS AND OTHER DEBITS

I. Investments

102	Fixed capital under construction	$116,128,134.91	
103	Other physical properties	1,430,492.17	
104	Investigations, Colorado River Basin	232,205.65	
104	Investigations, Parker-Gila project	75,350.64	
105	Other capital expenditures—Interest during construction	18,615,492.69	
106	Earnings and expenses during construction	[1] 571,794.20	
	Total investments		$135,909,881.86

II. Current and Accrued Assets

121	Treasury cash:		
	For advances to Colorado River Dam fund	$3,500,000.00	
	Colorado River Dam fund	32,730.62	
	N. I. R. A.—Parker-Gila project	8,098.42	
	Collections in transit	500,307.47	
	Total Treasury cash	4,041,136.51	
122	Disbursing officer's cash	490,007.76	
124	Accounts receivable	22,528.96	
	Total current and accrued assets		4,553,673.23

IV. Deferred and Unadjusted Debits

141	Clearing and apportionment accounts	[1] $197,275.02	
143	Field cost adjustments	10,642.54	
145	Jobbing accounts	54,514.89	
146	Prepayments		
171	Unadjusted debits	[1] 6,920.22	
	Total deferred and unadjusted debits		[1] 139,037.81
	Total assets and other debits		140,324,517.23

LIABILITIES AND OTHER CREDITS

X. Capital and Long-Term Liability

205	Long-term liability—U. S. Treasury authorized appropriation	$126,500,000.00	
161	Less: Authorized but not appropriated	5,190,000.00	
	Total long-term liability:		
205.2	Appropriated but not advanced	3,500,000.00	
205.3	Appropriated and advanced	117,810,000.00	
205.4	Less: Impounded, Legislative Economy Act	[1] 137,653.66	
206	N. I. R. A. allotment Parker-Gila project	93,000.00	
207	Interest on advances to Colorado River Dam fund	18,589,861.11	
208	Judgments—Court of Claims	37,766.29	
			139,892,973.74

XI. Current and Accrued Liabilities

211	Audited accounts payable:		
211.1	Contractors—current		
211.11	Contractors earnings—holdback		
211.2	Labor	$62,083.63	
211.3	Purchases	14,583.25	
211.4	Freight and express	58,661.58	
211.5	Passenger fares	609.65	
211.6	Rights-of-way		

[1] Contra.

BOULDER CANYON PROJECT

RECLAMATION TABLE 3.—Financial Statement June 30, 1939—Continued

XI. Current and Accrued Liabilities—Continued

211.9	Miscellaneous	$4,110.68	
211.91	Refunds		
	Total audited accounts payable	140,048.79	
219	Accrued interest		
	Total current and accrued liabilities		$140,048.79

XIII. Deferred and Unadjusted Credits

231	Unadjusted credits	10,974.14

XV. Reserves

258	Reserve for amortization of long-term debt and payment to States	280,520.61
	Total liabilities and other credits	140,324,517.28

BOULDER CANYON PROJECT

RECLAMATION TABLE 4.—Appropriations and Cash Statement June 30, 1939

	Regular appropriation	N. I. R. A. allotment	Total	N. I. R. A. Parker-Gila project
TREASURY CASH				
Appropriations and allotments	$83,310,000.00	$38,000,000.00	$121,310,000.00	$93,000.00
Advances to Colorado River Dam fund	79,810,000.00	38,000,000.00	117,810,000.00	
Balance not advanced	3,500,000.00		3,500,000.00	
Colorado River Dam fund:				
Advanced from appropriation to fund	79,810,000.00	38,000,000.00	117,810,000.00	
Collections deposited in fund	7,702,293.94	23,013.63	7,725,307.57	5,176.67
Total advances and collections	87,512,293.94	38,023,013.63	125,535,307.57	98,176.67
Transfer to miscellaneous receipts, Treasury	6,500,000.00		6,500,000.00	
Disbursements by General Accounting Office	4,983,345.66	54,723.63	5,038,069.29	
Advances to disbursing officers	75,996,427.98	37,968,079.68	113,964,507.66	90,078.25
Total withdrawals	87,479,773.64	38,512,803.31	125,502,576.95	90,078.25
Balance	32,520.30	210.32	32,730.62	8,098.42
Repay collections in transit	484.18		484.18	
Miscellaneous collections in transit	499,823.29		499,823.29	
Total Treasury cash (G. L. 121)	532,827.77	210.32	533,038.09	8,098.42
DISBURSING OFFICERS' CASH				
Advances and appropriation transfer adjustments	76,006,661.87	37,974,709.56	113,981,371.43	90,078.25
Disbursements by disbursing officers	75,522,407.46	37,974,481.10	113,496,888.56	84,631.41
Disbursing officers' checking	484,254.41	228.46	484,482.87	5,446.84
Collections by disbursing officers	8,204,754.97	29,392.51	8,234,147.48	5,176.67
Collections deposited and appropriation transfer	8,204,676.92	29,392.51	8,234,069.43	5,176.67
Collections not deposited	78.05		78.05	
Total disbursing officers' cash (G. L. 122)	484,332.46	228.46	484,560.92	5,446.84

ALL-AMERICAN CANAL

RECLAMATION TABLE 5.—Financial Statement June 30, 1939

ASSETS AND OTHER DEBITS

I. Investments

102	Fixed capital under construction		$26,544,758.99

II. Current and Accrued Assets

121	Treasury cash:		
	For advances to Colorado River Dam fund	$2,450,000.00	
	Colorado River Dam fund	81,789.54	
	P. W. A., N. I. R. A., and E. R. A. allotments	323,240.41	
	Contributions—Imperial Irrigation District	26,287.54	
	Collections in transit	894.42	
	Total Treasury cash	2,882,211.91	
122	Disbursing officers' cash	1,264,653.70	
124	Accounts receivable	178,126.13	
	Total current and accrued assets		4,324,991.74

IV. Deferred and Unadjusted Debits

141	Clearing and apportionment accounts	$11,950.23	
143	Field cost adjustment	49,295.06	
171	Unadjusted debits	4,115.21	
	Total deferred and unadjusted debits		65,360.50
	Total assets and other debits		30,935,111.23

LIABILITIES AND OTHER CREDITS

X. Capital and Long-Term Liability

205	Long-term liability—U. S. Treasury authorized appropriation	$38,500,000.00	
	Less:		
161	Authorized but not appropriated	8,000,000.00	
	Total long-term liability:		
205.2	Appropriated but not advanced	2,450,000.00	
205.3	Appropriated and advanced	28,050,000.00	
			$30,500,000.00

XI. Current and Accrued Liabilities

211	Audited accounts payable:		
211.1	Contractors' earnings—current	$199,296.77	
211.11	Contractors' earnings—hold-back	98,657.57	
211.2	Labor	15,827.54	
211.3	Purchases	4,579.73	
211.4	Freight and express	39,964.30	
211.5	Passenger fares	135.50	
211.6	Rights-of-way		
211.9	Miscellaneous	69.54	
211.91	Refunds	248.47	
	Total Current and Accrued Liabilities		358,779.42

XII. Other Credits

226	Contributed funds—Imperial and Coachella irrigation districts		70,000.00

XIII. Deferred and Unadjusted Credits

231	Unadjusted credits	$4,319.71	
231.3	Unadjusted credits, Yuma project	44.49	
	Total Deferred Unadjusted Credits		4,364.30

XV. Appropriated Surplus

251	Appropriated surplus not specifically invested		1,967.71
	Total Liabilities and Other Credits		30,935,111.23

ALL-AMERICAN CANAL

RECLAMATION TABLE 6.—Appropriation and Cash Statement June 30, 1939

	N.I.R.A. allotment	P.W.A. allotment	Emergency relief allotment	1938 P.W.A allotments	Regular appropriation	Contributed funds
TREASURY CASH						
Appropriations					$10, 500, 000. 00	
Advances to Colorado River Dam fund					8, 050, 000. 00	
Balance not advanced					2, 450, 000. 00	
Colorado River Dam fund:						
Advances to Colorado River Dam fund allotments and contributed funds	$6, 000, 000. 00	$3, 000, 000. 00	$10, 000, 000. 00	$1, 000, 000. 00	8, 050, 000. 00	$70, 000. 00
Collections deposited	18, 847. 52	3, 090. 60	23, 283. 90		282, 719. 95	
Total advances, allotments, etc	6, 018, 847. 52	3, 003, 090. 60	10, 023, 283. 90	1, 000, 000. 00	8, 332, 719. 95	70, 000. 00
Disbursements by General Accounting Office	61, 164. 24	16. 17	551. 97		3, 930. 41	
Advances to disbursing officers and disbursements	5, 953, 703. 36	2, 993, 497. 18	10, 020, 000. 00	693, 048. 69	8, 247, 000. 00	43, 712. 46
Total withdrawals	6, 014, 867. 60	2, 993, 513. 35	10, 020, 551. 97	693, 048. 69	8, 250, 930. 41	43, 712. 46
Balance	3, 979. 92	9, 577. 25	2, 731. 93	306, 951. 31	81, 789. 54	26, 287. 54
Repay collections in transit	47. 84				88. 35	
Miscellaneous collections in transit					758. 23	
Total Treasury cash (G. L. 121)	4, 027. 76	9, 577. 25	2, 731. 93	306, 951. 31	82, 636. 12	26, 287. 54
DISBURSING OFFICERS' CASH						
Advances and appropriation transfer adjustments	5, 953, 878. 34	2, 993, 497. 18	10, 020, 000. 00		8, 247, 000. 00	
Disbursements by disbursing officers	5, 868, 582. 95	2, 887, 396. 61	9, 868, 448. 61		7, 325, 354. 55	
Disbursing officers' check balance	85, 295. 39	106, 100. 57	151, 551. 39		921, 645. 45	
Collections by disbursing officers	18, 999. 59	3, 090. 60	23, 283. 90		283, 627. 43	
Collections deposited and appropriation transfer	18, 999. 59	3, 090. 60	23, 283. 90		283, 566. 53	
Collections not deposited					60. 90	
Disbursing officers' cash balance	85, 295. 39	106, 100. 57	151, 551. 39		921, 706. 35	

BUREAU OF MINES

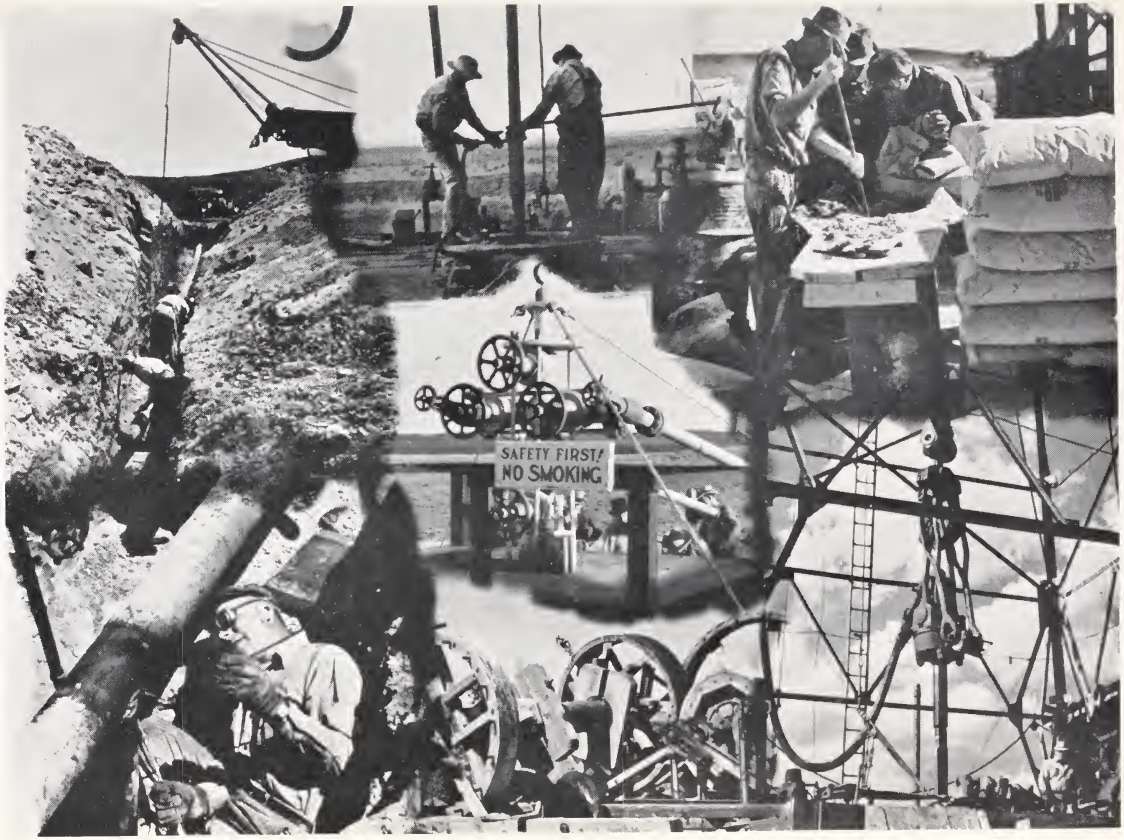
John W. Finch, *Director*

THE general purpose of the Bureau of Mines is to conduct, in behalf of the public welfare, fundamental inquiries and investigations regarding the mining industry. These are national in scope, and seek development of methods that will promote the upbuilding and permanence of the industry as a whole and the conservation of our national resources by increasing safety, efficiency, and economic development in the mining, quarrying, metallurgical, and miscellaneous mineral industries of the country. The inquiries and investigations may be divided into three main categories relating to economics, safety, and technology.

In the field of economics, much attention has been focused upon mineral self-sufficiency, as a result of the present interest in national defense. Persons who think in terms of airplanes, machine guns, and tanks when armament is discussed frequently overlook the fact that manufacture of such equipment necessitates the assembling of a wide variety of raw materials and that among the most important of these are the so-called "strategic minerals," such as manganese, chromium, tungsten, mercury, and molybdenum. The value of maintaining cumulative historical data on production, consumption, sources, prices, and stocks of strategic minerals seldom has been justified more completely than when the Army and Navy Munitions Board called upon the Bureau for detailed information of this nature covering metals and nonmetallic minerals on its "critical" and "essential" lists.

The place of nations in the economic sun is dependent largely upon their supplies of the two vital minerals, coal and iron. By visits to the principal industrial countries of Europe the Bureau's foreign-minerals specialist obtained first-hand information on the resources of and demand for these commodities and embodied these data in a paper that was published while the material was still most timely.

When the Bureau was organized—at the beginning of the fiscal year 1911—major mine disasters (catastrophes in which at least 5 men were killed) occurred all too frequently and exacted an annual toll of more than 600 lives. The first year of the Bureau's existence was darkened by 17 major disasters, which killed 464 miners in all. Improvement seemed painfully slow for the first two dec-



Oil for America.

Better methods for extracting petroleum is one of the major concerns of the Bureau of Mines.

ades, but the third witnessed heartening progress. It is therefore a pleasure to announce that the fiscal year 1939 was the first since statistics have been on record in which there was no major mine disaster.

The Bureau of Mines has claimed that mining can be a safe occupation if operators and miners cooperate to make it so. Many mines and plants have operated for at least 1,000,000 man-hours without a lost-time accident, as the data submitted for the annual mine safety competitions have proved. The achievements of 1939 are believed to be all the more remarkable because the increased use of electrical equipment and mechanized mining introduces hazards unknown in the first part of this century.

Another record was broken during the year; 120,733 persons in the mineral and allied industries earned certificates to show that they had completed Bureau of Mines courses in mine rescue and first aid, the largest number ever trained in a 12-month period. In 1911, the first year such training was offered, 509 persons received certificates. Nearly 1,000,000 coal miners alone have completed the courses—920,309, to be exact—and the number trained in all the mineral industries totals 1,267,587. At 2,315 mineral plants every member has completed a Bureau course in safety instruction.

One phase of the Bureau's technologic work during the past year comprised comparative tests made by the coal-hydrogenation laboratory on various types of low-rank coals from the West. Owing to the demand for solid fuels of high grade, it has never been profitable to market some of these western coals. However, the reserves are of such prodigious size that, in spite of the relatively low recovery of liquid hydrocarbon from them, they offer a potential source of motor fuel and may permit fuels of higher grade to be reserved for services where quality is of importance. Moreover, manufacture of motor gasoline from this source would help to insure a continued supply of motor fuel if and when our petroleum output begins to decline.

As fuel consultant to the Government, the Bureau made numerous money-saving suggestions for the operation of heating equipment. One such suggestion reduced the cost of a proposed replacement over $80,000.

A bulletin on metal-mining practice that promises to become a standard textbook in its field is in course of publication. It embodies the cumulative information contained in several hundred reports on mining and milling methods at representative operations and should prove a valuable handbook for metal-mining engineers and students.

The Bureau's two "experimental mines," the original Experimental Mine at Bruceton, Pa., and the Testing Adit at Mount Weather, Va., are proving to be valuable laboratories for testing mine equipment

and practice. Ventilation, drilling, blasting, and dust studies are conducted by three Bureau divisions working in cooperation at Mount Weather. At Bruceton demonstrations of the explosibility of coal dust and studies of strength of coal pillars are being continued.

The process for making electrolytic manganese, developed and patented by the Bureau, will be applied on a commercial scale in a plant utilizing electric energy supplied by facilities of the Tennessee Valley Authority.

Greater efficiency is being obtained with improved apparatus for precipitating solids from smelter smoke and fume by supersonic methods.

Progress is reported in a study of atmolysis (the unmixing of gases); in investigations of methods for producing pure sponge chromium from chromium chlorides; in advancing from a laboratory to a pilot-plant scale the process for desulfurizing blast-furnace iron by treatment with calcium carbide; in recovering gold from arsenical ore by a sulfatizing roast and cyanidation; and in devising a process for the manufacture of magnesium metal from magnesites.

Bureau of Mines petroleum engineers visited a number of representative oil fields to make determinations of gas escapement from wells with the Bureau's subsurface-temperature-recording gage. This apparatus locates the point at which gas escapes from a well, thereby allowing many millions of cubic feet of gas to be saved that otherwise would be dispersed under the surface.

The Bureau is studying well spacing, one of the important problems to be solved by the petroleum industry, especially in its conservation aspects. In several States, oil-field brines have been an agricultural hazard, killing livestock and vegetation and polluting the water supply. The Bureau has suggested methods of disposing of these brines and is extending its studies to other affected localities.

About one-sixth of the 6,000,000 cubic feet of helium produced by the Bureau's plant at Amarillo, Tex., during the fiscal year was purchased for non-Government use. Although the Army and Navy as usual bought the bulk of the output, the National Bureau of Standards used small quantities in research and the Weather Bureau contracted for delivery of about 750,000 cubic feet for inflating small balloons.

Electrothermal facilities afforded by acquisition of a laboratory in the Tennessee Valley Authority area of Tennessee have permitted tests to be conducted on the firing of sanitary wares made from American clays. It has been shown that the domestic commodity can replace English clays formerly used to the exclusion of clays obtainable in the United States.

Experiments on a variety of nonmetallics subject to beneficiation by flotation have proved that preliminary conditioning or "scrubbing"

of these minerals will result in pronounced improvement in the separation obtainable.

Preliminary tests are pointing to the utilization of coal refuse in a number of ways; these include application in water purifying, water softening, and soil conditioning.

A series of tests has been undertaken to determine the causes of ignition of firedamp by explosives. The emission of poisonous gases from explosives is proving one of the most important subjects being investigated at the Mount Weather Testing Adit.

Much work is involved in the testing of explosives for "permissibility." Explosives must not only pass the searching original tests to be adjudged "permissible," but must continue to pass them. About 2,000 gallery and other control tests were made in the course of the year.

The 1938 edition of Minerals Yearbook, numbering 9,000 copies, was exhausted before the end of the fiscal year. Final data for 47 chapters were prepared in time to permit publication before the bound volume went to press, so that about two-thirds of the material in the complete book was in the hands of interested persons several months earlier than usual. For the 1939 volume, 48 chapters were so prepared and distributed.

The Bureau of Mines editorial section now handles nearly 500 publications a year, including printed reports, mimeographed circulars, and papers prepared for technical conferences and scientific journals.

The Bureau has a film library comprising more than 2,200 sets of subjects, totaling over 2,000,000 feet of film. In 1939 attendance at showings of these industry-sponsored motion pictures was nearly 10,000,000.

FUTURE PROGRAM

Funds provided by the Third Deficiency Bill, signed by the President August 9, will enable the Bureau to begin the investigation of this country's resources of strategic minerals. It is proposed to study the occurrence of ores of these minerals to determine their tenor and to estimate mining costs so that, in an emergency, such information will be available.

Naturally, only a few localities can be surveyed with the funds provided, but these have been selected with care and plans for the reconnaissance have been painstakingly drawn.

The eight projects already started are: Investigation of antimony deposits, Valley County, Idaho; investigation of chromite deposits in Sweetgrass and Stillwater Counties, Mont., at Casper Mountain, Wyo., and near John Day, Oreg.; manganese deposits in the Olympic Peninsula, Wash.; tin deposits at Tinton, S. Dak., and in Catron

County, N. Mex.; and tungsten deposits in the Nightingale district, Nev.

Completion of the Intermountain Experiment Station at Salt Lake City will provide a greatly needed center for study of problems relating to nonferrous metallurgy. Adequate space is being supplied for the various types of laboratory equipment necessary for work actually under way or in contemplation. However, more extensive apparatus will be needed to carry development of processes through engineering-scale tests so that a more convincing picture of commercial possibilities can be offered for inspection by industrial firms.

The gigantic dam projects recently finished or nearing completion will bring tremendous supplies of electrical energy to regions abundant in minerals but lacking facilities for their preparation at low cost. One of the most interesting features of the Bureau's technologic work is to study these minerals, determine their characteristics, and endeavor to find new uses for them. Several promising opportunities for new domestic industries are thus being brought before the public. For example, the ceramics industry in the United States shows promise of becoming more self-sufficient in consequence of Bureau of Mines investigations in regions served by the Tennessee Valley Authority, Boulder Dam, and the soon-to-be-completed Grand Coulee Dam.

Results of the Bureau's investigations in the field of petroleum and natural-gas technology have been so cordially received by the industry that the Bureau's engineers are in great demand for study of problems applicable not only to the whole industry but also to individual districts and fields.

Transfer of the Bureau's foreign minerals specialist from England to Brazil, at the request of the Department of State, should make available a wealth of new information regarding the mineral industries of our neighbors to the south. However, withdrawal of the specialist from Europe deprives the Bureau of a first-hand view of events in the mineral industries of the Old World—a condition that should be remedied.

Considering the importance of the petroleum industry, it is unfortunate that the Bureau training courses in first aid could be extended to such a relatively small proportion of its personnel. Where training has been given, it has been received with enthusiasm and practiced so intelligently that a number of petroleum employees each year receive the honor awards of the Joseph A. Holmes Safety Association.

The Bureau of Mines is justly gratified that operators and miners cooperated so well in 1939 that not one major disaster occurred during the fiscal year. This excellent record, however, does not

mean that vigilance can be relaxed by the Bureau or the mining industries. New problems are constantly being brought into focus by changing technique and equipment.

REVIEW OF THE YEAR'S WORK

During the fiscal year 1939 the work of the Bureau of Mines was administered under the Technologic, Economics and Statistics, Health and Safety, and Administrative Branches from offices in Washington, but most of the activities were conducted in representative mining districts throughout the entire country. Fourteen experiment stations (at Bartlesville, Okla.; Berkeley, Calif.; Boulder City, Nev.; College Park, Md.; Laramie, Wyo.; Minneapolis, Minn.; Norris, Tenn.; Pittsburgh, Pa.; Reno, Nev.; Rolla, Mo.; Salt Lake City, Utah; Seattle, Wash.; Tucson, Ariz.; and Tuscaloosa, Ala.) studied problems connected with mining, utilization, and conservation of the Nation's mineral resources, a number of field offices handled special assignments, and the safety personnel moved on a flexible schedule, visiting mining establishments on request.

TECHNOLOGIC BRANCH

The Technologic Branch conducted engineering and scientific research in the interest of the mineral industries. It comprises six divisions—Coal, Mining, Metallurgical, Petroleum and Natural Gas, Nonmetal, and Explosives—and the office of the principal mineralogist. The branch also had charge of the cooperative program between the Bureau and corresponding Government organizations in several foreign countries.

Coal Division

The Coal Division tests all types of coal and investigates their composition, properties, and utilization not only as fuels but as raw material for the production of gas, coke, liquid fuels, and byproducts. In addition, the division acts as consultant in the purchase and use of fuels by the Government, a service that during the past year has been extended to serve the needs of the National Bituminous Coal Commission in obtaining and distributing comprehensive information concerning the analysis and physical properties of coal. These latter data bear an important relation to the fixing of minimum prices for the various classes of coal.

The survey of the gas-, coke-, and byproduct-making properties of American coals has been amplified to include a study of those that coke poorly; blending these coals with certain low-volatile coals improves the properties of the resulting coke. The Bureau's experimental coal-hydrogenation plant at Pittsburgh, Pa., has operated

almost continuously; it has been shown that the lower-rank coals, such as the lignites and subbituminous coals of the West, are amenable to conversion into liquid fuels and constitute an encouraging potential source of petroleum substitutes when the Nation's oil supply must be supplemented by motor fuels derived from coal.

Experimental coal mine.—Tests of small pillars of the Pittsburgh coal bed in the Experimental Mine, Bruceton, Pa., indicated that a cubical pillar had a crushing strength of 700 pounds per square inch. Studies of roof movement in other coal mines permitted mining methods and depth of cover to be correlated with subsidence of the surface, a matter of importance in connection with the construction and maintenance of permanent roads through mining areas.

Constitution of coal and miscellaneous analyses.—Carbonization tests have shown that resins in coal give high tar yields and that splint coal yields less gas than bright coal from the same bed. Hydrogenation studies of pure coal constituents indicate that opaque attritus is the principal constituent, other than fusain, responsible for low yields of oil and that splint coals are less suitable for liquefaction than bright coals.

Coal analyses and fuel inspection.—During the year, 10,097 samples of coal, coke, and related materials were analyzed in connection with Government purchases and studies of coal, an increase of 16.5 percent over last year. Three especially equipped trucks visited 380 mines in seven States and collected 1,524 samples, an increase of 100 percent.

Fuel-economy service.—Numerous power-plant studies, fuel-efficiency tests, and investigations on the selection of proper fuel for specific plants were made for various Government agencies. Recommended changes at one plant, costing about $18,700, eliminated the need for a new turbine costing about $100,000, thereby saving $81,300. Under Bureau of Mines supervision, feed-water conditioning has increased at Federal boiler plants, resulting in improved fuel efficiency, lower maintenance cost, and greater safety. Frequent calls from municipalities for advice on smoke abatement were answered, and six publications were issued.

Combustion research.—Supplementing the Bureau's previous studies of overfeed (hand-fired) and underfeed burning in fuel beds, research has been undertaken on the third and remaining primary type—the crossfeed—in which the coal burns on traveling-grate stokers.

Carbonization of coal.—The survey of gas-, coke-, and byproduct-making properties of American coals was extended to three medium-volatile coals, two low-volatile coals, and one high-volatile-A coal.

Subbituminous coal and lignite.—A coal-carbonizing power plant of 40 kilowatts capacity is under construction, to test its suitability for the utilization of subbituminous coal. Fifty tons of lignite from four North Dakota mines were dried at the University of North Dakota by the Fleissner process. A fairly stable fuel satisfactory for domestic use was obtained.

The physical and chemical properties and low-temperature carbonization yields of 14 representative subbituminous coals from the Denver (Colo.) region were surveyed.

Tests at the Seattle Experiment Station showed that subbituminous coals and lignites may be burned for house heating at high efficiencies if an overfeed-type stoker is used.

Hydrogenation of coal.—The procedure developed by the Bureau last year for the hydrogenation assay of American coals was applied to five different ranks, ranging from an Alabama high-volatile-A bituminous coal to a North Dakota lignite. The yields of oil decreased with the rank of the coal, being 50 to 60 percent by weight for bituminous coals, 45 percent for a Colorado subbituminous coal, and 30 percent for a North Dakota lignite. The glossy, bright bands in coal known as anthraxylon or vitrain were found to liquefy completely, whereas the dull, splinty bands were only partly liquefied in the hydrogenation process.

Conclusions and recommendations.—Demands from numerous Government agencies and from the public for more comprehensive information on the properties and suitability of different American coals for various purposes are increasing at a more rapid rate than are the appropriations for coal testing and research. Conservation of the Nation's limited reserves of the liquid fuel petroleum and of natural gas calls for intensive study that will point the way to wise complementary utilization of our abundant coal resources, thus prolonging the years in which petroleum will be available for supplying gasoline and other automotive fuels at a reasonably low price. Provision also should be made for research on the mining, preparation, and utilization of anthracite to assist this ideal solid fuel to regain its proper status in supplying national energy needs.

Mining Division

The Mining Division attempts to adjust its program to changing needs and conditions within the industry. From 1928 to 1936, for example, efforts were directed mainly toward the investigation of various mining and milling methods as a basis for comparison with respect to their application and their influence on economy and safety of operation and conservation of resources. At present, emphasis is

being placed on original research designed to aid practical solution of mining problems. Of special importance is the progress made during the past year in devising scientific methods for measuring pressures on rock pillars and for predicting their failure. Other outstanding work has included investigations of dust control and noxious gases from blasting, studies of seismic effects of blasting on artificial structures, ventilation of the mine face, and reclamation of stripped coal lands.

Metal mining and milling methods.—Detailed field investigations of metal mining and milling methods and costs continued in nine Western States, together with field service in the form of technical assistance to prospectors and small-scale operators.

Metal-mining research.—Encouraging progress was made on two principal problems—determination of pressures on rock columns by sonic methods and the use of stemming in blasting.

New technique was developed for the sonic method of determining the elastic constants of rocks in the laboratory, and application of the principles to measurement of loads on rock pillars was begun in mines of three districts. The large variation in velocity of sound with pressure found in the various rocks tested justifies use of the sonic method for this purpose. New field apparatus was designed, built, and tested. Some rocks receive a permanent set after heavy loading that reduces their elasticity by amounts that are measurable by the methods developed; application of this principle to mining problems requires additional study.

The Mount Weather (Va.) Testing Adit, now equipped for conducting various types of investigations, provided a useful mine-scale laboratory. Stemming tests comprised measurements of drilling speed, dust counts, and sampling of gases produced in drilling and blasting 53 standard rounds; only tentative major conclusions are yet possible. Data were procured on increased speed in drilling with reduction of bit gage; on comparative speed in drilling with anvil-block and standard drifters; on alloy-steel and hard-surfaced bits; and on methods of ventilating the face of mine workings.

Nonmetal mining.—Studies of drilling, blasting, loading, and transportation in quarries continued, and one progress report was completed. A summary report on results of earlier extensive investigations of primary crushing was published.

The manufacture of mineral wool was studied and a report on this subject published. Two reports were issued and two office memoranda completed on observations of seismic vibrations from blasting and on mechanically induced vibrations in buildings. Tests were made on the seismic effects of explosives having different physical charac-

teristics; on the destructive effects of blasting on frame structures; on calculated time delays between two blasts as a means of reducing the amplitude of resultant vibrations; and on the destructive effects of mechanical vibrations on frame structures.

Coal mining.—Various phases of coal-mining practice are investigated to ascertain trends and reach conclusions that will aid in promoting efficiency, safety, and conservation. Last year studies were made and reports issued as indicated by the following titles: Truck vs. Rail Haulage in Bituminous-Coal Strip Mines, Reclamation of Stripped Coal Lands, and Multiple-Shift Mechanical Mining.

Mine ventilation.—Investigations were made of mine and tunnel ventilation, of recent mine fires, and of air conditioning as applied to metal mines. Original research was conducted throughout the year at the Mount Weather Testing Adit on the face ventilation of tunnels and development headings.

Mineral-industries survey.—This survey involves investigations of the mining industry in separate districts or counties as a basis for reports giving authentic, pertinent information regarding past and current activities, operating costs, and local factors that affect them and calling attention to the potentialities of the areas studied. In addition to the four circulars of the mineral industries survey series already mentioned, one bulletin on mining in Calaveras County, Calif., was published during the past year, one on Tuolumne and Mariposa Counties was completed and in press, and district surveys were made in California, Nevada, Idaho, South Dakota, and Colorado.

Electricity and machinery.—More than 700 persons witnessed demonstrations of electrical ignition of gas-air mixtures, made to impress on the mining public the hazards of faulty electrical equipment and improper installation. Facilities were added for conducting tests for the Navy Department; two galleries were designed and constructed for making explosion tests of electrical equipment intended for use on ships where gasoline vapors may be present. Mechanical and explosion tests were made on nine pieces of electrical apparatus, such as lighting fixtures, limit switches, and push-button stations. Cooperation with the Navy Department was extended further by training an assigned navy metallurgist in the use of an explosion gallery for studying the possible ignition of gasoline vapors and of "dope" solvents by abrasive sparks from various metals.

Conclusions.—Investigations of the types now active should be continued but should be varied, as in the past, to adapt them to changing conditions and needs. Coal-mining investigations ought to be expanded, and the encouraging results already obtained from research on measurement of rock pressures warrant increased aggressiveness in applying it to other mining problems.

Metallurgical Division

The Metallurgical Division has made important contributions toward conserving domestic mineral resources through wise, efficient use. The investigations include: Determination of fundamental data on metallurgically important materials; improvement of standard ore-treatment methods to eliminate waste and improve the grade or recovery of products; and development of new metallurgical processes.

Among outstanding accomplishments may be listed the completion of investigations that have demonstrated the practicability of a new process for unmixing gases and a novel technique for the production of pure sponge chromium; cooperation in the establishment of a commercial plant for the production of electrolytic manganese; the development of procedures for the recovery of nickel, antimony, chromium, and gold from their ores; improvements in ore-dressing methods and in the desulfurization of iron; study of new apparatus and methods of analysis; and the development of apparatus for precipitation of dust and fume.

Metallurgical fundamentals.—The importance of determining and interpreting fundamental properties of metallurgically important minerals is becoming more widely recognized. Among the projects that may be listed under this heading, the experimental measurement of specific heats at low temperatures has been continued at a high degree of productivity; 13 materials were investigated during the year.

Refined methods of determining heats of solution, especially adapted to particular metallurgical problems, have been developed. They will be exceedingly useful in the study of silicates and slags. Comprehensive data on the hydrates of calcium sulfate have been obtained by this method.

A bulletin presenting the first inclusive treatise on technical atmolysis (the separation of mixed gases of unequal diffusibility by transmission through porous substances) has been virtually completed. It will provide a basis for commercial application in many fields of the process developed in the Metallurgical Division for unmixing gases.

Laboratory investigations of methods of producing pure sponge chromium from chromium chlorides have been completed; a bulletin on the thermodynamic properties of chromium compounds and their application to the reduction of chromium is in preparation.

Metallurgy of steel.—The coercimeter developed for rapid determination of carbon in plain carbon steels has proved quite suitable for the class of steel fabricated in most plants. A new method of determining carbon from measurements depending on the saturation value of the sample has been developed for high-carbon steels.

Blast-furnace studies.—The process for desulfurizing blast-furnace iron and cupola iron by treatment with calcium carbide was advanced from a laboratory to a pilot-plant scale.

Special studies.—A generator of sonic and ultrasonic waves has been built that is believed to be more efficient in flocculating fumes than any other device now available. High-frequency electrical methods have been devised in connection with research on metals and alloys.

Ore dressing.—Accomplishments of especial interest in the field of ore dressing include: The solving of a grinding problem by the use of wetting agents; the determination of optimum conditions for separating ores by suspensions that simulate heavy liquids; extension of the use of cationic agents to the flotation of ores not previously investigated; and determination and elimination of factors that prevented satisfactory flotation of various ores.

Pilot-plant and semicommercial-plant tests confirmed the findings of laboratory investigations. A 250-ton flotation plant for the treatment of a lead-zinc-fluorspar ore has been built, and a 100-ton flotation plant for the treatment of fluorspar tailings is being constructed as a consequence of these tests.

Precious metals.—A process developed for recovering gold from arsenical ore by a sulfatizing roast and cyanidation has proved its value since adoption by gold-recovery plants.

The study of new methods of analyzing ores has provided important improvements in determining several elements.

Nonferrous metallurgy.—A regulated roast has been devised to oxidize certain sulfide minerals superficially and thus provide for their separation by flotation. Conditions have been established in sintering lead products by which enriched sulfur dioxide gas is produced. Improved gold recovery has resulted from application of the knowledge derived from determination of the association of gold previously lost.

Copper metallurgy.—Work was continued on flotation of oxidized copper ores and on production of metallic titanium.

Electrometallurgy.—An outstanding phase of the electrometallurgical work is cooperation in establishment of a commercial plant at Knoxville, Tenn., for production of electrolytic manganese by the process developed by the Metallurgical Division.

A method has been developed for the recovery of nickel, copper, and platinum metals from domestic nickel ores, and results of the preliminary work are being prepared for publication.

Technique has been devised for the electrolytic recovery of antimony and gold from antimonial gold ores.

The recovery of potash and alumina from alunite has been worked out on a laboratory scale.

Notable achievements have been attained in devising a process for the manufacture of magnesium metal from magnesites.

Other electrometallurgical work is concerned with the recovery of metallic chromium and chromates from domestic ores, the treatment of vanadium ores, the production of calcium boride, metallic boron,

and boron alloys from colemanite, and the development of electric furnaces for smelting nonferrous ores.

Conclusions and recommendations.—The success achieved in inducing private interests to produce electrolytic manganese by the method devised in the Metallurgical Division has shown the value of carrying work through the laboratory stage to the solution of engineering problems. Some progress has been made in equipping the laboratories of the division so that this can be done, but there is still need for larger-scale apparatus and adequate funds to operate it.

Perhaps the greatest hindrance to effective operation of the division would be overcome by provision of a machine shop so well stocked that special instruments and apparatus can be promptly and properly constructed. Allowance for ample space has been made at the new Salt Lake City station, but funds for the purchase of machine tools and for large-scale equipment are not available.

Petroleum and Natural-Gas Division

Steady and persistent advance in hitherto unexplored fields of petroleum and natural-gas technology marked the activities of the Petroleum and Natural-Gas Division. The major benefits of the year's work will be revealed in the future, as gradual development along well-considered lines is required to show the true value of most new ideas. For example, only recently has there been general acceptance of the practice suggested by Bureau engineers some years ago of gaging the capacity of gas wells without wastefully "open-flowing" them to the air.

Production of petroleum and natural gas.—Work on the coordinated group of problems incident to the petroleum and natural-gas industry emphasized factors that influence the behavior of natural petroleum reservoirs. Casual observations at the surface often fail to reveal whether material coming from deep, high-pressure wells is liquid or gas at the pressures and temperatures in the natural reservoirs. Field tests and laboratory investigations with specially built apparatus gave data on the effects of retrograde condensation, which influences the behavior of many wells that produce large quantities of gas and relatively small quantities of liquid hydrocarbon. The Bureau's subsurface-temperature-recording gage was used to determine the position of gas escapement from wells, thus saving many millions of cubic feet of gas that otherwise would be lost underground.

Studies were continued on well spacing, judged to be one of the most important problems to be solved by the industry. The Cutler rule of well spacing was reviewed further in its application to present-day operations, and initial tests were made with the Bureau

of Mines-American Gas Association coring device, designed to obtain samples of uncontaminated reservoir rocks and their contents.

Other activities included a report on the study of flow of air and natural gas through porous rocks. Experimental work on the effects of edge-water encroachment was extended, and initial laboratory experiments were made upon the compaction of porous sandstone rocks. The effects of acid treatment on limestone formations in Kansas were reported, and new research on methods of cleaning wells was begun. The problem of penetrating deep-lying formations that expand into the well bore was attacked in the field by analyzing case histories of heaving-shale wells, and drilling fluids were studied to determine their behavior under imposed laboratory conditions.

Safety in the petroleum industry.—Records of 2,600 accidents in the Oklahoma petroleum industry during the calendar year 1937 were analyzed. Tests were made to determine the extent of hazards in petroleum laboratories owing to mercury vapors.

Natural gas.—A report was issued on the catalytic hydrogenation of tars obtained from pyrolysis of natural gas. In cooperation with the American Gas Association, additional reports were made on freezing in natural-gas pipe lines caused by formation of gas hydrates. At pressures exceeding 1,000 pounds per square inch, hydrates may form at temperatures above 60° F. The Bureau has designed a simplified apparatus suitable for determining compressibility of gas at pressures usual in industrial work.

Engineering field studies.—Supplementing work on fields of the Balcones fault-line system of Texas, decline curves and the relation between well spacing and recovery under conditions of restricted production were checked and compared with data developed for the most part under controlled conditions in the Rodessa (Louisiana, Texas, and Arkansas) and Anahuac (Texas) fields. A report was made on the reservoir characteristics of the Eunice (New Mexico) field, where an improved method of estimating oil and gas reserves in limestone fields is being developed that notes pressure drops and corresponding withdrawals of reservoir material at different time intervals.

Oil-field brines.—Cooperative reports describe typical oil-field brine-conditioning systems in Kansas and Oklahoma, and general assistance was given to other States concerned with the problem.

Storage, refining, and utilization of petroleum.—The survey of crude oil in storage for the year 1936–37 was reported, and two additions were made to the series of semiannual gasoline surveys, by cities, assisted by the Cooperative Fuel Research Committee. An information circular on ichthyol and a bulletin discussing properties of oil shale and shale oil were published. Continuing the series of crude-

oil analyses, a report was issued on oils from fields of Oklahoma, and manuscripts were completed on Arkansas and northern Louisiana crude oils. Work on the chemistry and refining of Wyoming black oils dealt particularly with crude oils from the Oregon Basin, Dallas, Derby, and Garland fields. The investigation also included chemical treatment of the cracked distillates. The study of asphalts centered around those prepared from Oregon Basin (Wyoming) crude oil. Changes in consistency with changes in temperature were compared with published values for asphalts obtained from other crude oils.

Helium production.—The Amarillo (Texas) plant produced 6,301,000 cubic feet of helium during the fiscal year. The Army and Navy purchased 72 percent, the National Bureau of Standards received shipments for research, and the Bureau of Entomology, Geological Survey, and Weather Bureau used the remainder diverted to Government use for inflating small balloons. The Weather Bureau alone was supplied with 743,745 cubic feet during the first 11 months of the fiscal year. The amendatory Helium Act, approved September 1, 1937, authorized the Bureau to sell helium for medical, scientific, and commercial use under regulations approved by the President. During the first 11 months of the year approximately 1,022,000 cubic feet of helium was delivered for non-Government use, mainly for lighter-than-air craft and for treatment of respiratory diseases. Deliveries for non-Government use increased more than fourteenfold over those of the previous year.

Conclusions and recommendations.—The whole-hearted cooperation of the industry with the division, in supplying technical data and other assistance, increased the effectiveness of its work tremendously. However, the $260,000 Federal appropriation for oil and gas studies, augmented by approximately $60,000 in cooperative funds supplied by States and other agencies, is indeed small in comparison with the needs for technical research pertaining to conservation of petroleum resources.

Nonmetals Division

In general, the work of the Nonmetals Division is concerned with the dressing of nonmetallic minerals, including salts and waters, and utilization of the products therefrom. Investigations of the division are now carried on at Bureau of Mines experiment stations at College Park, Md.; Tuscaloosa, Ala.; Seattle, Wash.; and Norris, Tenn. The last was acquired during the past year by arrangement with the Tennessee Valley Authority and is occupied with electrothermal research, using power generated by the T. V. A. and raw materials from the region.

Electrically heated ceramic kilns.—At Norris, many ceramic tests have been made in periodic electric furnaces and, more recently, in a twin-tunnel, continuous electric kiln.

Kyanite refractories.—Extremely fine concentrates of North Carolina kyanite purified by flotation were made into dense mullite refractories resistant to lead at 1,450° C. The results indicate the possibility of more extensive replacement of Indian lump kyanite by the southern mineral. Attempts are being made to improve the grade and recovery of kyanite from schists.

Coal.—Work on coal washing is done at Tuscaloosa and Seattle. Much practical information has been procured regarding the problem of handling slurry at Alabama and Washington coal washers. The drainage and dewatering of washed coal are being studied in Alabama, and the flocculating action of wheat flour and of potato starch for clarifying circulating washery water was compared at the Washington station.

Preliminary experiments have found uses for coal-mine refuse as an activated char for water purification, as a base exchanger in water softening, and as a soil conditioner in agriculture. An examination of pulverizers and powdered coal at power and metallurgical plants is in progress, and a new type of laboratory grindability machine has been developed.

Scrubbing mineral surfaces before flotation.—The surfaces of minerals are naturally contaminated. When these are difficult to float, experimenters spend much time seeking new flotation reagents to give more selective filming. Actually, the trouble is due rather to impurities that either mask the true mineral surface or serve as activators on the surface of minerals that are not to be floated. The desired minerals should be conditioned before floating, and an "attrition scrubber" has been developed that has proved suitable for such minerals as diatomite-clay, spodumene, mica, vermiculite, glass sand, and earthy stuff. The improvement in many flotation separations is so pronounced that this development is regarded as one of the outstanding achievements of the year.

Optical investigations.—The College Park and Tuscaloosa stations both have petrographic and spectrographic laboratories, and the former an X-ray laboratory as well, for the examination of minerals. Various problems in the field of optics are being studied at both stations.

Mineral separation by heavy suspensions.—The addition of some fine, heavy mineral to water, making the pulp denser than that of the ore being dressed, permits separation of the minerals from the gangue; this phase of mineral dressing is receiving attention.

Oil-drilling muds.—For the study of oil-well-drilling muds a device tentatively called the "eykometer" was developed to measure the yield-point of a mud immediately after agitation and after an elapsed time.

Boiler water and boiler steel.—For this continued investigation an embrittlement detector was developed to create test conditions that approach more closely those in a riveted boiler seam. Protective agents against crystalline cracking were thoroughly studied. A colorimetric determination of organic matter in boiler waters was adapted.

Slate concrete and silica brick.—Additional work was done on the possible use of waste quarry and mill slate as a raw material for lightweight aggregate, as well as on the use of opaline silica from diatomite deposits as raw material for silica brick.

Olivine refractories. At Seattle, work on uses for olivine was concerned mainly with the manufacture and testing of full-size refractories.

Diatomites.—Most of the reported deposits of diatomite in the State of Washington were sampled, and tests run on them to develop filter aids gave encouraging results.

Air or pneumatic elutriation.—The Roller apparatus has received study to adapt it to making subsieve-size (finer than 200-mesh) analyses of many materials that have hitherto been difficult to size accurately by this instrument.

Explosives Division

The Explosives Division conducts research and tests on the explosibility of gases and vapors and on the properties and reactions of commercial explosives with special reference to their suitability in metal mining and tunneling and their permissibility for use in coal mines.

Testing of explosives.—Seventeen explosives and two blasting devices were tested to determine their permissibility for use in coal mines. Only one explosive failed to pass the required tests. In all, 683 gallery tests and 1,309 other control tests were made at the Explosives Testing Station, Bruceton, Pa., and 131 chemical analyses were completed in the Explosives Chemical Laboratory, Pittsburgh, Pa.

Mechanism of ignition of firedamp by explosives.—An extended experimental study to determine and so move to eliminate the underlying causes of the ignition of firedamp by explosives indicates that incendive particles alone probably are not responsible. The inquiry is being continued to determine the importance of the shock wave and of the hot gases and flame.

Poisonous gases from explosives.—Studies to correlate field results with laboratory findings and to develop the fundamental factors influencing the emission of poisonous gases from explosives have shown the importance of the detonator, the conditions of confinement, and the weight of the explosive charge.

Gas explosions.—To assist in preventing deaths from the explosion of combustible anesthetic gases in hospital operating rooms, a report was published stating the conditions and causes to be eliminated. Additional studies were made of the amount of inert gases necessary to render combustible gases (including anesthetic gases) nonexplosive, and the oxygen concentrations below which these combustibles are incapable of propagating flames were determined.

Experiments on the elimination of explosion hazards in underground spaces and in battery rooms were continued, and fires and explosions in underground conduits, hospitals, a school, and coal in storage were investigated.

Mine fires.—The laboratory investigation of the causes, behavior, and control of anthracite mine fires was continued. A method depending on analysis of the coal alone was developed for estimating the amount of heating that had taken place in stored anthracite. Experiments showed that depletion of oxygen in a mine atmosphere is no indication of the amount of heating that may have occurred.

Recommendations were made for minimizing the possibility of fires in refuse banks.

Hazards in the use of Diesel mine locomotives.—In cooperation with the Health and Safety Branch, the composition of exhaust gases from two types of four-stroke-cycle Diesel engines was determined to evaluate the health hazard. Additional experiments will be made on devices for preventing the initiation of explosions by flames and sparks from the engine.

Conclusions and recommendations.—The division needs increased appropriations to enlarge its staff and thereby permit it to comply with the many requests being made by State mine inspectors, mine operators, and manufacturers of explosives for investigation of the safety and suitability of new explosives.

Principal Mineralogist

During the year the principal mineralogist answered more than 1,500 letters; examined and identified several thousand specimens; and gave information to many visitors concerning minerals, their associations, and possibilities of profitable exploitation. A report of investigations on lithium was published. Field studies were made of certain strategic minerals and of the dunite-chromite deposits in the Southern States.

ECONOMICS AND STATISTICS BRANCH

The Economics and Statistics Branch assembled, reviewed, and published data on the production and consumption of all principal mineral commodities; prepared reports giving the results of special economic studies; and compiled the annual publication, Minerals

Yearbook. The branch comprised the Coal Economics, Petroleum Economics, Mineral Production and Economics, Metal Economics, Nonmetal Economics, and Foreign Minerals Divisions.

Coal Economics Division

Statistical services to the solid-mineral-fuel industries continued during the past fiscal year.

Annual reports.—Annual reviews based on canvasses of all known individual producers of Pennsylvania anthracite, anthracite and semianthracite outside of Pennsylvania, lignite, byproduct and beehive coke, fuel briquets and packaged fuel, and peat were incorporated in chapters for Minerals Yearbooks, 1939.

Monthly reports.—A mimeographed sheet was issued on the fifth of each month, carrying preliminary estimates of the production of Pennsylvania anthracite and of beehive coke for the preceding month. A report listing current production, stocks, shipments, and prices of the byproduct- and beehive-coke industry is distributed the latter part of each month. The January issue always contains three additional pages of preliminary statistics concerning the industry for the preceding year.

A third monthly publication, International Coal Trade, is in great demand among producers of both hard and soft coals, because of the decreasing domestic markets for coal, which have made it necessary to search out every possible outlet for our output. Original articles of timely interest included: The Fuel and Power Situation in South America (July 1938); Fuel and Power in Czechoslovakia (August 1938); Germany's Position as a Coal Producer (October 1938); Fuel and Power in Turkey, and The Import Coal Trade and General Foreign Trade of Argentina, Brazil, and Uruguay (April 1939); and Coal Marketing in Great Britain under the 1930 Coal Mines Act (items in several issues under the section "Coal Marketing Abroad)."

Weekly reports.—A combined report, with production graph, stating the estimated current weekly output of Pennsylvania anthracite and of beehive coke was published regularly throughout the year. This report includes a summary of developments in the Psnnsylvania anthracite industry each month.

Correspondence and inquiries.—This phase of the division's work is of major importance, since it provides direct contact with the industries that the division is endeavoring to serve. The inquiries received—whether by telephone, mail, or personal visit—are a valuable aid in determining the needs of the solid-fuel industries and a service guide to the division.

Value of present statistical services.—The aggregate sales realization, at the plant, of the solid-mineral-fuel industries (exclusive of

bituminous coal) in even a subnormal year such as 1938 amounts to more than $500,000,000. Needless to say, such large, complex industries require reliable, unbiased figures for future planning, which of necessity must be based upon the record of the present and its relation to the past. The statistical services of the Coal Economics Division fill these needs insofar as funds and personnel available will permit, and the published reports are in great demand among the public the division serves.

Conclusions and recommendations.—No special economic studies were made during the fiscal year 1939. The field for economic study is open in nearly every solid-mineral-fuel industry, especially in the Pennsylvania anthracite field, which is in a chaotic state of transformation where clear thinking is greatly needed, and in the United States coal-export trade, which is largely at the mercy of foreign national policies that bear little relationship to economic laws.

However, unless a portion, at least, of the funds lost to the division in 1937 is restored, no greater amount of work can be undertaken than is now being done.

Petroleum Economics Division

The Petroleum Economics Division collected statistics and assembled economic data on domestic and foreign production and consumption of petroleum, natural gas, and their products; prepared annual, monthly, and weekly reports; and compiled special reports on these subjects for Federal and State agencies.

Forecasts of demand.—Monthly forecasts of national demand for motor fuel and for crude petroleum, by States, have been prepared and issued by the division during the past 4 years. This work is of primary interest to the various State conservation agencies as basic information necessary for production programs to avoid waste and unnecessary storage of crude petroleum and its products. Collection of additional data and improvements in methods used have increased the accuracy of these forecasts.

International studies.—A monthly review of the trends of oil production and consumption in foreign countries was issued regularly. A special report dealing with refining and exports of the Netherland West Indies was prepared as the second of a series to cover the more important features of the world petroleum industry.

Special studies.—The first survey of kerosene consumption by States was completed during the year and represented further progress in the development of essential information relating to interstate movements and consumption of petroleum products by uses. Data covering monthly operations, by districts, for the past 4 years were

compiled for publication, and an economic study of the factors influencing motor-fuel demand was completed.

Mineral Production and Economics Division

The Mineral Production and Economics Division continued to collect mine-production statistics for gold, silver, copper, lead, and zinc in the United States; supervised the preparation of the annual volume—Minerals Yearbook; collected and interpreted statistics on employment, accidents, and explosives as related to mining; and, in cooperation with the Works Progress Administration, carried forward the study of changes in mineral technology with regard to their effect on output per man.

Metal-mine statistics.—Preliminary reviews of metal mining in the 13 Western States that produced nonferrous metals in 1938 were issued. These were followed closely by recapitulations summarizing mine production of gold, silver, copper, lead, and zinc. For the first time in the history of the work, final detailed statistics for all metal-mining States were completed by the end of June. Progress was made during the year on compilation of the historical record of metal mining in the Western States.

Minerals Yearbook.—Minerals Yearbook, 1938, was issued in August 1938. The total circulation of this volume exceeded 9,000 copies, and the sales edition was exhausted several weeks before the close of the fiscal year. This was especially gratifying, because 47 chapters had been separately preprinted, and it was feared that this advance distribution might reduce the sales of the bound volume.

Minerals Yearbook, 1939, included, in addition to its regular features, a review of the bituminous-coal industry contributed by the National Bituminous Coal Commission; a new chapter on Scrap Iron and Steel, prepared by the recently created secondary metals section of the Bureau; special tabulations of historical data on strategic minerals; and, for the first time in the Yearbook series, final data on metal mining in Arizona for the year under review.

Employment and accidents.—For the purpose of supplying mining companies and safety engineers with uniform, comparable data revealing the number and causes of accidents, the division continued its annual statistical surveys of accidents and the number of men employed at mines, quarries, and related operations.

Accident-prevention contests were conducted and safety trophies awarded to mining companies that established the most outstanding safety records, as determined by a statistical analysis of reports of accidents and man-hours of exposure to mining hazards submitted by the competing companies.

The annual statistical survey of the production of explosives in the United States was made, based upon reports from manufacturing

companies and showing the quantity of explosives used for mining and for other industrial purposes.

Changes in mineral technology and output per man.—In cooperation with the Works Progress Administration, the division continued the study of technologic changes and output per man in selected mineral industries in the United States. Reports on crushed stone, phosphate rock, grade of ore, and fuel efficiency in cement manufacture were published during the year, bringing the total of completed reports resulting from this cooperative program to seven. Three reports were being printed at the end of the year, dealing with oil and natural gas, bituminous-coal mechanization, and gold placers. Others nearing completion cover iron ore, copper, gypsum, lead and zinc, anthracite, and progress in rock drilling.

Conclusions and recommendations.—Moderate expansion of the division is needed to permit compilation of the complete record of metal mining by districts and individual mines; to expand the work on accident statistics, so that the petroleum industry may be included and the data now collected more thoroughly analyzed; and to undertake studies of economic problems of the mining industry similar to the investigations carried on in cooperation with the Works Progress Administration.

Metal Economics Division

Of unusual interest during the fiscal year 1939 was the work by the Metal Economics Division in the field of strategic minerals. The head of the division served as a member of the Mineral Advisory Committee to the Army and Navy Munitions Board, and three other specialists served on five commodity subcommittees investigating the national defense aspects of mineral supply. These assignments involved preparation of extensive reports on various phases of the deficient minerals problem for confidential use of the military branches of the Government. In addition, the division prepared several special reports and answered a greatly increased number of requests for authoritative information on strategic minerals from the Congress, other Government agencies, industry, and the public.

Secondary metals.—The establishment of a secondary metals section at Pittsburgh to serve the waste-material trade was necessitated by the importance of scrap as a source of metal supply and the demand for more detailed information on this industry. The section now numbers four members, and besides completing the canvass on consumption of scrap iron and steel in record time has made much progress in expanding the work on nonferrous-metal scrap. An extensive field investigation is under way to determine the needs of the industry in order that the Bureau of Mines may give the maximum service to the scrap-metal trade.

Other services.—During the fiscal year 1939, the division conducted statistical canvasses, prepared 74 manuscripts for publication, and answered nearly 3,000 requests for information.

Conclusions and recommendations.—The past year's activity demonstrated the necessity for collecting statistics on the marketing aspects of the metal industries. In connection with plans for industrial mobilization the War and Navy Departments have called upon committees of experts for advice on raw-material problems, and this work was handicapped by lack of detailed information on the uses of minerals. It is unfortunate that annual records on the consumption of such important strategic metals as manganese, chromite, tungsten, mercury, and antimony are not available. Data of this type are essential in considering problems of national interest and would be exceedingly useful to industry. There is also need for current data on stocks of metal on hand in consumers' plants. At present adequate statistics are available on production, shipments, and producers' stocks of the more important metals, but reliable records of actual consumption and the balance of supply and demand are not available because of the lack of information on consumers' inventories. These deficiencies could be supplied by a small addition to the staff.

Nonmetal Economics Division

Strategic minerals.—After making comprehensive preliminary reports on abrasives, asbestos, graphite, iodine, magnesite, phosphates, potash, quartz crystals, refractories, titanium, zirconium, and sundry other mineral commodities of potential military importance, specialists of the division served as members of the Mineral Advisory Committee to the Army and Navy Munitions Board and assisted in the preparation of confidential reports on abrasive diamonds, graphite, and mica.

Publications.—A general survey of gypsum and gypsum products was issued as an information circular, and two more units of a series of information circulars on marketing were published, covering salt and talc, respectively.

Conclusions and recommendations.—Despite the growing importance of the nonmetallic mineral industries and the many opportunities for Government aid in finding, interpreting, and disseminating the economic facts that indicate the progress and problems of these industries, no provision has been made for keeping pace with the increasing need for service in this field. In addition to handling about 21,000 questionnaires, the division now responds annually to approximately 5,000 inquiries from the public and more than 30 Government agencies, for it is still the main repository of information on these industries. Additional travel funds are needed to provide opportunities for field work to supplement past experience and training of the staff, and more personnel is another necessity for properly checking their work.

Foreign Minerals Division

The principal function of the Foreign Minerals Division is to collect, compile, and distribute economic information on the mining industries of foreign countries.

Foreign Minerals Quarterly.—During the fiscal year comprehensive surveys of mineral production and trade of Belgium and its colonies, France and its colonies, Denmark, Finland, Norway, and Sweden were published.

Economic Paper 19, The Iron and Steel Industries of Europe, containing the latest available statistical data on reserves, production, consumption, and foreign trade in iron ore, ferro-alloying ore, pig iron, primary steel products, and coal in European industrial countries, was issued.

Foreign minerals specialist.—After completing the survey of European iron and steel industries, and at the special request of the State Department, the Bureau's foreign minerals specialist transferred his headquarters from London to La Paz, Bolivia. During the fiscal year 1940 he will conduct studies of the mineral resources, production, and trade of several South American countries. This work is part of the Government's program for promotion of friendly Inter-American relations.

Consular reporting service.—During the fiscal year 2,056 reports on various phases of mineral economics were received by the Bureau from the Foreign Service of the State Department.

HEALTH AND SAFETY BRANCH

The Health and Safety Branch, consisting of the Health Division and the Safety Division, conducted safety training courses, answered emergency calls for aid after catastrophes at mines and mineral plants, and studied conditions that affect the health of workers in the mineral industries.

Health Division

The Health Division continued its investigations of the effect of the working environment on the health of employees in the mineral industries. Much valuable information on sources, effects, and control of atmospheric contaminants was obtained and disseminated.

Gas analysis.—About 2,700 gas samples were analyzed during the year, an increase of 40 percent over the past fiscal year. Approximately 1,200 of the samples were from mines and tunnels, in connection with ventilation surveys, studies of mine explosions, control and extinguishing of mine fires, use of explosives underground, and promotion of safe and hygienic working conditions in and around mines.

The other samples were analyzed in connection with research on Diesel exhaust gas, compressed-air illness, and other special investigations.

Compressed-air illness.—A study of compressed-air illness in cooperation with the United States Public Health Service and the Port of New York Authority was completed. The results showed that administration of oxygen increased elimination of nitrogen from body tissues and fluids. Practical application of this information indicated that the administration of oxygen could be utilized in preventing compressed-air illness among tunnel workers. Valuable data and experience were gained that should be helpful in combatting hazardous conditions incident to work in compressed air.

Diesel exhaust gas.—The laboratory study of the composition of Diesel-engine exhaust gas was continued. The results of the past year have contributed materially to better understanding of the problems involved in the use of Diesel engines in underground operations.

Respiratory protective devices.—The Bureau's approval of respirators has been of incalculable value in the development and promotion of proper use of safe and satisfactory devices. As evidence of the value placed on the Bureau's approval, many organizations require that none but approved devices be purchased for use by their personnel. Eighteen approvals were granted during the year, an increase of 50 percent over the past fiscal year and more than 200 percent greater than in any other year.

Dust studies.—Work has been continued on investigations of the characteristics of various methods used for determining concentration, composition, and size properties of dusts. Notable progress has been made in utilization of X-ray, spectrographic, and petrographic methods in determining the composition of air-borne dust. Data obtained during approval testing of respirators have been of value in understanding the fundamental characteristics of air-borne dust.

Safety Division

Personnel.—During the fiscal year 1939 the Safety Division staff comprised 82 members—30 engineers, 29 safety instructors, 17 clerks, and 6 other employees. They were distributed as evenly as possible among the various mining States, and were headquartered at 17 cities.

Training courses.—In the past 12 months the Safety Division gave complete Bureau of Mines training courses in first aid and mine rescue to 120,733 persons in the mining and allied industries in 937 communities in 41 States compared with 105,093 persons trained in

1937 and 69,662 in 1936. The number trained in the past fiscal year is the largest in the history of the work. Since the Bureau was organized in 1910, full training courses in first aid and mine rescue have been given to persons in the mining and allied industries as follows: Coal mining, 920,309; metal mining, 140,641; petroleum industry, 99,513; metallurgical plants, 32,946; nonmetallic mining, 18,831; cement plants, 14,096; tunnel work, 6,543; and miscellaneous mining activities, 34,708—a total of 1,267,587. It is estimated that as a result of this phase of Safety Division work alone at least 200 lives are saved annually.

Mine fires and explosions.—In the entire fiscal year there was not one major explosion or fire disaster in any mine in the United States; 1939 was the first year in the history of the Bureau to have attained such a record. A major disaster is one in which five or more lives are lost. This achievement of the American mining industry is a remarkable one, especially when compared to the annual average of 17 major disasters and 562 fatalities in the 4 years that preceded establishment of the Bureau.

In the course of the year 14 mine explosions in 8 States and 20 mine fires in 14 States were investigated, and the Bureau's personnel aided in rescue and recovery work at virtually all where life was involved.

Without doubt, much of the relative immunity from mine fire and explosion disasters now enjoyed in the United States is due to various phases of safety work promoted by the Bureau. One of the most outstanding is its advocacy of rock dusting, a practice known to prevent the propagation of many widespread explosions every year, with attendant fatalities. It is believed that for the past decade rock dusting alone has forestalled several hundred fatalities annually in coal mines of the United States.

Fifty-nine miscellaneous accidents in 23 States (including those from roof falls, explosives, electricity, and other causes) and numerous surface explosions of black powder, dynamite, pulverized fuel, and gas were investigated.

Mine reports.—Two hundred and sixty-one reports were made during the year on safety conditions at individual mines or plants in the mineral industries of 31 States; some of these were transmitted confidentially to the operating company, with constructive criticism of existing conditions and definite recommendations for improvement. These reports, together with verbal suggestions by Bureau men during or after the inspections on which the reports were based, resulted in hundreds of important alterations in operating conditions (equipment, methods, and practices), with resultant favorable influence on the prevention of accidents. Large numbers of these changes have

been reported by field men, and several hundred letters from mining people voicing appreciation of this and other services were received during the year.

Other activities.—During the past year, 2,514 persons in 31 States were qualified to teach first-aid courses and given provisional or final first-aid instructor's certificates, raising the total number to 11,852 issued in 42 States since 1930. Certificates of 100-percent first-aid training were awarded to 405 mines or plants in 24 States in which every person had taken the Bureau of Mines first-aid course; to June 30, 1939, these certificates of 100-percent first-aid training had been issued to 2,315 mines and plants. On an average, 213 of these 100-percent first-aid certificates have been issued per year for the past 6 years.

In 1939, 118 expert mine rescue men took the Bureau's advanced course in mine rescue and recovery operations and earned certificates, bringing the total to 3,281. The Bureau's accident-prevention course for higher coal-mining officials was given to 534 persons; in all, 8,193 of these certificates have been issued in 16 States since 1930. Five new safety clubs (Holmes Safety Association chapters) were established in 4 States; the number of these mining-community safety organizations now totals 477, and they represent 28 States.

Numerous special studies and reports were made on rock dusting, ventilation, electricity, haulage, air conditioning, wetting methods, detecting gases, testing roof, reducing air dustiness, and other health and safety phases of the mineral industries.

The members of the Safety Division assisted in conducting 68 first-aid contests in 16 States and in British Columbia; prepared and conducted 26 safety exhibits and demonstrations in 12 States; attended 681 safety meetings in 38 States; and prepared 55 manuscripts for publication. As a means of disseminating safety knowledge, sound has been reproduced on five silent motion pictures which have been shown before more than 38,000 persons in the mineral industries at 217 meetings.

Recommendations and conclusions.—The services of the Safety Division are in greater demand than at any other time in its history, but with its limited personnel only a portion of the requests for services can be filled. The popularity of first-aid training is so great that other important activities of the division have suffered because of the necessity of diverting engineers as well as safety instructors to this work. Some of the engineering personnel should be returned to accident-prevention duties; this, however, would leave a shortage of instructors for first-aid training.

The accident rate in mining has been much lower in the past 6 years than in any other period in the history of the industry in the

United States, insofar as statistics show; nevertheless, the excellent records attained by some mineral establishments show that a further drastic reduction is possible.

ADMINISTRATIVE BRANCH

The Administrative Branch comprised the Information and Office Administration Divisions.

Information Division

The work of the Information Division included the editing and distribution of publications, supervision of motion-picture production and circulation, maintenance of the Bureau library, and preparation of exhibits.

Editorial.—During the fiscal year 7 bulletins, 15 technical papers, 2 miners' circulars, 1 economic paper, 70 chapters comprising Minerals Yearbook, 1939, 1 schedule, 1 annual list and index of publications, 12 monthly lists of publications, and 1 motion-picture list were edited and sent to the printer—a total of 110 printed publications. Moreover, during the year 71 publications were prepared and sent to the printer for reprinting, including 16 bulletins, 29 technical papers, 21 Minerals Yearbook chapters, and 5 other reports.

The editorial section also edited 51 reports of investigations and 58 information circulars. In addition to these, 32 periodical, cooperative, and miscellaneous reports were edited.

Owing to lack of printing funds, only a part of the Bureau's output could be printed at Government expense; consequently, 161 papers were submitted for publication in the technical and trade press. The reports handled during the year—483 in all—involved the editing of 25,740 pages of manuscript and the preparation of 1,651 illustrations.

Publications.—During the fiscal year, 170,581 copies of the free editions of Bureau publications and approximately 300,000 reports of investigations, information circulars, and monographs were distributed by the publications section. In addition, the Superintendent of Documents sold about 100,000 copies of the Bureau's printed reports.

Numerous brief statements announcing the issuance of new publications or describing current investigations were supplied to the daily and technical press.

More than 82,000 letters requesting publications or information on the Bureau's activities and general mining subjects were received.

Motion-picture production.—As a means of disseminating information on safety and efficiency in the mineral industries, the Bureau maintains what is perhaps the largest library of educational motion-picture films in the world. These films are prepared under the supervision of the division, through cooperation of industrial concerns that

bear the entire cost of production and that of providing copies for distribution. During the year, 730 sets of new films, comprising 1,497 reels, were added to the library.

Motion-picture circulation.—Circulation of the Bureau's motion-picture films is centralized in the Central Experiment Station, Pittsburgh, Pa., but there are 16 subdistributing centers for films throughout the country, selected with regard to accessibility. The films are loaned to schools, churches, civic and business clubs, miners' local unions and chapters of the Holmes Safety Association, and similar organizations. No charge is made for use, but exhibitors are asked to pay transportation charges. On June 30, 1939, the Bureau had 2,221 sets of films, including 4,160 reels and aggregating 2,021,410 feet. During the year films were shown on 90,370 occasions to an attendance of 9,136,788 persons.

Graphic services.—Graphic services, such as drafting and photography, are also centralized at Pittsburgh. Over 1,500 drawings and 5,000 blue prints were prepared and more than 18,000 prints made from negatives.

Library.—The year's accessions to the library comprised 3,934 books and pamphlets, 376 periodicals were received currently, and 6,964 books were loaned for use outside the library.

Exhibits.—The division prepared and installed exhibits illustrating Bureau activities at expositions and conventions.

Office Administration Division

The Office Administration Division is charged with handling personnel matters, property records, accounting, multigraphing and mimeographing, and general administrative routine.

FINANCES

The total funds available to the Bureau of Mines for the fiscal year ended June 30, 1939, including direct appropriations, departmental allotments, reappropriated balances, and sums transferred from other departments for service work, were $3,085,667.75. Of this amount, $3,010,338.28 was spent, leaving an unexpended balance of $75,329.47. On the regular work of the Bureau, $2,382,517.59 was expended. This figure is subject to slight corrections due to unpaid obligations.

Table 1 presents classified and complete information regarding the financial history of the Bureau since its establishment in 1910.

Table 2 gives a statement of the distribution of Congressional appropriations to the branches and divisions and the expenditure of these funds in 1939 by Bureau divisions.

TABLE 1.—Bureau of Mines Appropriations and Expenditures, Fiscal Years Ended June 30, 1911–39

Fiscal year	Appropriated to Bureau of Mines	Departmental allotments [1]	Funds transferred from other departments [2]	Total funds available for expenditure	Unexpended balances	Total expenditures	Expenditures exclusive of service items [3]
1911	$502,200.00	$34,200.00		$536,400.00	$22,818.27	$513,581.73	$513,581.73
1912	475,500.00	45,640.00		521,140.00	6,239.77	514,900.23	514,900.23
1913	583,100.00	47,850.00		630,950.00	4,087.20	626,862.80	626,862.80
1914	664,000.00	57,307.79		721,307.79	4,678.29	716,629.50	716,629.50
1915	730,500.00	55,424.60		785,924.60	4,178.11	781,746.49	781,746.49
1916	757,300.00	48,710.87		806,010.87	9,058.63	796,952.24	796,952.24
1917	981,060.00	52,400.00		1,033,460.00	48,588.10	984,871.90	984,871.90
1918	1,467,070.00	51,901.98 [4]	$3,062,000.00 [4]	4,580,971.98	395,745.10	4,185,226.88	1,172,939.64
1919	3,245,285.00 [5]	49,542.86	8,600,000.00 [6]	11,894,827.86	2,452,236.78	9,442,591.08	1,137,471.37
1920	1,216,897.00	52,800.00		1,269,697.00	9,592.18	1,260,140.82	1,245,891.36
1921	1,362,642.00	62,618.72	666,720.00	2,091,980.72	13,985.89	2,077,994.83	1,412,923.15
1922	1,474,300.00	59,800.00	182,200.00	1,716,300.00	52,120.45	1,664,179.55	1,483,038.47
1923	1,580,900.00	70,814.30	97,100.00	1,748,814.30	10,959.08	1,737,855.22	1,640,840.57
1924	1,784,959.00	50,710.00	347,820.00	2,183,489.00	38,085.43	2,145,403.57	1,804,800.41
1925	2,028,268.00	57,500.00	236,465.86	2,322,233.86	107,743.20	2,214,490.66	1,998,669.20
1926	1,875,010.00	81,220.00	510,501.15	2,466,731.15	28,891.78	2,437,839.37	1,841,150.80
1927	1,914,400.00	94,443.39	325,000.00	2,333,843.39	44,871.29	2,288,972.10	1,926,910.12
1928	3,025,150.00	113,266.45	328,000.00	3,466,416.45	736,235.62 [7]	2,730,180.83	1,997,270.66
1929	2,725,118.00	103,000.00	205,500.00	3,753,094.67 [7]	152,701.34 [8]	3,600,393.33	2,280,960.68
1930	2,274,670.00	123,300.00	166,200.00	2,684,386.38 [8]	135,714.93 [9]	2,548,671.45	2,216,995.72
1931	2,745,060.00	120,680.91	166,500.00	3,134,595.10 [9]	195,534.37 [10]	2,939,060.73	2,304,121.45
1932	2,278,765.00	137,866.48	194,500.00	2,770,712.18 [10]	344,689.43 [11]	2,426,022.75	2,186,799.92
1933	1,860,325.00	75,100.00	184,000.00	2,361,138.96 [11]	475,895.41 [12]	1,885,243.55	1,710,949.42
1934	1,574,300.00	50,230.00	17,000.00	1,872,586.04 [12]	397,131.28 [13]	1,475,454.76	1,254,846.72
1935	1,293,959.07	50,000.00	126,513.10	1,520,472.17 [13]	34,154.47 [14]	1,486,317.70	1,349,490.11
1936	1,970,311.00	69,500.00	47,570.00	2,114,966.51 [14]	14,074.34 [15]	2,100,892.17	2,052,751.87
1937	2,093,200.00	69,000.00	73,000.00	2,237,812.45 [15]	8,700.66 [16]	2,229,111.70	2,161,472.73
1938	2,272,696.99	83,000.00	62,300.00	2,421,962.44 [16]	59,899.12 [17]	2,362,063.32	2,286,856.42
1939	2,856,307.32	88,790.00	96,650.00	3,085,667.75 [17]	75,329.47 [18]	3,010,338.28	2,382,517.59
1940	2,533,160.00	93,290.00	66,200.00	2,765,197.06 [18]			2,595,250.00 [19]

[1] Includes printing and binding, stationery, and contingent funds.
[2] Includes proceeds from sales of residue gas.
[3] Service items include Government fuel yards, helium, and other investigations and services for other departments.
[4] Includes gas investigations for War Department.
[5] Includes $1,586,388 for Government fuel yards.
[6] Includes War Minerals Relief Commission, $8,500,000.
[7] Includes $719,476.67 unexpended balance reappropriated.
[8] Includes $120,216.38 unexpended balance reappropriated.
[9] Includes $102,354.19 unexpended balance reappropriated.
[10] Includes $159,580.70 unexpended balance reappropriated.
[11] Includes $241,713.96 unexpended balance reappropriated.
[12] Includes $231,056.04 unexpended balance reappropriated.
[13] Includes $50,000 unexpended balance reappropriated.
[14] Includes $27,585.51 unexpended balance reappropriated.
[15] Includes $2,612.45 unexpended balance reappropriated.
[16] Includes $3,965.45 unexpended balance reappropriated.
[17] Includes $8,399.29 unexpended balance reappropriated, and balance of $35,521.14 receipts from sale of helium and other products.
[18] Includes $13,808.01 unexpended balance reappropriated, and balance of $58,739.05 receipts from sale of helium and other products.
[19] Estimated.

TABLE 2.—Bureau of Mines Expenditures, Fiscal Year 1939

Branch or division	General expenses	Operating rescue cars and stations and investigations of accidents	Testing fuel	Mineral mining investigations	Oil and gas investigations	Expenses mining experiment stations	Economics of mineral industries	Care, etc., buildings and grounds, Pittsburgh, Pa.	Acquisition of helium properties	Laboratory, Boulder City, Nev.	Appreciation of foreign currency	Helium production	Engineering, Bureau of Engineering	Development and operation helium properties	Working fund T.V.A. transfer	Printing and binding	Department contingent expenses	Total
Office of the Director	$11,600	$78				$820												$12,498
Office of the Assistant to the Director	9,660					252												9,912
Total	21,260	78				1,072												22,410
Administrative Branch:																		
Office Administrative Division	41,774	27,482	$225			1,220	$9,825					$3,580		$654		$1,754	$5,959	92,473
Information Division	963	12,652	13,749	$9,953	$15,257	23,376	8,872	$5,611								4,491		94,924
Total	42,737	40,134	13,974	9,953	15,257	24,596	18,697	5,611				3,580		654		6,245	5,959	187,397
Technologic Branch:																		
Coal Division		123,902	236,107					89,248								13,268		462,525
Explosives Division		77,878														2,276		80,154
Metallurgical Division				128,120		179,180				$5,999						902		314,201
Mining Division		49,279		124,575		5,855							$7,931			8,912		196,552
Nonmetals Division						154,107									$16,776	850		171,733
Petroleum & Natural Gas Division					244,458				$537,975			61,911		23,700		6,757		874,801
Principal Mineral Technologist				7,700														7,700
Total		251,059	236,107	260,395	244,458	339,142		89,248	537,975	5,999		61,911	7,931	23,700	16,776	32,965		2,107,666
Economics Branch:																		
Coal Economics Division							25,120									428		25,548
Mineral Production and Economics Division							96,942									25,026		121,968
Nonmetal Economics Division							51,102									1,044		52,146
Foreign Minerals Division							26,802				$244					93		27,139

Metal Economics Division							44,567									624		45,191
Petroleum Economics Division							61,162									998		62,160
Total							305,695				244					28,213		334,152
Health and Safety Branch:																		
Safety Division		295,359														15,328		310,687
Health Division		47,985														39		48,024
Total		343,344														15,367		358,711
Total appropriation	64,000	635,000	250,400	270,860	260,000	365,000	324,500	95,000	537,975	6,000	550	79,299	8,000	83,093	17,200	82,790	6,000	3,085,667
Total expenditures	63,997	634,617	250,081	270,348	259,715	364,810	324,392	94,859	537,975	5,999	244	65,491	7,931	24,354	16,776	82,790	5,959	3,010,338
Balances	3	383	319	512	285	190	108	141		1	306	[1]13,808	69	[1]58,739	424		41	75,329

[1] Available for expenditure in fiscal year 1940.

THE NATIONAL PARK SERVICE

Arno B. Cammerer, *Director*

DURING the past year the place of recreation in our industrialized society has been recognized as never before. As the Nation has become more mechanized and motorized, as life and its problems have become more complex and intensified, the principle that outdoor recreation is essential to life has been more widely accepted. It has been realized in the United States that our parks and forests, our monuments and historic shrines, our wide open spaces of the desert and the mountains—all are necessary both for recreation and so that man may get away from and think more clearly amid natural surroundings.

The conservation of citizenry through outdoor recreation now is looked upon as one of the chief functions of government. This recognition is reflected in the many State recreational reports, recommendations, and plans presented during the year for review and perfecting by the National Park Service. These reports have been studied so as to focus all interest, private, State, and national, upon a common objective—the proper public use and preservation of resources that contribute to recreation and inspiration.

SUMMARY

The four regional organizations whose set-up was reported last year functioned smoothly during their first year of complete service. They proved their effectiveness as administrative units, relieving the Washington Office of a multiplicity of details. Through the relatively close contact they maintain with the national parks and monuments, the regional offices contributed effectively to the broad park program; and the amicable relations maintained by them with State and metropolitan park authorities advanced the National Park Service leadership in that field.

Also through the public contact work of the regional offices the general public has gained a better understanding of Department and Service policies and objectives in their relation to conservation, recreation, and general park administration.

The region 3 headquarters unit at Santa Fe, N. Mex., for which gift of land was reported last year, was completed. The new structure, of adobe brick and following the Spanish and Mexican patio motif,

NATURE'S MONUMENTS IN SEQUOIA NATIONAL PARK.

These giant trees are preserved under the conservation program of the Department of the Interior.

was the result of cooperation between the Service, the Civilian Conservation Corps, and the Public Works Administration.

Additional areas, significant for their historic or scenic exhibits, were brought into the Federal park system during the year. Five national monuments and three national historic sites were established, increasing the system to a total of 154 units. With these new areas and boundary adjustments of existing parks and monuments, the total area of the Federal park system was increased from 19,193,933 to 20,817,228 acres.

More than 16,250,000 persons visited the Federal parks during the travel year ended September 30, 1938. President Roosevelt again headed the visiting list, participating in the observance of the 75th anniversary of the Battle of Gettysburg at Gettysburg National Military Park and in the Nation's Christmas Tree ceremonies in the National Capital Parks. He also visited Yosemite National Park.

The National Park Service also was host to their Britannic Majesties, King George VI and Queen Elizabeth, in the National Capital Parks; to Crown Prince Frederick and Crown Princess Ingrid of Denmark in Yosemite and Grand Canyon National Parks and at the Boulder Dam National Recreational Area; and to Crown Prince Olav and Crown Princess Martha of Norway at Glacier, Grand Canyon, Mount Rainier, and Yellowstone National Parks.

Visitors to the Federal parks came from all the States of the Union and most of its territories, and from many foreign countries.

Winter sports use of the national parks showed a strong upward trend. Skiing continued to lead in popularity and was enjoyed informally on simple slopes, as well as on steep, marked ski runs. Interest in skating continued to increase, and other forms of winter sports also had their devotees.

The series of lectures conducted in Washington midweekly from October to May met with even greater popular acclaim than previously. Nineteen of these lectures were presented, attended by over 23,000 persons. Frequently, several hundred were turned away from a lecture hall already filled to capacity. The talks covered different phases of national park work, and varied from straight travel talks to popularly phrased lectures on history, geology, biology, and archeology. In addition, several popular guest speakers talked on foreign lands.

Acquisition of the Chesapeake & Ohio Canal, to be administered as one of the recreational areas of the National Capital Parks, brought into the Federal park system the historic old canal with towpath, lock houses, inns, and other buildings having historic associations with the early development of the trade routes from the

rich Cumberland Valley to the old port of Georgetown, now part of the National Capital.

Protection of the Appalachian Trail, famous hiking way leading through the eastern mountainous areas from Maine to Georgia, gained impetus during the year from the joint action of the National Park Service and United States Forest Service. The two Bureaus mutually agreed to promote the Appalachian Trailway, as it passed through national parks and national forests, as a distinct type of recreational area devoted particularly to hiking and camping.

Intensive training and additions to fire-prevention personnel and equipment, together with favorable weather conditions, resulted in a ten-year low record of fires in the Federal park areas. A total of 1,279 acres were burned over in 416 fires. Seventy-three percent of the blazes were man-caused. The Service is working progressively through various informational channels toward the enlightenment of the public in the dangers inherent to the handling of fires in forested areas, especially during dry seasons.

The outstanding wilderness preservation project before the Service is the establishment of the Kings Canyon National Park in California. So magnificent is this wilderness country that efforts to bring it within a national park were begun as early as 1881, and these efforts have continued ever since—only to be met by continuous opposition from various commercial interests. During the past year active support for the project grew by leaps and bounds, endorsements from conservation, civic, and outdoor associations running into the hundreds and representing many thousands of individuals. Legislation to establish the park passed the House during the first session of the Seventy-sixth Congress, and was reported favorably by the Senate Committee on Public Lands and Surveys.

Meanwhile, pending establishment of the Kings Canyon National Park, negotiations were proceeding at the end of June for the acquisition of several tracts of land on Redwood Mountain, which will be part of the park when established. These private holdings contain over 4,000 acres of very fine sequoia forest land. It is expected that the largest tract, consisting of approximately 2,680 acres, will shortly be turned over to the Federal Government.

The long fight to acquire the Carl Inn Tract of giant sugar pines for addition to Yosemite National Park culminated successfully, saving thousands of acres of the dwindling forests of this rare tree from the lumberman's axe.

In the field of historic conservation the year 1939 was notable for the acquisition of New York's famous subtreasury, located on the site of the old Federal Hall, scene of some of the most momentous occurrences in early American history. In Federal Hall, George Wash-

ington was inaugurated first President of the United States. There the first Congress under the Constitution convened from April 1789 to August 1790. The President's executive offices were there, and there the Supreme Court and the Cabinet came into being. Previously the Stamp Act Congress, assembled there in October 1765, was the first effective attempt at united Colonial opposition to Parliamentary taxation. From 1785 to 1789 the Congress, established under the Articles of Confederation, met in Federal Hall, in 1787 enacting its most important legislation, the Northwest Ordinance, which formulated principles by which new States were admitted to the Union on an equal basis with the older States.

Fort Laramie National Monument, Wyo., was another exceptionally noteworthy historic acquisition. Closely associated with the heyday of the western fur trade (the 1830's), with famous trappers and explorers of the pioneer period, and with the great overland migrations over the Oregon Trail—Fort Laramie was an outpost of military protection second to none in American frontier history. Its story will occupy an important place in the Service's historical program, illustrating significant features of the development of the trans-Mississippi West.

The serious shortage of trout eggs for planting throughout the West focused attention upon Yellowstone Lake, in Yellowstone National Park, as the major source of black-spotted trout eggs, for planting not only in national parks but in other lakes and streams throughout the West. Construction of a new fish hatchery was begun at Glacier National Park, and facilities improved at Yosemite for taking rainbow trout eggs. A scientific stocking program under way in the Great Smoky Mountains National Park is making that area a model of fisheries technique throughout the United States. All fisheries activities in the Federal parks are carried on in cooperation with the Bureau of Fisheries.

Two wildlife studies of prime significance centered around the status of predators in the national parks and the use of range lands by both native and domestic animals. Especial studies were made of coyotes and wolves in relation to other animal life.

A conference of national park superintendents, regional directors, and other key field people was held in Washington in January. At the request of the Secretary of the Interior the conference studied present methods of operating, developing, and administering the Federal park areas, with a view to effecting all possible improvements in service to the traveling public. A conference of chief clerks of the national parks also was held in Washington in February, as part of the program to establish close harmony of action between the Washington headquarters and the field.

An initial step toward accomplishing the Department's policy of Government construction of new facilities in the Federal parks, for operation by private concessionaires, occurred in Bandelier National Monument, N. Mex., with the completion of the new Frijoles Lodge, built by C. C. C. labor under National Park Service technical direction.

Two operators of park accommodations, the Yellowstone Park Co. and the Yosemite Park & Curry Co., joined forces in a practical effort to design a satisfactory minimum cost prefabricated housing unit. As a result, a new unit, for which plans have already been approved by the Service, is to be constructed in the Old Faithful area of Yellowstone National Park.

A new type of winter accommodations was introduced at Fort Jefferson National Monument, in Florida's Dry Tortugas Keys, with the awarding of contract to a boat transportation company to anchor a houseboat off the historic fortress to furnish meals and overnight accommodations.

In line with the governmental policy to establish the national parks more nearly on a "pay as you go" basis, so far as administration and protection of these areas is involved, the existing national park fees were revised and new fees of a more uniform nature established. It is realized that few of these Federal park areas can be self-supporting, but the opinion of the Bureau of the Budget and of Congress is that visitors actually enjoying the benefits from the millions of dollars annually expended in their upkeep and development should pay, in slight measure, toward their maintenance.

On June 30 the Branch of Buildings Management was transferred to the new Federal Works Agency. During the 6 years the buildings unit functioned under the National Park Service (it was transferred to the Service in the consolidation of park activities in 1933) its scope increased from the management of 45 buildings and 5 memorials in Washington, D. C., to the operation of 128 buildings and 7 memorials in the National Capital and maintenance of 14 buildings in 11 other cities.

Continued use of Civilian Conservation Corps labor was productive of excellent results. Outstanding was the assistance furnished in timber salvage and clean-up activities, for fire protection, following the September hurricane and floods in New England.

Facilities to meet recreational needs in 27 State, county, and metropolitan parks were completed by C. C. C. camps under National Park Service direction and the camps thus released transferred to other areas.

The Service continued cooperation in 45 States in the conduct of the park, parkway, and recreational-area study authorized by Congress

in 1936; and also furnished planning and consultation service to States requesting guidance in building up their State park programs. Over 5,000 job plans for construction work in State, county, and municipal parks were furnished various State park authorities.

The United States Travel Bureau was transferred from the National Park Service to the Secretary's Office on March 28, while bills to broaden its authority were pending in both houses of Congress. Highlight of the Travel Bureau year was the appointment by the Secretary of an Interdepartmental Travel Advisory Committee. A field office was established in San Francisco, with a branch on the grounds of the Golden Gate International Exposition.

PRESERVATION OF HISTORIC VALUES

Conservation of the Nation's archeological, prehistoric, and historic assets is a Service obligation that yearly grows in importance and scope. The past year has seen outstanding accomplishments in this field. Some of America's most dramatic landmarks were rescued from premature destruction and made safe for posterity. Notable among such were Fort Laramie, Wyo., where disastrous deterioration was taking place, and the historic Chesapeake & Ohio Canal. The acquisition of the Subtreasury in New York City, and the Old Philadelphia Customhouse, and the preservation of the Saratoga Battlefield, in New York, through legislation, also completion of land purchases for the Jefferson National Expansion Memorial, Mo., were other conservation objectives attained.

Preservation of long-cherished landmarks by stabilization and repair assures new leases of life to such national shrines as Fort McHenry, Baltimore, birthplace of the Star-Spangled Banner, and the Lee Mansion, in Arlington National Cemetery. At Gettysburg, Pa., dedication last year of the Eternal Light by the Blue and the Gray, symbolizes the peace and indissolubility of the Union. Restoration of the waterfront at Salem Maritime National Historic Site; the repairs on the Statue of Liberty, "best-known landmark on the globe;" archeological research and protective work at such unique archeological areas as Ocmulgee, Ga., Chaco Canyon, and Aztec Ruins, N. Mex., were other milestones in conservation progress.

HISTORIC SITES SURVEY

The Nation-wide Historic Sites Survey, supervised by the Advisory Board on National Parks, Historic Sites, Buildings and Monuments, is proceeding according to a chronological, thematic program as a continuing activity.

Studies of Spanish and French exploration and colonization which last year culminated in a final report on sixteenth-century sites, this

year were focused on preliminary research on those of the seventeenth century. Out of 81 sites inventoried in the final report, 8 were recommended as of national significance, and for protection through Federal, State, and local collaboration.

The Service has continued to profit by the valuable assistance made available since 1934 by the Smithsonian Institution. Similarly, the Library of Congress, the National Archives, the Historic American Buildings Survey, and various universities and museums have rendered scientific aid.

Educational work has been increasingly emphasized by historical technicians of the Service, and highest scientific standards have been followed in all work of preservation and restoration, always based upon intensive scholarly research. The master plans have profited by these studies, which provide data on the physical aspects and historic points of areas when at the zenith of their historical significance, and strike the keynote for interpreting them through the museum story, the park literature, and guided tours by which the public derives maximum information from such sites.

HISTORIC AREAS POPULAR

Eight million people visited historical areas during 1939. Legions of school children, often in classes, were included in the number. By means of the above contacts and interpretations, their patriotism was revitalized, and deeper appreciation was fostered for the meaning—and price—of democracy.

Record-breaking attendance at seventy-fifth anniversaries of Civil War battles, celebrated at Gettysburg, Chickamauga, and Vicksburg, also revived interest in American history. That at Gettysburg was nationally publicized and marked the final joint reunion of the Union and Confederate veterans.

ASSISTANCE IN STATE PROGRAMS

C. C. C. projects have been incalculable assets in enabling preservation of America's historic and archeologic treasures, providing labor for repair, erosion control, preservation of earthworks, caulking of joints, and stabilization of ruins. C. C. C. and W. P. A. projects also have been utilized for archeological research in field and laboratory and in State-wide surveys. All such projects, also those of the E. R. A. and W. P. A. in Federal and State parks, have been checked from angles of archeological and historical research by the Service, which is now responsible for the basic soundness of all historical restoration and preservation undertaken by the Federal Government. Archeological projects undertaken through Federal emergency funds have been jointly checked by the Service and the Smithsonian Institution.

The Service has continued its cooperation with State agencies in the planning of State programs of historical and archeological conservation, utilizing the labors of the C. C. C. in parks of this type throughout the United States.

PRESERVATION OF GREAT SMOKY MOUNTAINS CULTURE

Attention has been given to the unique opportunity presented in the Great Smoky Mountains National Park to preserve frontier conditions of a century ago, which have vanished elsewhere. The cultural and human interest aspects of this park are as outstanding as its scenery and vegetation. The whites of the southern Appalachians still exhibit the ruggedness and self-sufficiency of the pioneer period during which they settled this region shortly after the American Revolution.

Several typical mountain habitations remain intact within the park boundaries and may constitute valuable outdoor exhibits in any ultimate materialization of the "proposed museum of mountain culture." Already large collections of household goods, tools, farm equipment, weapons, chiefly primitive and hand-wrought, have been made. When properly studied from the viewpoints of technology and social anthropology, these should make available valuable data on the daily life of the mountain people. Studies of the folklore, ballads, linguistics, genealogy, and local traditions initiated several years ago are being continued. In preview these cultural studies contemplate a regional picture of native folk life in the Great Smoky Mountains unique in American historical experience.

ADVISORY AND TRUST FUND BOARDS

Maj. Gist Blair, long associated with the movement for historical conservation, was appointed to the Advisory Board on National Parks, Historic Sites, Buildings and Monuments, to succeed Archibald M. McCrea, deceased. Dr. Frank M. Setzler, head curator of anthropology, National Museum, Smithsonian Institution, succeeded Dr. Alfred V. Kidder, resigned.

The trust fund administered by the Service's Trust Fund Board now amounts to approximately $12,000. Annual interest on investments increased the fund in 1939 by $343.65.

HISTORIC AMERICAN BUILDINGS SURVEY

The long-planned catalog of drawings and photographs of historic buildings of this country included in the permanent graphic records being made by the Survey was compiled and published during the year. Sales during the first four months of its availability indicate that it is filling a need long felt by architects, archeologists, historians, and college and public libraries.

The fiscal year 1939 was the sixth year of continuous field work on this project and under the supervision of the National Park Service a number of State W. P. A. and several university collaborative programs were organized or continued. The measured drawings which have been placed in the Fine Arts Division in the Library of Congress now total more than 16,000 and architectural photographs exceed 17,000.

These records have been widely used. Even Hollywood's large motion-picture companies have called on them for details to be used in the design of historic and typical buildings for major productions, such as the New Orleans settings for "The Buccaneer" and "Jezebel," and pioneer towns for a number of western pictures.

During the year, the Survey, through a three-party agreement between the National Park Service, the Library of Congress, and the American Institute of Architects, continued to record first those historic structures in danger of destruction, in States where work relief projects for this purpose could be organized.

FOREST PROTECTION AND FIRE PREVENTION

Fire record.—The forest fire record for the period January 1 to December 31, 1938, is one in which the National Park Service can well take pride. The total number of fires affecting the national parks and monuments was 416, of which 113, or 27 percent, were caused by lightning and 303, or 73 percent, by human agency. The average annual total for the past 10 years is 350 fires, but during that period there has been a great increase in the total area of the national park system and an even greater increase in the number of park visitors. This makes it all the more remarkable that the total area burned in the national parks and monuments during the calendar year 1938, 1,279 acres, is the lowest annual loss during the past decade. The average acreage per fire of only 3 acres is likewise the best record the Service has recorded since fire records were initiated in 1928. While favorable weather conditions contributed toward this excellent record, more intensive training and additional fire guards and equipment were important factors.

Fire protection training.—During the past year special emphasis has been placed upon fire protection training. No. C. C. C. enrollee or supervisory officer is permitted to participate in fire-suppression activities until he has been given training in fire-suppression technique and safety requirements. This has resulted in an increased interest in fire prevention and suppression, a more thorough realization of the duties and responsibilities of each member of the fire-protection organization, and greater efficiency in all phases of the protection work.

Fire equipment.—Added protection for both forests and buildings was provided by the purchase of three 1½-ton fire trucks, equipped with water tanks, pumpers, and hose, for Zion and Mesa Verde National Parks, and Shiloh National Military Park and a larger truck with a 750-gallon-per-minute pumper designed for building-fire protection, for the Mammoth Hot Springs section in Yellowstone National Park. Ten recreational demonstration areas were supplied with portable pumpers and hose.

Detection system.—Improvement in the detection system for Mammoth Cave National Park was provided by the installation of three steel lookout towers, forming the primary detection system for that park. A steel lookout tower was likewise erected in Saguaro National Monument, Ariz., and one in the Lake of the Ozarks Recreational Demonstration Area in Missouri. Additional fire-lookout structures are under construction in Mesa Verde, Great Smoky Mountains, and Shenandoah National Parks.

Protection planning.—The National Park Service has assembled fire-protection statistical data over a 10-year period which will be invaluable in a study of its fire-protection problems with a view to improving its protection facilities and organization. A detailed study of the statistics for each individual park has been launched, and it is hoped that within the next year revised programs of fire-protection requirements will be completed for each national park and monument. As a part of this program of utilizing vital statistics, additional fire-weather stations have been installed in the national parks and monuments in order to cooperate with the Weather Bureau in its fire-weather forecasting, and also for the measurement and evaluation of the factors affecting local forest-fire danger. Thus park organizations will not be caught unawares by emergency conditions, which have been the cause of numerous disasters in the past.

C. C. C. and forest protection and fire prevention.—As in preceding years since the establishment of the Civilian Conservation Corps, that organization has been the mainstay for fire-fighting forces, as well as for insect and tree disease control, tree preservation, and fire-protection improvements. Great credit is due the C. C. C. for its accomplishments along these lines. The forest-protection and fire-prevention appropriation under the regular Interior Appropriation Act provided funds only for the most essential needs for fire-protection personnel and equipment that could not be supplied under the C. C. C. program.

Insect control.—In the eastern States the beech-scale infestation in Acadia National Park is the most serious threat to the park forests at present. Spraying operations were continued during the past spring for the control of this epidemic within the park.

In the West, control work was continued in Rocky Mountain National Park for the Black Hills beetle in ponderosa pine, and also in Jewel Cave National Monument in South Dakota. The mountain-pine-beetle infestation still is serious in the forests of Yellowstone and Grand Teton. In the latter park experiments were carried on by the Bureau of Entomology and Plant Quarantine for the control of the mountain pine beetle in lodgepole pine by spraying the infested boles with penetrating oils. This method proved so successful experimentally that it is to be used on a control project in Grand Teton this season. In Yosemite National Park the needle miner still continues to threaten the lodgepole pine forests.

White-pine blister rust.—In the East, white-pine blister rust control has been continued in Acadia and Shenandoah and has been extended to Great Smoky Mountains National Park.

In the West, the advance of the white-pine blister rust to the sugar-pine forests of California has necessitated rapid expansion of the Ribes eradication work in the national parks of that State. Through the cooperation of the Division of Plant Disease Control of the Bureau of Entomology and Plant Quarantine, advance checks in all of the parks have developed a program which calls for the control of the disease on 400,000 acres of land containing the various species of five-needled pine in the western region. The greater proportion of this area lies in the sugar-pine stands of Yosemite and Sequoia National Parks. To date, initial eradication of Ribes has been accomplished on 28,447 acres within the western parks, which represent roughly seven percent of the area which must be covered in the national parks of the Pacific Coast States.

At the present time this work in the national parks is conducted entirely under the C. C. C. program. If control is to keep ahead of the advance of the disease, additional funds in large amounts will have to be made available under regular appropriations. Outside of fire protection this is the biggest forest protection problem with which the Service is faced.

Campground protection.—Last year a study of the most intensively used campgrounds was inaugurated in the western national parks, in order to determine the present condition of the trees and other vegetation and the measures essential to protect these campgrounds from further rapid deterioration. This is one of the most urgent forest protection problems of the Service today.

Type mapping.—During the past year the type map of Great Smoky Mountains National Park was completed. Last winter and up to June 30 a crew of 20 was employed under an E. R. A. project in the western region to prepare and color a large number of type maps for park areas in all regions.

Forest nurseries and planting.—Forest nurseries were operated in Sequoia, Yellowstone, Great Smoky Mountains, and Shenandoah National Parks, producing 2,627,000 seedlings. In addition, more than a million seedlings were obtained from Soil Conservation Service and Forest Service nurseries for planting on areas within the national-park system.

PLANNING AND CONSTRUCTION

P. W. A. funds made possible the inauguration of construction of a number of long-needed building projects, including administration buildings at Shenandoah, Great Smoky Mountains, and Olympic National Parks, and Muir Woods National Monument, also water and sewage system extension where urgently needed. Many smaller projects, such as employees' residences, museum extensions, and small utility buildings, were also provided. Acquisition and development of large tracts of additional land adjacent to established national parks with other P. W. A. funds necessitated general development studies covering the Redwood Mountain area near General Grant National Park and the pending seacoast addition to Olympic National Park.

Work on the historic Chesapeake & Ohio Canal, which was acquired with P. W. A. funds and is to be restored and developed as a recreational area, was a major project of the year. Extensive property, topographic, and hydrologic surveys were made in connection with its acquisition and restoration, and construction was inaugurated. Two C. C. C. camps were established to clear trees and brush from the canal bed, to restore the towpath and the canal cross-section so that it could again carry water. In addition, many of the decayed lock gates between Seneca Creek and Georgetown were rebuilt and the stonework in the lock structures repaired. Work has started on restoration of lockkeepers' houses, and measurements and studies have been made in connection with the Great Falls Tavern.

The new hotel at McKinley Park Station, Mount McKinley National Park, Alaska, was completed December 15, 1938, except for the final outside coat of paint and installation of water-softening material, items which had to wait for warmer spring weather. The National Park Service undertook the design and construction of this development for the Alaska Railroad, work starting on the ground in August 1937. An additional wing of bedrooms was added and corresponding enlargement of the dining room made. Grading and landscaping the hotel grounds were being carried on during the summer of 1939 by C. C. C. labor.

Another interesting development of the year was the placing of the Laura Spelman Rockefeller Memorial plaque in the Great Smoky Mountains National Park. This is known also as the "Founders Plaque." Funds in the amount of $10,000 each were appropriated by

the States of Tennessee and North Carolina for the erection of such a plaque and its implacement on the State line in the park to commemorate acquisition of park lands by the generosity of Mr. John D. Rockefeller, Jr., and the commendable efforts of the citizens of the States of Tennessee and North Carolina. The firm of Olmsted Bros. was commissioned by the two States to prepare general development plans of a suitable memorial and the plaque was designed and executed by Paul Manship, the sculptor. Construction of the development was under the immediate supervision of Park Service technicians furloughed for the purpose from the Service and employed by the two States.

On the Thomas Jefferson Memorial project, specifications were reviewed, work advertised, and four contracts involving $2,596,196.75 were awarded. The present year will see the superstructure construction only starting, the foundation contract completed, and two minor contracts, covering the general landscape plan and preliminary roadway relocation, wholly completed.

Appropriations available for planning and construction were not large during the year, compared with allotments of recent years, so that few new projects other than buildings were started, and money was alloted to continue construction on only the most urgent road projects, including two new approach roads to western national parks, the Fresno-General Grant approach road and the Zion-Bryce Canyon approach road. The only new road begun was one of three miles to reach the Hemenway Wash development in Boulder Dam National Recreational Area.

During 1939, approximately 850 engineering job plans for national parks and monuments were reviewed in the Washington office, covering practically all types of park construction, except major roads, and including work to be performed under regular, C. C. C., P. W. A., and other emergency funds. In addition, more than 5,000 job plans for similar work in State park, recreational demonstration, and land development areas were reviewed by the Service's regional engineering staffs, and technical assistance given to State authorities in both planning and construction.

As in the past, the Bureau of Public Roads of the Department of Agriculture continued major road-building for the Service.

The work of the Engineering Laboratory gradually increased during 1939, and requests for soil investigations for numerous jobs, especially on dams and roads, overtaxed both facilities and personnel as the value of laboratory analysis became more apparent to the field. A lecture course on soil mechanics was given in the laboratory during the winter and was attended not only by members of this Service but also by the principal engineers of several other Federal Bureaus.

Through the work of the Sign Committee, road sign standards of the American Association of State Highway Officials were adopted for Service use and arrangements made with the District of Columbia penal institutions for their production.

PARKWAY DEVELOPMENT

Construction work on the Blue Ridge and Natchez Trace Parkways continued with regular Federal appropriations totaling $7,000,000 for the 1939 fiscal year.

The Blue Ridge Parkway now has 113 miles graded and surfaced, an additional 20 miles graded, and 90 miles under grading contracts. It has reached a useful stage, as far as several portions are concerned, particularly the Roanoke-Asheville unit. Development of recreational parks adjacent to the parkway road continued under C. C. C. and E. R. A. forces.

On the Natchez Trace Parkway, grading was completed on three sections, totaling 34 miles in Mississippi. Surfacing will be applied to these sections this season. An additional 11 miles are under construction. Survey and location work was carried on in Mississippi, Alabama, and Tennessee in collaboration with the Bureau of Public Roads. Construction of additional sections can be accelerated as soon as rights-of-way have been acquired by the various States and deeded to the Federal Government.

The most important work on the George Washington Memorial Parkway in the District of Columbia was carried on at Key Bridge, on which an additional span is being constructed to allow the parkway to underpass it on the Virginia side, in the vicinity of Rosslyn.

CONSERVATION—NATURAL HISTORY RESEARCH AND POPULAR INTERPRETATION

Conservation, in the many-varied aspects presented in the national park and monument system, is the dominant spirit of the diversified activities directed by the Service in these Federal areas. Through interpretive programs and exhibits carried out by staff scientists, historians, and museum technicians, results of scientific research and the abiding need of conservation policies are communicated to the American people. Wildlife management, geological research, and museum planning and development have advanced during the year to new high levels and received increasing appreciation both from scientists and laymen. Permanent impetus was given museum development by appointment of a scientist, certified by the Civil Service Commission, with the title of Chief of the Museum Division. Additional technicians engaged in wildlife and naturalist research continued to be employed through the Civilian Conservation Corps.

Introduction into the parks of physical improvements, necessitated by human use, involves biotic and geologic factors. Biologists and geologists of the Service have studied problems and directed developments related to such matters as land utilization; contamination or drainage of underground water; adequacy of natural foundations for roads, tunnels, and dams; cave development; location of roads and trails; quarrying; erosion control; beach and stream development; mineral valuations; and appraisals of areas proposed for inclusion in the Federal or State park systems. These studies have aimed at minimum disturbance of geologic and biotic conditions and maximum utilization of educational values and conservation principles.

Special effort has been made to keep organized scientific and conservation groups throughout the country in touch with the policies and procedures of the Service in meeting wildlife problems in Federal areas.

Government funds have been saved and satisfactory water supplies developed in park areas by the Service's geological staff through their scientific investigation of underground water and problems therewith connected. A core drill operating in Region I was utilized in drilling water wells in State parks. Sixteen such wells and many test holes at foundation sites were completed during the year. Five mineral appraisals were completed to determine land valuations and boundary limitations.

NATURALIST SERVICES

Programs designed to interpret plant and animal life and nature's inorganic forces in terms interesting and comprehensible to park visitors and emphasizing their irreplaceable value as national resources are among the Service's most popular features. Such work is now carried on in 34 Federal park areas. A tabulation of these contacts is appended.

More than 5,000 color photographs of the parks were taken and made into lantern slides for use in the lecture program. Ever-growing interest by park visitors in making their own photographic records has been met by introducing guided camera trips and giving technical advice on use of the camera.

New types of hikes, caravans conducted to unusual places, and talks on current discoveries also stimulate popular interest in conservation and in the educational aspects of the parks. Moonlight hikes from Half Dome; spotlight caravans, disclosing game by the glare of a powerful light; and sunrise talks at Mirror Lake were innovations at Yosemite National Park. Fish and fishing-hints lectures from the famous Fishing Bridge, in Yellowstone National Park; lectures on the Nation's Capital, before the District of Colum-

bia School of Americanization; and an illustrated talk given at Casa Grande National Monument, Ariz., as background material, calculated to increase appreciation of the conducted trip through the area which follows, are highlights in the naturalists' programs. On several occasions the naturalists have gone on the air during the past year to broadcast information on their parks.

Witness to the constantly increasing interest in interpretive programs is the fact that new amphitheaters were built and increased campfire programs instituted at Rocky Mountain, Great Smoky Mountains, Mammoth Cave, and Sequoia National Parks and in the National Capital Parks.

In response to growing demands, Easter sunrise services are becoming annual features in many of the parks, where the sublimity of the natural setting emphasizes the solemnity of the ceremonies.

TRAINING OF NATURALISTS

The Yosemite School of Field Natural History, a graduate school with a college degree as entrance prerequisite, operated again during the past season, training prospective national park personnel qualified for naturalist positions. This school and the Yosemite Junior Nature School are nonprofit, scientific organizations engaged in a training enterprise helpful to the Service. The 1939 session, the 15th class of the school, began courses on June 26 with the selection of 20 students (16 men and 4 women) from more than 100 applicants.

Yale University continued its cooperation, assisting in National Park Service personnel training through awarding two graduate fellowships. The fellowships are open to those interested in graduate studies bearing upon the educational or interpretative program of the Service and may include forestry, geology, biology, history, archeology, psychology, and education.

MUSEUM PROGRAM

In the forefront of interpretive visual education is the museum program which directs the planning, construction, and maintenance of park museums, trailside structures, and exhibits of park activities displayed at expositions, conventions, and like assemblages.

The largest and most complex historical museum project yet attempted by the Service was undertaken during the year. This was the museum development for the proposed Jefferson National Expansion Memorial at St. Louis, Mo., designed to tell the epic story of the Nation's westward growth. Sample exhibits, including dioramas, models, large maps, and animated charts already have been prepared for installation in a temporary museum room at the headquarters

office in St. Louis, and extensive research studies are in progress for the basic plans of the Memorial.

Administration and maintenance of the Interior Department Museum were turned over on April 1, 1939, to the Office of the Secretary of the Interior, and a permanent curator employed. Constant revision of the exhibits keeps it abreast of current events.

Work was launched on the construction of a museum at Ocmulgee National Monument, Ga., which will become a study center for southeastern prehistory. At Guernsey Lake State Park, Wyo., where the story of the conquest of the frontier, of mining, and of reclamation is told, an outstanding exhibit was installed. Another museum exhibit is nearing completion in Custer State Park, S. Dak. A unique archeological museum to shelter excavated prehistoric burial pits was completed at Mound State Monument, Ala., through cooperation of the Service, the State, and the C. C. C.

In addition, exhibits were made for 7 national parks and monuments and three State parks by the preparation laboratories at Berkeley, Calif., and Washington, D. C., assisted by P. W. A., E. R. A., and C. C. C. funds and personnel. Much of the research necessary to the preparation of the geological and biological exhibits in these displays was done by the naturalist staff. The laboratories also supplied several hundred maps, charts, and diagrams to augment existing displays and distributed 1,359 nature trail labels, 20 plant presses, and 15 herbarium, geology, study skin, and insect storage cases.

A noteworthy accomplishment in the development of museum exhibits is found in the Southwestern National Monuments. A ¾-ton truck was equipped with sectional, removable, dust-proof wall cases to accommodate sufficient tools, equipment, and materials to make it an efficient traveling museum preparation laboratory. The truck, manned by a staff of preparators, will travel to the various Southwestern Monuments and install museum exhibits.

Dioramas, paintings, models, and photographs were displayed at 13 fairs, conventions, and expositions during the year.

The high caliber of the Service's museum work was recognized with grants-in-aid by the American Association of Museums from funds provided by the Carnegie Corporation of New York City to two of its employees for foreign travel and museum study.

WILDLIFE PROBLEMS

In management of wildlife, the problem of relieving overgrazing has received the greatest attention during the past year. A program, authorized by the act of June 16, 1938, was actively undertaken at Wind Cave to reduce the 291 buffalo to 175, and the 150 elk to 50. Complete reduction to the numbers stated above was not possible

during the first year of the program, but sufficient work was done to relieve materially the overgrazed conditions in the park. The Camp Fire Club of America endorsed the program of elk reduction in Yellowstone whereby a minimum annual reduction of 3,000 head by hunting in the adjoining portions of the State of Montana is being undertaken.

Problems of surplus deer populations were satisfactorily solved in Zion National Park by live trapping and shipment outside of the park of 126 head; and to Hickory Run Recreational Demonstration Area, Pa., by opening the area to hunting of antlerless deer during the regular State season. The recreational demonstration areas are not units of the Federal park system, in which no hunting is ever permitted.

Elimination of grazing by domestic stock in parks was another problem given attention in Bryce Canyon and Carlsbad Caverns National Parks, and Zion, Lava Beds, and Saguaro National Monuments. At Bryce, Zion, and Carlsbad the problem is well on the way to successful solution by inauguration of a gradual reduction, expected completely to eliminate grazing within 6 years.

Work started last year on the bear-visitor problem has continued this year with concentration upon publicity designed to control undesirable actions by park visitors. Other management projects include introduction of beaver into Shenandoah National Park and definite arrangements for such introduction at Silver Springs State Park, Oreg.; construction of nesting islands for trumpeter swans in certain lakes of Yellowstone National Park; fencing of an area in Grand Canyon National Park to exclude domestic stock and encourage increase of antelope; and inauguration of naturalistic treatment of potential wildlife areas along the Blue Ridge Parkway.

A serious shortage of trout eggs available for planting throughout the West has focused Nation-wide attention on Yellowstone Lake, now recognized as the major natural source for black-spotted eggs. Here, the National Park Service is seeking closer cooperation with the Bureau of Fisheries in the conservation of its fish resources and general fish management in all national park areas.

At Glacier National Park a fish hatchery is now under construction.

At Yosemite National Park a new dam has been installed on Frog Creek, at Lake Eleanor, to facilitate taking of rainbow eggs.

In the East a scientific stocking program has been worked out for Great Smoky Mountains National Park and the management of fish resources now being handled on the basis of this study is making the Great Smoky area a model for fisheries' technicians throughout the United States. Trout rearing pools are being developed at Cades Cove in the park.

185642—40——20

The Service also has advised on pond construction, fish planting, and fish-food plants in various State parks and recreational demonstration areas throughout the East.

SCIENTIFIC STUDIES

Scientific research is a continuing obligation in the Service's conservation program. Among the most important of such projects were the following:

Observation to determine the temperature at which the forest was killed in the chain of craters region, Hawaii National Park.

A study of the relationship between barometric pressure and eruption of geysers at Yellowstone. A device which automatically recorded the period of eruptions was constructed as a part of this problem.

Research relating to the study of an unusual type of geologic structure, tentatively called "turtle-back" folds, found in the Black Mountains, Death Valley National Monument.

A study to determine the source and direction of movement of sediments from which the Tapeats sandstone was formed and the effect of the pre-Cambrian mountains on the sediments in Grand Canyon National Park.

An investigation of the stratigraphy in the vicinity of Grand Wash Cliff, Boulder Dam National Recreational Area.

A survey of the ground water at Cape Hatteras National Seashore Project to determine the fresh water available for development uses and the influence of pumping and drainage projects on brackish-water encroachment.

The important task of securing basic data upon which intelligently to administer wildlife resources of the parks centered around two major problems—the status of predators in the national parks and the question of range utilization by both native and domestic animals. An outstanding contribution to solution of the first problem was the completion of a coyote study in Yellowstone National Park in which over a year of field observations resulted in data definitely establishing the coyote as a natural and desirable component of the primitive biotic picture, not inimical to the well-being of any species upon which it feeds in the park, and not requiring any control at present.

Early in 1939 the study of this problem was extended to Mount McKinley National Park in Alaska, where continued pressure from several groups has demanded control of wolves. This study will continue throughout the summer of 1939 and upon its results the Service will base its management of bighorn, caribou, wolves, and other species in that park.

Studies of range utilizations in many parks have become necessary conservation measures by reason of previous unwise reduction in

numbers of predators and consequent overpopulations of browse animals, particularly deer. In addition to the studies under way, there have been special investigations by the Service staff and by cooperative agreement with other agencies of the relation between deer, domestic sheep, and sage hens at Lava Beds National Monument; conflicting use of range by concessionaire saddle horses and bighorns during lambing season at Glacier National Park; and conflict between bighorn and feral burros in Death Valley National Monument.

Related studies include an investigation of efficiency of electrified fences for necessary control of animals such as bear, deer, and bison; yield of range grasses in Wind Cave National Park; and bighorn studies in Grand Canyon National Monument and Zion National Park. Results of these studies are in many cases already being incorporated in management measures designed to remedy whatever defective conditions were discovered. Other miscellaneous research projects undertaken during the year include a study of the tern nesting colony at Fort Jefferson National Monument, Fla.; the effect of ammonium thiocyanate on rodents when used in control of Ribes in connection with the white-pine blister rust campaign in the California parks; mosquito control methods in various State park and recreational demonstration project areas throughout the eastern States; life history studies of the trumpeter swan in Yellowstone; and biological surveys of Mount McKinley and Mesa Verde National Parks, Organ Pipe Cactus National Monument, and the Boulder Dam National Recreational Area.

At Scotts Bluff National Monument and at Boulder Dam National Recreational Area extensive collections were made of vertebrate materials for later classification and use as articulated skeletons in museum and educational exhibits. At Organ Pipe Cactus National Monument a faunal survey was made. The three above projects benefited by cooperation of outside agencies and individuals.

At Crater Lake National Park, the National Park Service, the United States Geological Survey, and the University of California collaborated in soundings of the lake to obtain data as to its formation and the geologic history of the area.

In cooperation with the National Park Service, the Seismological Society of America and the University of California jointly loaned to Lassen Volcanic National Park, Calif., a seismograph and a short-wave radio of latest type for receiving time signals. Lassen Peak is the most recently active volcano in United States proper. Its latest eruption ceased in 1921.

The practical value of scientific research was shown in Hawaii National Park in November when, after a local seismograph registered a severe distant earthquake and the epicenter was located, it was predicted that a tidal wave should be expected to strike Hawaii

3 to 6 hours later the same day. The wave, which did no damage, arrived on schedule and caused water-level displacement of 0.6 foot to 2.5 feet on the shores of the Islands.

Use of the parks as outdoor laboratories by schools and universities continues. Many student field trips are conducted annually, and much private research is done. A notable example was that of Bruce Richardson, physiologist, and Dr. Nathaniel Kleitman of the University of Chicago who spent weeks in Mammoth Cave trying to break down the daily cycle of human life and substitute a longer (28 hours) cycle.

Dr. Alexander H. Smith, of the University of Michigan Museum, an authority on fungi, has been concerned with research in the Great Smokies, and has listed for the park approximately 400 species of the gilled fungi (*Agaricaceae*). His work, together with the findings of Dr. L. R. Hesler, of the University of Tennessee, forms a basis for future work of this branch of the plant kingdom in the Great Smokies field.

Dr. W. B. Spencer, of Wooster College, Ohio, discovered 24 species of fruit flies (*Drosophilidae*) in the Great Smoky Mountains, three previously undescribed.

A collection containing more than 1,200 specimens of insects was made, mounted, and identified by assistant park naturalist Louis Schellbach at the North Rim of Grand Canyon.

A porphyritic dike was found near Boulder Dam which is unusual because it shows that molten rock was forced into gravels which were only partially cemented, without disturbing them appreciably and without altering them by the heat or chemical activity of the magma.

A new subspecies of reptile, a bicolored ground snake, found in Grand Canyon National Park and described as *Sonora semiannulate gloydi*. So far as is known, it is unique to the Grand Canyon.

A very rare occurrence of rhyolite and basalt was found in the Gardiner River, Yellowstone National Park: a rhyolite lava flowed over basalt and digested the latter, a relationship heretofore generally considered impossible.

Discovery of an unexplored section of Mammoth Cave National Park, reportedly unsurpassed in beauty, was the outstanding event of the year for this area. Spectacular features include an onyx dam, 4½ feet high and 42 feet long, and helictites—contorted gypsum crystals—in flower-like clusters and ribbons as long as 14 inches.

The first record since 1889 of the appearance of Townsend's warblers in Grand Canyon National Park was made last September.

Scientific articles contributed by Service staff members appeared in Service publications as well as in a large number of scientific and popular periodicals.

INFORMATION SERVICE

A multifeatured information service was maintained and expanded to explain the conservation policies and procedure of the Service and also to direct attention to the attractions of and facilities available in the various Federal park areas. The press, radio, printed and processed literature, a picture-distribution service, illustrated lectures, and moving pictures all served as media to advance public knowledge of and interest in the Federal parks. The Service also utilized existing channels of information to disseminate national park facts. This involved cooperation with patriotic societies, civic and conservation organizations, study clubs, schools, and allied groups.

That the public might know of the work being done by the National Park Service, stories on all phases of its work were released to the press during the year. In addition, a wide variety of material was furnished to reporters and free-lance writers making personal requests, many of these requests being based on items furnished in releases which intrigued their curiosity and pointed the way to worthwhile feature stories.

LITERATURE FOR DISTRIBUTION

Awakened public interest in conservation, growth of travel, and the addition of new areas to the system, all united to increase greatly the need for printed literature. During the last travel year (October 1, 1937–September 30, 1938) more than 16,250,000 people visited the national parks and monuments, yet during the 1939 fiscal year the Service was able to issue only approximately 1,000,000 printed circulars of general information. In addition to the actual visitors there are hundreds of thousands of potential visitors requesting travel literature from which to plan their vacations.

In an effort to secure maximum circulation for an entirely inadequate supply of information circulars, the Service supplied libraries, schools, museums, chambers of commerce, motor clubs, and other organizations with a few loan copies. Also in several instances local chambers of commerce and motor clubs purchased supplies of booklets for distribution to their members.

It is gratifying to report that the serious situation created by this shortage of printed material was recognized by the Bureau of the Budget and the Congress, with the result that the Service's allotment for printing was substantially increased for the 1940 fiscal year. With the additional funds, and drastic reductions in the size of information circulars under way in aid of economy, the printing situation will be better next year. The Service still will be open to legitimate criticism, however, on the ground of lack of printed informational material to supply all bona fide requests.

The shortage of informative literature is particularly felt at this time, with two great expositions on our east and west coasts. Visitors display keen interest in the national park exhibits—provided largely by the States, transportation companies, and other interested agencies—and requests for information on the parks result. Not only was it impossible to relieve this somewhat impossible situation in the past, but the financial relief furnished for the current fiscal year cannot be stretched to cover this glaring shortage. Another need for increased printed literature is to cooperate with chambers of commerce, automobile clubs, gasoline stations, and other agencies reaching a large segment of the traveling public and able and willing to direct that public to the nearby national parks or those within easy range of planned travel routes. Without descriptive literature, however, such agencies find it difficult to cooperate with the Federal Government in travel promotion to the fullest possible extent.

Of prime importance in supplementing the printed literature during the past year was the issuance of brief multilithed circulars, processed in the Department.

Altogether the Service now issues 269 free informative booklets, and similar new bulletins for parks not covered by printed literature are being multilithed monthly.

A new series of informational bulletins on historic areas was planned and the first booklet "Manassas to Appomattox" issued. Copy for seven others in the series was transmitted to the Public Printer prior to June 30. The type of information furnished and the new format met with wide popular acclaim. Plans are now under way for the initiating of new series of publications, both free and sale.

To aid in a balanced publications program, a publications committee was formed to consider the relative merits of all needed bulletins and plan the output of publications according to the greatest need for special types of circulars and the printing funds available. Deserving special consideration are papers on scientific and technical subjects which should be issued both because of their wide interest in connection with park activities and to produce the greatest results from special investigations and studies. Without a final printed report, the results of some field research may be virtually lost.

RADIO

Radio, the newest form of news dissemination, is an invaluable medium in transmitting to the American public information on the national parks of the United States, thus making them travel-conscious. Aware of the possibilities inherent to this method of advertising, the Service, through the Washington headquarters, has for the past half

dozen years carried on wide-scale preparation of radio programs for broadcasting nationally, on donated time. This year—indicative of the interest in this mode of advertising and the results obtained from past radio work carried on as extra-curricular activity in connection with other activities—the concessionaires operating the accommodations for the public in the western national parks have cooperated by donating to the National Park Service funds to defray the salary of a full-time radio-script writer.

Meanwhile, the regional offices and various parks have entered the broadcasting field and during the past year produced programs of wide interest and popular appeal. This field activity is given all possible encouragement and assistance by Washington headquarters.

LECTURES

Another method of spreading knowledge concerning the parks that has a wide popular appeal is the illustrated lecture. The work done in this field by naturalists and historians in the parks is reported elsewhere. In addition, Washington and regional office officials and representatives of the various parks cooperate, as time will permit, in this form of activity in their immediate localities.

An especially enthusiastic reception greeted the series of lectures conducted midweekly from October to May in the Departmental Auditorium. Nineteen lectures were given during the 1938–39 season, touching on subjects of travel interest and on the popular sciences connected with the parks. The new natural-colored slides, which are exceptionally well adapted for depicting the colorful scenery of the national parks, added greatly to the popular interest.

More than 23,000 persons attended these free lectures, many of which were given to capacity houses. In a few instances several hundred people were turned away for lack of space. The entire program is planned and timed to listener-interest and forms an important feature of the Service's informational and publicity work.

Assistance also was given during the year to placing cooperating lecturers of high standing on various civic and educational programs.

STUDY PLANS AND ENCYCLOPEDIAS

Information was furnished to patriotic organizations, study clubs (especially of conservation organizations), schools, and other groups requesting assistance in planning study courses. The possibilities in this field are limited only by the small staff available for the work.

Each year additional editors of books of source material—encyclopedias, yearbooks, and almanacs—request information on the national parks, while those already receiving this material request check of data previously used to bring it up-to-date and in line with

new Service policies. The material furnished includes information not only on the Federal park areas, but also on the cooperation the Service furnishes State and other local park systems.

NATIONAL CAPITAL PARKS

The 717 units of the National Capital Parks system, serving Washington and adjacent metropolitan areas, were used by an estimated 50,000,000 people. In addition to the parks of all sizes, the Office of National Capital Parks supervises the Mount Vernon Boulevard.

Of unusual interest is the newest unit, the historic Chesapeake and Ohio Canal, acquired during the year through P. W. A. cooperation and placed under the jurisdiction of National Capital Parks. This was dedicated to public use as a historic and recreational area on Washington's Birthday, 1939, because of the personal interest the first President took in the canal project.

Notable also was the breaking of ground for the Thomas Jefferson Memorial on the south bank of the Tidal Basin, on December 15, 1938, with President Roosevelt officiating.

An event of chief importance to the National Capital and to its park system was the visit on June 8 and 9 of their Britannic Majesties, King George VI and Queen Elizabeth. It is estimated that approximately 90 percent of their time in Washington was spent in units administered by the Office of National Capital Parks, including the White House. This entailed a tremendous responsibility and amount of work on the part of the park police and other officials.

Construction projects carried on in the National Capital Parks system were part of the ultimate design for the Federal City. The George Washington Memorial Parkway was extended to connect Lee Boulevard with the Mount Vernon Memorial Highway (which is part of the larger George Washington Parkway plan) and with the Arlington Memorial Bridge. Further extension of the parkway to Francis Scott Key Bridge (involving the construction of an additional arch at the Virginia end of the bridge) and redesigning of the Rosslyn Plaza are in progress. Relocation of the Mount Vernon Highway between Roaches Run and Four Mile Run will be necessary because of the construction of the National Capital Airport at Gravelly Point.

Among important achievements were conversion of the Brightwood Reservoir adjacent to Sixteenth Street, into a major recreational center of Rock Creek Park; reconstruction, as a P. W. A. project, of the historic Bullfinch Gatehouses in the grounds south of the Executive Mansion; and planting of flowering dogwood trees in West Potomac Park. Progress was made in the development of

the Chopawamsic Recreational Area under C. C. C. funds. The area afforded camping facilities for five organized underprivileged groups during the current season.

District of Columbia projects which affect National Capital Park areas were the construction of the Thomas Circle underpass and the K Street overpass at Rock Creek and Potomac Parkway intersection; also the construction of a storm-water diversion sewer in Piney Branch Valley, in Rock Creek Park, and the Rock Creek and Potomac Parkway, causing temporary and perhaps permanent relocation of bridle paths. Plans for the construction of the Massachusetts Avenue Bridge to permit open valley treatment of the Rock Creek and Potomac Parkway at that point are under way.

During the fiscal year 1939 the total appropriations for National Capital Parks, including maintenance of the White House and five C. C. C. camps, amounted to $2,398,524.93.

EXPANSION OF THE NATIONAL PARK AND MONUMENT SYSTEM

The fiscal year was characterized by continued progress in rounding out the Federal park system in accordance with long-range plans for locating, appraising, and securing lands of major importance for public-park use. Such plans contemplate the inclusion in the system of the most superb natural scenery; outstanding stretches of ocean beaches; the most instructive geological exhibits; the finest representative examples of native plant and animal life; nationally significant prehistoric and historic sites, objects, and buildings; a system of important scenic and historic parkways; and other areas that are nationally of more value for recreation than for any other use.

Although no national parks were created during the year, five new national monuments and three new national historic sites were established. These additions, with adjustments in boundaries of existing areas, raised the total acreage of the national park and monument system from 19,193,933, as of June 30, 1938, to 20,817,228 acres on June 30, 1939.

The national park and monument system on June 30 included a total of 154 areas, as follows: 27 national parks, 2 national historical parks, 11 national military parks, 78 national monuments, 8 national battlefield sites, 4 national historic sites, 1 national recreational area, 8 national memorials, 11 national cemeteries, 3 national parkways, and the National Capital Parks in the District of Columbia.

National monuments established: Fort Laramie National Monument, Wyo., July 16, 1938; Ackia Battleground National Monument, Miss., October 25, 1938; Homestead National Monument of America, Nebr., January 3, 1939; Badlands National Monument, S. Dak., Janu-

ary 25, 1939; and Santa Rosa Island National Monument, Fla., May 17, 1939.

National historic sites designated: Hopewell Village National Historic Site, Hopewell, Pa., August 3, 1938; Federal Hall Memorial, New York City, May 26, 1939; and Old Philadelphia Customhouse, Pa., May 26, 1939.

Extensions of existing Federal park areas: The largest extensions to the system were Carlsbad Caverns National Park, N. Mex., February 3, 1939, 39,488.41 acres; Dinosaur National Monument, Utah, July 14, 1938, 205,885 acres; Arches National Monument, Utah, November 25, 1938, 29,160 acres; and Glacier Bay National Monument, Alaska, April 18, 1939, 1,134,720 acres. The Cape Henry Memorial, in Virginia, was transferred from the War Department to the Department of the Interior to be administered as part of Colonial National Historical Park. This site marks the approximate scene of the first landing by Jamestown colonists in 1607.

STATUS OF FEDERAL PARK AREAS AUTHORIZED BY CONGRESS

Big Bend National Park project, Tex.—Authorized by act of Congress of June 20, 1935, was given impetus on May 12 when Governor O'Daniels approved an act of the State legislature providing for transfer of jurisdiction over 132,107 acres of State school lands within the proposed park area to the State Park Board. The act further authorized the State Park Board to acquire other lands necessary for the national park and to transfer such lands, including the school lands, to the Federal Government. With these school lands, the State now has full title to approximately 145,567 of the total of 788,682 acres needed to complete the project. It is understood that a State-wide campaign will be undertaken to raise funds by public subscription to purchase the private lands within the proposed park boundary.

Everglades National Park project, Fla.—Authorized by act of May 30, 1934. Little progress has been made during the year toward acquiring the necessary lands for this project, although the State has been encouraged in every reasonable manner to secure such lands for donation to the Federal Government before it is too late to save them from despoliation. The area is imperiled by drainage work in the Everglades. This has resulted in sweeping fires in the partially dried out marshes and invasion of salt water into large areas formerly of the fresh-water marsh type. The entire natural biotic scheme of the proposed park area is in greater danger of destruction now than ever before.

Isle Royale National Park project, Mich.—Of the 133,405 acres involved in this project, authorized by act of Congress approved March

3, 1931, title to 115,643 acres had been vested in the Federal Government by June 30, 1939. Of the remaining acreage, approximately 2,500 acres are State owned. The balance is now in process of being acquired by the Federal Government and the State of Michigan. The State has ceded complete jurisdiction to the Federal Government over all lands within the area, and now is preparing to convey the State-owned lands involved to the United States.

Saratoga National Historical Park project, N. Y.—Authorized by act of June 1, 1938, to include part of the Saratoga Battlefield now belonging to the State of New York and additional lands in the vicinity which the Secretary of the Interior may designate. On May 19, 1939, the Governor of New York approved legislation providing for conveyance of State lands to the United States and cession of State jurisdiction over the area.

Appomattox Court House National Historical Monument project, Va.—Authorized by act of Congress approved August 13, 1935. All lands within the proposed boundaries have been acquired with the exception of one tract of approximately six acres, which will be purchased with funds Congress made available for use during the 1940 fiscal year.

Cape Hatteras National Seashore project, N. C.—Authorized by Act of June 1, 1938, upon vesting of title in the United States to lands within designated boundaries. On March 30, 1939, the State of North Carolina enacted the Cape Hatteras national seashore bill, which provides for a commission to acquire title to the private lands involved, and appropriated $20,000 to carry out the purposes of the act.

OTHER PROPOSED NATIONAL PARK AND MONUMENT AREAS

John Muir-Kings Canyon, Calif.—Hearings were held in March and April 1939 on H. R. 3794, introduced by Congressman Gearhart, of California, to include the world-famous Kings Canyon region in a national park, where its scenic beauty would be protected and dedicated to the highest use. There is no more important national-park project before the country today. The bill has the approval of both the United States Department of Agriculture and the United States Department of the Interior. It is supported by more than 165 public organizations.

The committee reported the bill favorably, but with certain amendments that would violate accepted park practice. One of the amendments would open the proposed park to water storage and power development projects. This is wholly unnecessary, since both the Commissioner of Reclamation and the Chief of Engineers, United States Army, state that the most feasible power and irrigation reservoir sites are outside of the proposed park, and their plans do not include the development of sites within the proposed park.

Provisions in the bill that would define and prescribe wilderness preservation, over and above that prescribed in the act of August 25, 1916 (39 Stat. 535), as amended, and would provide that all structures erected for public accommodation should be financed by the Federal Government, were also stricken out in the committee report. The name John Muir-Kings Canyon National Park was changed to Kings Canyon Wilderness National Park.

NOTE.—On July 18, 1939, the House, after eliminating the amendment which would authorize construction in the park for power-development and water-storage purposes, approved H. R. 3794, authorizing the establishment of the "Kings Canyon National Park."

Green Mountain, Vt.—Legislation to establish this national park (H. R. 2961) was introduced in the Seventy-sixth Congress. By joint resolution approved April 10, 1937, the General Assembly of the State of Vermont authorized the Governor to appoint a committee to study the desirability of establishing a national park within the State and to accept gifts and options of land within the proposed park area. Little progress has been made thus far due to insufficient support within the State.

Cumberland Gap, in Tennessee, Kentucky, and Virginia.—H. R. 3960 and S. 1518, now pending in Congress, propose the establishment of a national historical park and a national recreational area in this region. Cumberland Gap and its surroundings are of national historical importance as the gateway for trans-Allegheny travel to the West in the period of westward expansion just prior to and during the Revolutionary War. Strong public support is being given by local people.

Escalante, southwestern Utah.—The long-standing proposal to establish a national monument in this area received considerable attention during the year. The lands proposed for national-monument status consist of a narrow strip on both sides of the Green and Colorado Rivers from the vicinity of their junction southwest of Moab, Utah, south to the Arizona-Utah State Line. With the exception of a few homestead entries, oil and gas permits, and mineral claims, title to the 1,280,000 acres involved is vested in the United States. At the request of Governor Blood, of Utah, the national-monument proposal is being held in abeyance pending additional study to determine whether certain questions relating to potential power production in the area can be settled to the satisfaction of the State and this Department.

Ship Island, Miss.—Located in the Gulf of Mexico, near Biloxi. Monument status is suggested for this area because of its historic significance. It was an important point during first French settlement of Louisiana; was used as headquarters for the British General

Packingham prior to his attack on New Orleans during the War of 1812; and in the War between the States was a Federal navy yard for the Gulf blockading squadron. The National Park Service has continued negotiations to effect the transfer to this Department of the Federal and private lands necessary for national-monument purposes.

Manuelito, N. Mex.—For a number of years the Department has been interested in giving national-monument status to this area of notable archeological ruins. Establishment of the monument is contingent upon acquisition of alienated lands in the area. A progressive step was taken on March 13 when Governor Miles, of New Mexico, signed a State act appropriating $12,000 toward the purchase of such lands.

Travertine Bridge National Monument, Ariz.—H. R. 5140, now pending in Congress, proposes to establish a national monument of 280 acres—just large enough to include the Tonto Natural Bridge and its immediate surroundings. The bridge, of travertine, is remarkably picturesque and impressive, and is probably unique as to its origin.

Proposed historical areas.—Under authority of the act of August 21, 1935, the National Park Service is conducting a Nation-wide survey of historic sites and preparing a long-time program for cooperative preservation and use. Many individual historic sites now are under consideration as to relative importance and necessary protection.

PROPOSED EXTENSIONS OF EXISTING FEDERAL PARK AREAS

Olympic National Park, Wash.—Studies and negotiations with local authorities continue to determine the lands that should be added to the park under the enabling act of June 29, 1938, which authorized the President, by proclamation, to enlarge the park so established to a total of approximately 898,292 acres.

Chalmette Monument and Grounds National Battlefield Site, in Louisiana, now consisting of 15 acres, should be enlarged to a maximum of 1,000 acres and its designation changed to that of a national historical park. H. R. 4742 was introduced in the last session of Congress for that purpose. It is contemplated to acquire the additional lands with a fund of $300,000 appropriated by the Louisiana legislature for national historical park purposes.

Rocky Mountain National Park, Colo.—Enlargement of this park has been advocated by the Department for many years. Congressional bills now pending—H. R. 6655 and S. 2651, provide for a southern extension of approximately 35,295 acres and an eastern extension of 1,720 acres. The former comprises the Arapaho area, a highly important part of the superlative scenic region now within the park. The latter would help eliminate undesirable developments, enlarge the present park administration area, and make possible the construction

of a parkway from the Big Thompson River park entrance to Estes Park village.

LANDS ADDED TO THE FEDERAL PARK SYSTEM

The following lands were added to the Federal park system through establishment of new areas, adjustment of boundaries of existing areas, and acquisition of lands for authorized projects:

Acadia National Park.—Donations of 408.88 acres and recalculation of acreage changed the area of this park to 16,522.492 acres.

Ackia Battleground National Monument.—By proclamation of October 25, 1938, this monument was established, containing 49.15 acres.

Appomattox National Battlefield Site.—By executive order of February 23, 1939, this area of 963.93 acres was transferred from the Department of Agriculture for the purposes of this authorized area.

Arches National Monument.—By proclamation of November 25, 1938, 29,160 acres were added to the monument making a total of 33,680 acres.

Badlands National Monument.—By proclamation of January 25, 1939, this monument was established containing 150,103.41 acres.

Big Hole Battlefield National Monument.—By proclamation of June 29, 1939, 195 acres were added to this monument making a total of 200 acres.

Blue Ridge Parkway.—Donations of 7,545.98 acres and purchase of 10,605.90 acres increased the lands acquired for the parkway to 22,577.27 acres.

Boulder Dam National Recreational Area.—Donations of 18.83 acres increased the total holdings of Federal lands to 1,439,832.30 acres.

Carlsbad Caverns National Park.—By proclamation of February 3, 1939, 39,488.41 acres were added making a total area of 49,568.44 acres.

Chickamauga and Chattanooga National Military Park.—Donation of 3.75 acres brought the total area to 8,632.962 acres.

Colonial National Historical Park.—Acquisition of .23 acre through transfer from the War Department resulted in a total of 6,325.616 acres.

Dinosaur National Monument.—By proclamation of July 14, 1938, 203,885 acres were added to this monument, making a total area of 203,965 acres.

Federal Hall Memorial.—By departmental order of May 26, 1939, this area of 0.487 acre was designated a national historic site.

Fort Laramie National Monument.—By proclamation of July 16, 1938, this monument was established, containing 214.41 acres.

Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park.—Donations of 13.34 acres and a correction in previous acreage resulted in a total area of 2,230.971 acres.

Gettysburg National Military Park. Donation of 0.064 acre and a recomputation of the area of this military park resulted in a total area of 2,392.069 acres.

Glacier Bay National Monument.—By proclamation of April 18, 1939, 1,134,720 acres were added to this monument, making a total area of 2,299,520 acres.

Glacier National Park.—Acquisition of 63.03 acres by purchase brought the total Federal holdings in this park to 959,296.39 acres.

Grand Canyon National Monument.—Acquisition of 852.73 acres by exchange brought the total Federal holdings in this monument to 254,089.74 acres.

Grand Canyon National Park.—Acquisition of 436.02 acres by exchange brought the total Federal holdings in this park to 640,804.83 acres.

Great Smoky Mountains National Park.—Acquisition of 1,674.715 acres by donation and purchase brought the total area of this park to 439,277.365 acres.

Guilford Courthouse National Military Park.—Acquisition of 9.90 acres by donation brought the total area of this military park to 146.774 acres.

Homestead National Monument of America.—By departmental order of January 3, 1939, this monument was established, containing 160.82 acres.

Hopewell Village National Historic Site.—By proclamation of August 3, 1938, this national historic site was established, containing 213.696 acres.

Hot Springs National Park.—The acquisition of 16.681 acres by transfer and purchase resulted in a total area of 1,006.436 acres.

Isle Royale National Park project.—Donations and purchase of 2,819.88 acres resulted in a total area of 115,642.87 acres being acquired for this authorized national park, leaving approximately 18,000 acres to be acquired to complete this project.

Kennesaw Mountain National Battlefield Park.—The purchase of 930 acres resulted in a total area of 1,577.93 acres.

Mammoth Cave National Park.—The acquisition of 2,044.79 acres by donation and purchase and a correction of acreage in first deeds brought the total acreage to 40,486.38 acres, leaving approximately 10,000 acres to be acquired to complete this park.

Mount Rainier National Park.—The acquisition of 18.20 acres by purchase brought the Federal lands within the park to a total of 239,909.969 acres.

Morristown National Historical Park.—The acquisition of 0.46 acre by donation resulted in a total area of 1,051.09 acres.

Natchez Trace Parkway.—The acquisition of 899.782 acres by donation brought the total lands acquired for the parkway to 4,687.918 acres.

Old Philadelphia Customhouse.—By departmental order of May 26, 1939, this national historic site was established containing 0.786 acre.

Petersburg National Military Park.—The acquisition of 90.007 acres by purchase, donation, and transfer from the War Department resulted in this park having a total area of 2,031.455 acres.

Rocky Mountain National Park.—The acquisition of 1.832 acres by purchase brought the Federal lands within this park to 251,913.40 acres.

Santa Rosa Island National Monument.—By proclamation of May 17, 1939, this monument was established containing 9,500 acres.

Shenandoah National Park.—The acquisition of 2,099.86 acres by purchase and transfer from War Department resulted in a total area of 182,671.59 acres.

Walnut Canyon National Monument.—By proclamation of September 24, 1938, 919.46 acres were added to this monument resulting in a total area of 1,879.46 acres.

White Sands National Monument.—By proclamation of August 29, 1938, 17.95 acres were withdrawn from this monument, resulting in a total area of 143,227.47 acres. Acquisition of 604.93 acres by exchange brought the total Federal holdings in this monument to 131,572.82 acres.

CIVILIAN CONSERVATION CORPS COOPERATION IN PARK WORK

The fiscal year closed with 311 C. C. C. camps operating under technical supervision of the Service, compared with 294 on June 30, 1938. Camps in operation at the close of the year included 91 on continental national parks and 220 on State, county, and metropolitan park and recreation areas and recreational demonstration areas. During the year work was continued on a general program of conservation and recreational development involving construction of such facilities as

minor roads, trails, dams, cabins, and other simple park structures, water and sanitary systems, for both extended and day use of areas; and preservation of natural features of scenic value, general conservation of natural resources of water, soil, forest, and wildlife; restoration and preservation of areas of historical, geological, and archeological importance.

Work considered sufficient for present recreational needs was completed on 27 State, county, and metropolitan areas during the year, and the camps thereon transferred to other areas. Thirty-two new camps were established.

The Service cooperated with the United States Forest Service and other agencies in a general program of clean-up activities for fire protection and timber salvage necessitated by the floods and hurricane of September 1938, which wrought destruction in some of the New England States. A total of 212,000 man-days of C. C. C. enrollee labor was expended in this work.

In Territories and insular possessions 1,600 C. C. C. enrollees under the jurisdiction of the Service were engaged in conservation activities. In the Territory of Hawaii the enrolled strength of the corps was increased by 100 over the number of men authorized for the previous year. Of the total 900 authorized, 225 worked in Hawaii National Park and 675 were employed on lands under the jurisdiction of the Territorial government. In the Virgin Islands, C. C. C. work was initiated on the island of St. John, and continued on St. Thomas and St. Croix. Five hundred enrollees were engaged on these three islands at the close of the year. A 200-man C. C. C. camp at Mount McKinley National Park, Alaska, during the summer months worked primarily in the headquarters area and at McKinley Park Station.

Of importance to the State park C. C. C. program this year was the direct appeal to the Governors of the States by Director Fechner of the Civilian Conservation Corps for full compliance with the law requiring adequate maintenance, operation, and utilization of the areas developed by the Corps. Issued at a time when most of the legislatures were in session, this appeal was most effective in clarifying the position of the Federal Government with respect to its limitations in providing C. C. C. assistance to the States in the future.

RECREATIONAL DEMONSTRATION AREAS

In the recreational demonstration area program, 374,537 acres have been acquired and declarations of taking have been filed to acquire all remaining tracts for which funds were available.

Fire-protection plans have been perfected for each area, and utility groups and complete road and trail systems provided for most of them.

Sixty organized camps and many picnic areas and public bathing facilities have been completed or are nearly finished. There has been a 400 percent increase in the number of camper days of use and a heavy increase in public-use patronage. Swift Creek Recreational Demonstration Area, Va., alone had more than 100,000 visitors. In addition to the summer use of organized camps, there was a great increase in short-term camping throughout the year. The summer camps are operated by counties, community chest agencies, city boards of education, "Y" organizations, youth organizations, and similar agencies; and in South Carolina directly by the Division of State parks. A still greater variety of agencies used the camps week ends and holidays.

Legislation was introduced in Congress to authorize the Secretary of the Interior to convey or lease these areas to the States or the political subdivision thereof without a consideration when the grantees or lessees are adequately prepared to administer, operate, and maintain them.

NOTE.—This bill, H. R. 3959, was vetoed by President Roosevelt on August 11.

Studies reveal a great need for small group campgrounds providing only water and sanitation.

EMERGENCY RELIEF ACT PROJECTS

Ninety-four E. R. A. projects, consisting of 75 development and 19 "white-collar" projects, operated under supervision of the National Park Service.

The development projects, operated on Federally owned lands in 35 States, compare with 65 such projects in operation on June 30, 1938. They were carried on in 11 national parks, 12 national monuments, 2 national military parks, 2 national historical parks, 1 national historic site, 43 recreational demonstration areas, 1 beach erosion control project, and 1 national cemetery. Work on the recreational demonstration areas consisted principally of continued construction of organized camps, individual camp sites, picnic grounds, bathing facilities, and area operating facilities. The work on national park and monument areas consisted of the development of simple park facilities and the restoration and preservation of important natural and historic features. One unique E. R. A. project was the construction of 104 miles of brush fences and the planting of 980 acres of grass to arrest and prevent sand erosion by wind

and wave action on the more than 100 miles of beach in the proposed Cape Hatteras National Seashore in North Carolina.

The 19 "white-collar" projects were operated in 10 States and the District of Columbia, employing research workers, writers, guides, etc.

The Service received $9,268,308 from the Emergency Relief Appropriations of 1939 for the operation of E. R. A. projects under its supervision, giving employment to a monthly average of 11,500 relief workers, of which 9,200 were employed locally and 2,300 were quartered in subsistence camps.

THE PARK, PARKWAY, AND RECREATIONAL AREA STUDY

In 45 States the Service continued its cooperation in the conduct of the study authorized by the act of June 23, 1936 (49 Stat. 1894). Preliminary reports on State-wide recreational plans have been completed in Alabama, Connecticut, Georgia, Idaho, Kentucky, Minnesota, New Jersey, North Dakota, Oklahoma, Oregon, South Carolina, Utah, and Wisconsin, and summary reports have been prepared in Florida and Missouri. A total of 23 State reports have been completed. Fourteen were published by the States.

These reports will serve as a guide for the development of parks and recreational areas by the States and as a basis for continued cooperation by the National Park Service. Work is being continued in these States toward preparation of more complete and comprehensive plans for integrated systems of recreational areas and facilities, based upon suggestions by the Service and State agencies.

In order to correlate the plans of the States and provide the framework for a national recreational plan, the Service has begun the preparation of the first edition of a report on a Nation-wide basis. Material in this report will be based in part upon the findings and recommendations of the State reports.

The proposal for a national Mississippi River Parkway, from the headwaters of the Mississippi in Itasca State Park, Minn., to the Gulf of Mexico, is a direct outgrowth of the study. This proposal is sponsored by 9 of the 10 States bordering the Mississippi River, and each has appointed a parkway planning committee. Through the efforts of these committees bills authorizing the Mississippi River Parkway were introduced in both Houses of Congress. Although the Service favors these bills in general, it is believed that definite action should await the development of a national plan for parkways.

During the year the Service continued to assist the States and their civil divisions in establishing and improving the functioning of their park systems. This involved consultation service, research, demonstration, and exchange of information relative to legislation, financing,

personnel requirements, and area and system administration, in relation to problems of maintenance, area protection, and the organization of recreational programs.

A comparative study of State park legislation was made and published in the 1938 Yearbook—Park and Recreation Progress, issued by the Service. A study of fees and charges is being compiled which is a consensus of experience of State and local park and recreational authorities in relation to this subject.

ACCOMMODATIONS FURNISHED BY PARK OPERATORS

Increased attention was given to the study of rates charged the public for accommodations furnished by private capital in national parks and monuments, an analysis which may lead to future adjustments in rate schedules.

It was impossible to secure permanent personnel to carry on these important rate studies, but work was accomplished by part-time, temporary, and emergency employees, and an E. R. A. "white-collar" project was established near the end of the fiscal year to continue the work.

While considerable thought has been given to the acquisition and operation of Government-owned facilities, the old, established policy under which concessions are granted to private interests for the establishment and operation of accommodations for the public was continued and further developed during the 1938 season. Proposed legislation affecting this policy, considered by the Congress during the fiscal year, included a bill to authorize the acquisition and operation by the Government of concessionaires' facilities throughout the park system. This bill was before the House Committee on Public Lands at the close of the fiscal year. Other bills were introduced for the purchasing of accommodation facilities in certain areas only, such as Mount Rainier, Olympic, and Mount McKinley National Parks, but they did not become law.

Government-built and Government-owned facilities at Bandelier National Monument were opened to the public during May 1939, the concession contract going to Mrs. Evelyn Cecil Frey, who had furnished accommodations in the area for many years prior to the establishment of the national monument. This is the first distinct step in the policy of the Government's construction of new facilities in national parks for operation by private concessionnaires. While there have been many Government-owned facilities in national parks and monuments heretofore utilized for accommodation of the public, these facilities had all been acquired only incidentally in land purchases or similar transactions.

In addition to the Bandelier concession contract, additional long-term concession contracts were granted to Emery C. Kolb for opera-

tions on the South Rim of Grand Canyon National Park; the Hale Bathhouse at Hot Springs National Park; and the Sutton Lines, Inc., for boat transportation and lodge accommodations at Fort Jefferson National Monument; and for ferry service between the Battery in New York City and the Statue of Liberty National Monument.

Shortly before the close of the fiscal year, 17 new cabins, with a total of 35 rooms of minimum-priced housing accommodations, were opened to the public at Mammoth Cave National Park for operation by the Mammoth Cave Operating Committee.

The Yellowstone Park Co., general operator in Yellowstone National Park, joined the Yosemite Park & Curry Co., of Yosemite National Park in a practical effort to design a satisfactory minimum cost prefabricated housing unit. The plans for the unit at Yellowstone were approved by the Service in May as part of a carefully worked out program to improve the general lay-out, appearance, and facilities in all cabins of that park. The first area to be revamped is Old Faithful.

Efforts were made during the year to furnish boat transportation service between Isle Royale and Houghton, Mich. An annual permit to cover expected service during the 1939 summer season, with a tentative arrangement for the continuation of such service thereafter, was made, but the permittee was unable to consummate the necessary arrangements and the permit was canceled. Invitations for bids were contemplated near the close of the year in the hope that some concern would be interested in providing this service.

Invitations for bids were extended to the general public on March 1, 1939, for the operations of meals, refreshments, and other small services at the Painted Desert Inn in Petrified Forest National Monument. The bids were due to be opened on April 3 but no bids were received. A further study is being given this matter with a view to securing a satisfactory operator.

SANITATION AND SAFETY PRECAUTIONS

Cooperating with the engineers of the National Park Service, sanitary engineers of the Public Health Service of the Treasury Department worked throughout the year to protect the health of the millions of visitors and thousands of employees of the Service's parks and monuments. Special attention was given to the provision of adequate supplies of pure water and the proper disposal of sewage, with many plans and designs of new facilities and improvements to old being reviewed and approved.

Swimming pools under the jurisdiction of the National Capital Parks were inspected and sampled for bacteriological examination at weekly intervals throughout the summer season. Inspections were

made also of the restaurants, tourist camp, and four camp units in the Chopawamsic recreational demonstration project.

Plans covering designs for sewerage systems were prepared for the following areas: Acadia National Park, Sieur de Monts Spring area, Seawall campground, and Thunder Hole; Mammoth Cave National Park, key area; Shenandoah National Park, Lewis Mountain cabin area, checking station, and rangers' quarters; Isle Royale National Park Project, Mott Island, Rock Harbor, and Washington Island; Fort Jefferson National Monument; Grand Canyon National Park, the North Rim; Glacier National Park, Many Glacier area; Lassen Volcanic National Park; Yellowstone National Park, the Thumb; Yosemite National Park, Tuolumne Meadows; Wind Cave National Park; and Boulder Dam National Recreational Area.

Plans were also submitted for improvements to the valley treatment plant in Yosemite.

Assistance was given in plans for developing water-supply systems at Colonial National Historical Park, Isle Royale National Park project, Fort Jefferson National Monument, Gettysburg National Military Park, Great Smoky Mountains National Park, Yellowstone (at the Canyon, Fishing Bridge, Lake and Thumb areas), and data were furnished for improvements to supply systems in the Yosemite, Rocky Mountain, Grand Teton, Mount Rainer, Lassen, and Mesa Verde National Parks.

Plans, bill of materials, and specifications were prepared for garbage incinerators to be constructed in Sequoia, Rocky Mountain, Glacier, Grand Teton, and Mesa Verde.

In addition to the safeguarding of health through inspection of sanitary conditions and facilities, the Service has worked to protect the public and its employees from accidents and to safeguard property against loss by fire. Safe-practice standards have been prepared for employees' use in working with machines, and first-aid training has been given to Service personnel through cooperation with the American Red Cross.

The Service has been active in the leadership of the Federal Interdepartmental Safety Council, an official advisory agency in matters relating to safety of all Federal employees.

MAINTENANCE OF FEDERAL BUILDINGS

At the close of the fiscal year, the activities of the Service's Branch of Buildings Management were transferred to the Federal Works Agency, in accordance with the President's Reorganization Plan No. 1. Between the time functions of buildings management were first placed under the Department of the Interior, in 1933, and this present transfer, the branch has grown in size and greatly extended its

scope. In 1933 the unit operated 45 buildings and 5 memorials in Washington, D. C. On July 1, 1939, at the time of the transfer, it was the largest organization of its kind in any one city of the United States, operating 128 buildings and 7 memorials and monuments in the National Capital and 14 Federal buildings in other parts of the country.

The National Park Service, through this branch, was responsible, during the past fiscal year, for the maintenance, operation, and protection of 21,917,843 square feet of floor space in the District of Columbia, of which 18,499,767 gross square feet were in 48 Government-owned buildings and 3,418,076 were in 80 privately owned buildings rented by the Government.

The only building in the District of Columbia acquired during the year was the War Department Annex (formerly known as Corcoran Courts Apartments), located at 401 Twenty-third Street, NW., which was purchased by the Treasury Department and turned over to the Service on October 1. Its remodeling was one of the major projects of the year. Funds were provided for this in the second deficiency bill, and approximately $170,000 expended. Three new buildings in other cities—the United States Courthouse in Hattiesburg, Miss., the National Park Service Regional Headquarters Building in Santa Fe, N. Mex., and the Forest Service Building in Russellville, Ark., were taken over toward the close of the year for maintenance and operation.

With funds provided for repairs and improvements necessary in the maintenance of buildings, the Service was able during the year to complete a variety of projects in the State Department, Internal Revenue, Navy and Munitions, and the Arlington buildings, and in the Central Heating Plant.

Service of the heating plant was extended to the War Department Annex during the year, and the addition of this building increased the potential connected load by 3,500 pounds of steam per hour. Owing to the mild winter, only 94,434 tons of coal were consumed at the plant, the total steam generated being 2,051,140,000 pounds.

Operation of guard and elevator conductor schools was continued, and training courses were inaugurated for operating engineers and foremen of laborers. Instructions included fire fighting, safety practices, and, for the engineers, operation of air-conditioning systems.

Preservation of the stonework of buildings has been given considerable attention, and 12 stonemasons were employed during the year.

SPACE CONTROL

At the close of the fiscal year, space aggregating 15,596,688 net square feet was occupied by Government agencies in 121 Government-

owned buildings in the District of Columbia, housing 82,610 employees, under authorization from the National Park Service—the Service being responsible for allocation and proper utilization of space in nearly all of the Federal buildings in the District. Also, a total of 3,836,820 net square feet of space in 146 privately owned buildings, housing 27,710 employees, was being leased at an annual rental of $3,583,931.11. This makes a total of 19,433,508 square feet of space occupied by 110,320 employees in 267 buildings.

Thirty-five changes in space allocations in Government buildings were approved, and 944 moves accomplished. The major move was that of the remaining War Department offices from the State Department to the Munitions Building, and of certain other War Department offices from the Munitions Building to the remodeled War Department Annex.

CONCLUSION

Two major problems face the Service in the years immediately to come. One is to round out the Federal park system by the inclusion of those areas whose highest value is that of conservation or recreation. There still remain a few scenic wildernesses, such as the Kings Canyon, referred to earlier in this report, which by their superb natural qualities merit national park status, and the protection it engenders. There also remain to be included places, both sites and structures, that were the locale of some of the most stirring and far-reaching events in our colonial and national life; and also of archeological remains that tell of prehistoric life on this continent. Before the wilderness is violated or the historic shrine desecrated, the protection of the Federal Government should be given to all such areas of truly national significance.

The second major problem is that of personnel. In its 1938 annual report, the Service stressed the urgency of obtaining adequate basic personnel to carry forward the mandate laid upon it to protect the parks and administer them for the benefit and enjoyment of the public. Since 1933 most of the new work entailed through consolidation of Federal park activities and the addition of new areas and new functions, has been handled through emergency personnel available to the Service for a limited and uncertain period of time. At the close of 1938 contraction of the emergency personnel already had been under way for 2 years. At the close of the 1939 fiscal year, word came of two more drastic reductions in administrative positions, one in Civilian Conservation Corps supervisory personnel and the other in that of the Emergency Relief projects assigned to the Service. Many of the cuts in personnel were immediately effective, while in some cases a year was given in which to reduce the number of employees.

Not only must the work of the Service of necessity suffer from shortage of experienced personnel under such conditions, but a serious decline in morale is bound to occur from these repeated and often unheralded reductions in staff. Moreover, the priceless natural and historic resources placed under the protection of the National Park Service will suffer if an adequate protective and administrative force is not provided. In addition, the traveling public is entitled to receive information on the Federal parks when traveling in them and when planning trips or studying them. Unless consideration is given to the proper manning of the various services maintained for the public—which was cut heaviest in the recent reductions—the Service will be justly open to criticism.

Replacement of the remaining temporary personnel by permanent civil-service employees, with the cooperation of the Bureau of the Budget and of Congress, is the only logical and satisfactory solution of this hampering and morale-destroying condition.

TABLE 1.—Holdings Acquired for National Park and Monument Purposes

Federal park system	Holdings acquired from July 1, 1938, through June 30, 1939							
	Holdings acquired by purchase			Holdings acquired otherwise than by purchase		Total acquired in acres	Holdings acquired prior to July 1, 1938, in acres	Total holdings acquired through June 30, 1939, in acres
	Government funds	Donated funds	Area in acres	How acquired	Area in acres			
Acadia National Park				Donation	408.880	408.880	16,113.612	16,522.492
Ackia Battleground National Monument	$2,612.50		49.150			49.150		49.150
Appomattox National Battlefield Site [2]				Transfer	963.930	963.930		963.930
Badlands National Monument	111,802.10		40,231.560	Donation Exchange	1,395.790 9,700.900	51,328.250		51,328.250
Blue Ridge Parkway	115,103.02		10,605.900	Donation	7,545.980	18,151.880	4,425.390	22,577.270
Boulder Dam National Recreational Area				do	18.830	15.930		34.760
Chickamauga and Chattanooga National Military Park				do	3.750	3.750	8,629.212	8,632.962
Colonial National Historical Park				Transfer	.230	.230	6,325.386	6,325.616
Federal Hall Memorial				do	.487	.487		.487
Fort Laramie National Monument				Donation	214.410	214.410		214.410
Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park.				do	13.340	13.340	2,217.631	2,230.971
Gettysburg National Military Park				do	.064	.064	2,392.005	2,392.069
Glacier National Park	15,172.60		63.030			63.030	4,379.004	4,442.034
Grand Canyon National Monument				Exchange	852.730	852.730	14,551.810	15,404.540
Grand Canyon National Park				do	436.020	436.020	74,965.310	75,401.330
Great Smoky Mountains National Park	22,153.53		904.050	Donation	770.665	1,674.715	437,602.650	439,277.365
Guilford Courthouse National Military Park				do	9.900	9.900	136.844	146.744
Homestead National Monument of America	18,000.00		160.820			160.820		160.820
Hopewell Village National Historic Site				Transfer	213.696	213.696		213.696
Hot Springs National Park	1,326.00		.330			.330	85.965	86.295
Isle Royale National Park Project	94,294.05		2,707.000	Donation	112.880	2,819.880	102,556.640	105,376.520
Kennesaw Mountain National Battlefield Park	38,997.84		930.000			930.000	647.930	1,577.930
Mammoth Cave National Park	19,435.00		615.600	Donation	1,429.190	2,044.790	38,441.590	40,486.380
Mount Rainier National Park	30,000.00		18.200			18.200		18.200
Morristown National Historical Park				Donation	.460	.460	1,050.630	1,051.090
Natchez Trace Parkway				Donation	899.782	899.782	3,788.136	4,687.918
Old Philadelphia Customhouse				Transfer	.786	.786		.786
Petersburg National Military Park	600.00		3.340	Donation Transfer	30.287 56.380	90.007	1,959.628	2,031.455
Pinnacles National Monument [1]	6,000.00		640.000			640.000		640.000
Rocky Mountain National Park	150.00		1.832			1.832	5,214.568	5,216.400
Shenandoah National Park	7,766.25	$14,624.00	1,122.360	Transfer	977.500	2,099.860	180,571.730	182,671.590
Tuzigoot National Monument [2]				Donation	42.665	42.665		42.665

TABLE 1.—Holdings Aquired for National Park and Monument Purposes

Federal park system	Holdings acquired from July 1, 1938, through June 30, 1939							
	Holdings acquired by purchase			Holdings acquired otherwise than by purchase		Total acquired in acres	Holdings acquired prior to July 1, 1938, in acres	Total holdings acquired through June 30, 1939, in acres
	Government funds	Donated funds	Area in acres	How acquired	Area in acres			
White Sands National Monument				Exchange	604.930	604.930	3,646.020	4,250.950
Yosemite National Park [1]	1,498,500.00		6,977.860			6,977.860	27,844.880	34,822.740
Acreage acquired in other areas prior to July 1, 1938							148,477.635	
Total	1,981,912.89	14,624.00	65,031.032		26,704.462	91,735.494	1,086,039.136	1,029,280.815
Grand total								1,177,774.630

[1] Outside.
[2] Not established.

TABLE 2.—Appropriations for Administration, Protection, and Maintenance, Expenditures Therefrom, and Revenues, Fiscal Year 1939

Name of Park	Appropriated	Expenditures and obligations	Revenues received
Acadia	$49,700	$49,044.09	$214.72
Bryce Canyon	12,250	12,095.33	
Carlsbad Caverns	100,300	92,380.58	273,856.03
Crater Lake	83,615	83,474.92	48,338.23
General Grant	20,960	20,898.34	15,123.35
Glacier	234,920	242,209.27	39,430.85
Grand Canyon	123,630	119,854.81	103,952.50
Grand Teton	31,380	31,377.69	1,593.70
Great Smoky Mountains	86,350	84,642.61	3,574.67
Hawaii	56,400	56,148.23	663.45
Hot Springs	73,530	73,313.03	38,554.20
Lassen Volcanic	50,300	49,924.63	16,774.61
Mammoth Cave			786.82
Mesa Verde	55,290	56,348.44	9,074.83
Mount McKinley	28,770	28,507.72	
Mount Rainier	176,555	178,414.84	49,363.50
National Capital Parks:			
United States	227,000	222,997.53	2,883.70
District of Columbia	925,280	917,203.77	23,605.02
Olympic	(2)		
Platt	19,325	19,193.90	114.57
Rocky Mountain	88,950	95,928.87	11,438.60
Sequoia	133,935	131,773.30	60,694.28
Shenandoah	68,900	69,708.78	13,683.10
Wind Cave	18,720	19,790.85	10,613.94
Yellowstone	447,840	447,060.21	413,522.84
Yosemite	311,920	311,463.57	301,845.36
Zion	43,330	45,692.25	41,250.72
National historical parks and monuments	146,610	143,626.68	3,276.06
National monuments	216,920	218,379.99	8,970.12
El Morro National Monument	4,000	3,211.13	
National military parks, battlefields, monuments, and cemeteries	342,140	336,851.12	27,971.15
Boulder Dam National Recreational Area	87,840	87,613.78	906.05
National Park Service	218,540	221,091.00	232.13
Regional offices	34,000	32,926.97	681.63
Public buildings and grounds	8,090,892	8,984,104.66	15,375.79
Public buildings and grounds, deficiency	375,000		
General expenses, National Park Service	28,500	27,522.93	
Forest protection and fire prevention	110,000	94,095.96	
Emergency reconstruction and fighting forest fires	40,000	26,649.87	
Construction of roads and trails	[1] 5,991,120	5,512,251.84	
Blue Ridge and Natchez Trace Parkways	[1] 7,000,000	2,667,284.00	910.54
Historic sites and buildings	12,000	11,683.03	
Investigation and purchase of water rights	50,000	41,602.09	
Miscellaneous			28,056.64
Total	26,216,712	21,868,342.61	1,567,333.70

[1] Available until expended.
[2] Included in national monuments.

TABLE 3.—Summary of Appropriations for the Administration, Protection, and Improvement of Areas Under the Jurisdiction of the National Park Service, Together With the Revenues Received, for the Fiscal Years 1917 [1] to 1939, Inclusive

Year	Department	Appropriation		Revenues
1917	Interior Department	$537,366.67		
	War Department	247,200.00		
			$784,566.67	$180,652.30
1918	Interior Department	530,680.00		
	War Department	217,500.00		
			748,180.00	[2] 217,330.55
1919	Interior Department	963,105.00		
	War Department	50,000.00		
			1,013,105.00	196,678.03
1920			907,070.76	316,877.96
1921			1,058,969.16	396,928.27
1922			1,433,220.00	432,964.89
1923			1,446,520.00	513,706.36
1924			1,892,601.00	663,886.32
1925			3,027,657.00	670,920.98
1926			3,258,409.00	826,454.17
1927			3,698,920.00	703,849.60
1928			4,889,685.00	808,255.81
1929			4,754,015.00	849,272.95
1930			7,813,817.18	1,015,740.56
1931			12,113,435.00	940,364.79
1932			12,831,250.00	820,654.19
1933			10,640,620.00	628,182.06
1933–35			53,402,249.00	
1934			10,983,089.00	731,331.80
1935			12,461,513.00	907,189.96
1936			16,686,090.00	1,136,533.68
1937			18,190,490.00	1,398,691.66
1938			23,333,525.29	1,504,561.84
1939			26,216,712.00	1,567,333.70

[1] For summary of appropriations and revenues prior to 1917, see 1920 Annual Report, p. 359.

[2] The revenues from the various national parks were expendable during the years 1904 to 1918, inclusive, with the exception of those received from Crater Lake, Mesa Verde, and Rocky Mountain National Parks, the revenues from which were turned into the Treasury to the credit of miscellaneous receipts.

TABLE 4.—Forest-Fire Statistics, 10-Year Record, Jan. 1, 1929 to Dec. 31, 1938

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	Grand total	10-year average
Fire occurrence by size:												
Class A fires (¼ acre or less)	121	102	193	125	176	205	246	311	228	253	1,960	196
Class B fires (between ¼ acre and 10 acres)	35	45	63	61	59	108	150	302	114	124	1,061	106
Class C fires (over 10 acres)	20	13	64	35	42	66	41	120	45	39	485	48
Total Class A, B, and C fires	176	160	320	221	277	379	437	733	387	416	3,506	350
Fire occurrence by causes:												
Campfires	21	25	58	26	28	23	32	26	28	28	295	29
Smokers	54	50	85	62	78	115	119	171	121	125	980	98
Debris burning	13	11	56	27	24	35	43	72	31	37	349	35
Incendiary	11	2	45	24	31	51	90	247	53	84	628	63
Lumbering	1				1	2	2	3	1	2	12	1
Railroads	9			1	3	1	4	4	2	7	31	3
Miscellaneous	10	13	15	16	14	24	30	32	23	20	197	20
Total man-caused	109	101	259	156	179	251	320	555	259	303	2,492	249
Total lightning	67	59	61	65	98	128	117	178	128	113	1,014	101
Grand total	176	160	320	221	277	379	437	733	387	416	3,506	350
Total number of park visitors	3,248,264	3,246,656	3,544,856	3,754,596	3,481,590	6,337,206	7,676,490	9,929,432	[1]11,635,181	[1]13,176,619	66,030,890	6,603,089
Number of visitors per fire started by campers and smokers	49,973	43,288	24,789	42,666	32,845	45,921	50,838	50,403	78,359	86,121	505,203	50,520
Total cost of fire fighting (exclusive of C. C. C.)	$146,900	$28,843	$176,855	$19,199	$23,959	$33,420	$37,494	$92,373	$4,944	$2,297	$566,284	$56,628
C. C. C. man-days contributed						44,339	29,326	30,047	7,417	5,293	116,422	11,642
Area burned inside parks:												
Forest	55,040	3,248	23,313	4,181	4,777	4,545	1,861	11,847	688	344	109,844	10,984
Brush	529	407	2,877	182	219	2,101	498	220	13	9	7,055	706
Grass	138	687	1,346	180	116	550	343	3,974	871	926	9,131	913
Total	55,707	4,342	27,536	4,543	5,112	7,196	2,702	16,041	1,572	1,279	126,030	12,603
Average acreage per fire	315	27	86	20	18	18	6	21	4	3	518	.52
Total area needing protection	6,238,500	6,241,074	6,407,048	6,502,074	6,902,319	7,451,060	7,451,060	7,648,462	7,858,914	8,212,978	70,913,489	7,091,349
Area burned per million acres protected	8,930	695	4,297	698	741	966	362	2,097	200	155	19,141	1,914

[1] Exclusive of visitors to miscellaneous memorials and areas with little or no fire hazard.

TABLE 5.—Interpretational Activities of the National Park Service

National parks and monuments	Guided trips		Lectures		Attended exhibits	Unattended exhibits	Total contacts	Total park visitors
	Number	Attendance	Number	Attendance				
Acadia	101	4,372	72	12,814	50,370	----	67,556	414,911
Bryce Canyon	218	17,360	291	42,506	----	----	59,866	102,531
Carlsbad Caverns	----	202,005	----	30,648	----	----	232,653	202,005
Crater Lake	181	2,859	516	31,287	92,756	700	127,602	203,284
General Grant	40	1,308	47	20,765	20,192	2,286	44,551	115,580
Glacier	816	19,694	432	31,539	65,011	103,875	220,119	158,534
Grand Canyon	472	31,893	1,499	146,274	169,794	4,422	352,383	336,393
Grand Teton	68	1,947	85	14,966	42,490	75	59,478	122,955
Hawaii	276	8,476	202	13,545	26,748	90,999	139,768	176,061
Hot Springs	2	131	16	633	32,342	1,050	34,156	162,241
Lassen Volcanic	189	7,864	164	24,445	29,027	4,150	65,486	93,181
Mesa Verde	1,297	41,042	367	19,421	46,905	29,515	136,883	32,784
Mount McKinley	49	773	50	1,546	646	----	2,965	1,672
Mount Rainier	335	6,107	742	30,657	258,503	----	295,267	368,854
National Capital Parks	151	7,411	137	41,463	----	7,450	56,324	----
Rocky Mountain	250	6,906	363	27,107	86,293	2,510	122,816	643,879
Sequoia	148	7,133	563	144,320	29,185	24,000	204,638	263,399
Shenandoah	29	736	49	3,835	238	13,750	18,559	897,501
Wind Cave	----	19,114	----	----	----	----	19,114	19,106
Yellowstone	1,630	92,554	2,134	587,878	677,415	237,850	1,595,697	465,727
Yosemite	672	32,918	2,189	490,751	333,953	24,500	882,122	457,013
Zion	240	15,335	582	81,758	566	----	97,659	151,352
Boulder Dam	136	1,845	761	31,490	43,749	----	77,084	546,384
Great Smoky Mountains	26	384	21	1,565	80	----	2,029	719,432
Mammoth Cave	----	71,231	----	----	----	----	71,231	120,505
Southwestern monuments	17,204	93,781	10,936	68,328	10,549	12,982	185,640	296,977
Cedar Breaks	13	59	133	2,607	9,563	----	12,229	17,327
Death Valley	4	214	195	12,000	2,712	150	15,076	59,552
Dinosaur	1,380	9,429	832	9,431	1,622	625	21,107	10,057
Lava Beds	2,645	13,018	14	695	28,353	20,993	63,059	36,199
Lehman Caves	495	3,148	----	----	2	----	3,150	3,910
Muir Woods	1,701	23,145	3	165	----	53,287	76,597	126,727
Oregon Caves	750	12,000	743	14,777	500	800	28,077	49,786
Petrified Forest	127	3,188	705	16,908	126,672	----	146,768	213,242
Scotts Bluff	----	----	24	325	24,225	13,440	37,990	93,121
Timpanogos Cave	1,198	13,528	9	998	3,194	----	17,720	13,494
Total	32,843	772,908	24,876	1,957,447	2,213,655	649,409	5,593,419	7,735,676

Percentage of park visitors served by the educational activities, 72 percent.

TABLE 6.—Statement Showing Work Accomplished at Civilian Conservation Corps Camps Under the Jurisdiction of the National Park Service July 1, 1938, to June 30, 1939

Item	Unit	Total work accomplished July 1, 1938–June 30, 1939			
		New construction		Maintenance	
		National parks and monuments	State parks	Combined total national parks and State parks	National parks and monuments
Bridges:					
Foot and horse	Number	1	47	48	8
Vehicle	Number	5	43	48	96
Barns	Number	----	6	6	1
Bathhouses	Number	3	14	17	----
Cabins, overnight	Number	----	128	128	----
Combination buildings	Number	----	35	35	----
Dwellings	Number	61	27	88	187
Equipment and supply storage houses	Number	7	70	77	20
Garages	Number	29	31	60	5
Latrines and toilets	Number	44	133	177	92
Lodges and museums	Number	4	11	15	7
Lookout houses	Number	----	1	1	2
Lookout towers	Number	2	7	9	3
Shelters	Number	8	58	66	2

TABLE 6.—Statement Showing Work Accomplished at Civilian Conservation Corps Camps Under the Jurisdiction of the National Park Service July 1, 1938, to June 30, 1939—Continued

Item	Unit	Total work accomplished July 1, 1938–June 30, 1939			
		New construction		Maintenance	
		National parks and monuments	State parks	Combined total national parks and State parks	National parks and monuments
Other buildings	Number	35	132	167	454
Cribbing, including filling	Cubic yards	1,650	8,278	9,928	
Impounding and large diversion dams	Number	2	22	24	
Fences	Rods	15,172.3	29,337.5	44,509.8	13,660.4
Guard rails	Rods	2,358	10,983.1	13,341.1	1,268
Levees, dykes, jetties and groins	Cubic yards		118,775	118,775	
Power lines	Miles	4.6	76	80.6	46.4
Incinerators	Number	2	30	32	2
Sewage and waste-disposal systems	Number	27	226	253	65
Telephone lines	Miles	239.8	138.3	378.1	1,442
Fountains, drinking	Number	7	148	155	
Pipe or tile lines	Linear feet	149,934	350,199	500,133	13,366
Storage facilities (omit last 000)	Gallons	3,149	709.3	3,858.3	
Wells, including pumps and pumphouses	Number	6	60	66	
Miscellaneous	Number	9	15	24	3
Camp stoves or fireplaces	Number	181	1,677	1,858	
Cattle guards	Number	2	14	16	
Corrals	Number	4	2	6	
Seats	Number	289	1,881	2,170	22
Signs, marks, and monuments	Number	5,371	4,241	9,612	1,801
Stone walls	Rods	291.9	1,532.3	1,824.2	1,647
Table and bench combination	Number	446	3,735	4,181	80
Tool boxes	Number	43	535	578	
Miscellaneous structures	Number	818	2,858	3,676	11
Radio stations	Number	5		5	27
Springs	Number	19	20	39	
Small reservoirs	Number	10	8	18	9
Landing docks and piers	Number	2	36	38	1
Airplane landing fields	Number				1
Truck trails or minor roads	Miles	147.9	333.4	481.3	2,728.5
Foot trails	Miles	47.5	143.4	190.9	251.5
Horse or stock trails	Miles	136	82.5	218.5	1,687.9
Stream and lake bank protection	Square yards	10,600	597,530	608,130	1,065
Bank sloping	Square yards	407,380	323,744	731,124	1,192,560
Check dams:					
Permanent	Number	16	958	974	
Temporary	Number	2,524	314	2,838	
Seeding and sodding	Square yards	375,441	352,012	727,453	502,964
Tree planting, gully	Square yards	249,500	210,670	460,170	
Ditches, diversion	Linear feet	4,029	11,963	15,992	2,047
Terracing	Miles	1.5	1.8	3.3	
Channel construction	Linear feet		1,480	1,480	
Outlet structures	Number		2	2	
Planting, seed, or sod	Square yards		128,008	128,008	
Wind-erosion area treated	Acres		20.3	20.3	
Water spreaders (rock, brush, wire)	Linear feet		5,895	5,895	
Channels and levees—clearing	Square yards	81,025	147,479	228,504	
Reservoir, pond, and lake sites—clearing	Acres		722.8	722.8	
Excavation channels, canals, and ditches:					
Earth	Cubic yards	68,918	648,331	717,249	
Rock	Cubic yards		2,399	2,399	
Pipe and tile lines and conduits	Linear feet	10,567	39,920	50,487	
Rock or concrete—riprap	Square yards	12,738	58,259	70,997	
Brush or willows—riprap	Square yards		7,000	7,000	2,500
Water-control structures other than dams	Number	26	338	364	
Field planting or seeding (trees)	Acres	4,452.7	14,673.3	19,126	5,645.8
Forest stand improvement	Acres		263	263	
Nurseries	Man-days	29,094	51,957	81,051	7,490
Tree seed collection, conifers (cones)	Bushels	9	1,902	1,911	
Tree seed collection, hardwoods	Pounds	17,474	15,213	32,687	
Collection of tree seedlings	Number		47,877	47,877	
Fighting forest fires	Man-days	13,310	37,364	50,674	
Firebreaks	Miles	11.7	139.1	150.8	78.9
Fire-hazard reduction:					
Roadside and trailside	Miles	231.5	283.2	514.7	
Other	Acres	4,961	21,205.8	26,166.8	
Fire presuppression	Man-days	63,160	74,706	137,866	
Fire prevention	Man-days	834	3,538	4,372	

TABLE 6.—Statement Showing Work Accomplished at Civilian Conservation Corps Camps Under the Jurisdiction of the National Park Service July 1, 1938, to June 30, 1939—Continued

Item	Unit	Total work accomplished July 1, 1938–June 30, 1939			
		New construction		Maintenance	
		National parks and monuments	State parks	Combined total national parks and State parks	National parks and monuments
Tree and plant disease control	Acres	17,793.2	15,934.3	33,727.5	712
Tree insect pest control	Acres	14,075.7	50,222	64,297.7	4,076
Beach improvement	Acres	221	154.8	375.8	30
General clean-up	Acres	11	495	506	
Landscaping, undifferentiated	Acres	6,359.7	5,436.9	11,796.6	429.2
Moving and planting trees and shrubs	Number	222,387	1,285,792	1,508,179	383,196
Parking areas and parking overlooks	Square yards	33,277	717,056	750,333	1,262
Public camp-ground development	Acres	77.1	236.1	313.2	730.8
Public picnic ground development	Acres	3.8	638.2	642	216.5
Razing undesired structures and obliteration.	Man-days	56,077	144,960	201,037	
Seed collection (other than tree)	Pounds	13	1,740	1,753	
Seeding or sodding	Acres	304.1	973.8	1,277.9	3,212.4
Soil preparation (top soiling)	Acres	329.1	1,070.3	1,399.4	
Vista or other selective cutting for effect	Acres	502.3	483.9	986.2	
Walks, concrete, gravel, cinder, etc	Linear feet	28,596	44,429	73,025	7,102
Elimination of livestock and predators	Number	2,880		2,880	
Fish-rearing ponds	Number	24	34	58	21
Food and cover planting and seeding	Acres	19	262.1	281.1	
Lake and pond development	Man-days	2,082	27,229	29,311	
Stocking fish	Number	1,425,489	112,700	1,538,189	
Stream development (wildlife)	Miles	1.6	3	4.6	
Other wildlife activities	Man-days	14,019	4,398	18,417	
Wildlife feeding	Man-days		587	587	
Wildlife shelters	Number		18,729	18,729	
Education, guide, contact station work	Man-days	68,924	67,612	136,536	
Emergency work	Man-days	5,195	73,775	78,970	
Eradication of poisonous weed, or exotic plants.	Acres	267.3	910.3	1,177.6	
Experimental plots	Number	14		14	19
Insect pest control	Acres		1,245	1,245	
Maps and models	Man-days	2,322	4,431	6,753	
Marking boundaries	Miles	123.9	73.3	197.2	
Mosquito control	Acres		1,097	1,097	
Preparation and transportation of materials.	Man-days	179,237	340,704	519,941	
Reconnaissance and investigation:					
Archaeological	Man-days	8,817	12,822	21,639	
Other	Man-days	6,151	11,375	17,526	
Restoration of historic structures	Number	43	1,515	1,558	
Rodent and predatory animal control	Acres		45	45	
Surveys	Man-days	26,359	69,748	96,107	
Tree preservation	Man-days	12,438	19,596	32,034	
Equipment, repair, or construction	Man-days	1,325	2,380	3,705	
Hydraulic research	Man-days		472	472	
Warehousing	Man-days	3,578	5,193	8,771	
Unclassifiable	Man-days		232	232	

OFFICE OF THE SOLICITOR

Nathan R. Margold, *Solicitor*

DURING the fiscal year 1939 the Solicitor and the members of his staff were called upon to perform legal duties more widely varied, more extensive, more involved, and frequently more difficult than in preceding years.

The volume of legal work received in the immediate office of the Solicitor during the fiscal year 1939 is indicated by the following table:

Requests for formal Solicitor's opinions	483
Legislative matters	1,090
Contracts	2,725
Division of Investigations matters	56
Requests for land decisions in connection with appeals from the General Land Office	761
Board of Equitable Adjudication cases	1,546
General Land Office matters	4,008
Division of Grazing matters	198
Geological Survey matters	224
Bureau of Mines	122
Petroleum Conservation Division matters	26
War Minerals Relief cases	60
Indian Office matters	8,271
Bureau of Reclamation matters	1,045
National Park Service matters	814
Division of Territories matters	144
St. Elizabeths Hospital matters	16
Miscellaneous items	79
Total	21,668

Disregarding changes in recording procedures, the numerical increase in the work of the Solicitor's immediate office during 1939 was 4.75 percent; adjusting for these changes, the numerical increase over 1938 was substantially in excess of that figure.

During the course of the fiscal year the Solicitor and members of his immediate staff were required to conduct, on behalf of the Government, the defense of a number of suits pending in the courts of the District of Columbia. These suits involved the legality of various official acts of the Secretary of the Interior.

In *United States ex rel. Roughton* v. *Ickes* (101 F. (2d) 248), the Court of Appeals construed and sustained the discretionary powers of the Secretary with respect to the issuance of oil and gas leases

187642—40——22

under the Mineral Leasing Act; and in *Richardson* v. *Ickes* the District Court upheld the action of the Secretary in denying an application for a grant of oil and gas privileges without competitive bidding. In connection with this latter controversy the question of the Government's title to certain valuable oil lands off the coast of Louisiana was also presented. Another decision favorable to the position of the Government was rendered by the District Court in *Burley Irrigation District* v. *Ickes*, a suit attacking both the ownership of power facilities on reclamation projects by the United States and the power of the Secretary of the Interior to control the use of water thereon as between irrigation and power purposes. In *Glass* v. *Ickes and Holland* the District Court sustained the validity of a regulation prohibiting ex-employees of the Department from practicing as attorneys before its various bureaus and offices until two years after the termination of their employment; and in *Glass* v. *Ickes* the same tribunal dismissed a libel suit raising important questions as to the privileged character of public statements made in the performance of official duties. Appeals from the three last-mentioned decisions have been taken to the Court of Appeals.

Seven war minerals relief cases filed in the courts of the District of Columbia under the act of February 13, 1929 (45 Stat. 1166) were disposed of during the fiscal year through consent decrees or orders of dismissal. Twenty-two war minerals relief cases are still pending on the court dockets, in two of which appeals have been filed with the Court of Appeals.

Numerous civil and criminal actions arising out of or bearing upon departmental activities were pending in other courts during the fiscal year. The Solicitor and his staff assisted the officers of the Department of Justice in prosecuting or defending many of these proceedings.

Water-right and irrigation litigation presented many intricate issues. Decisions on Indian water rights favorable to positions contended for by the Department were rendered in the important cases of *United States* v. *Powers* (305 U. S. 527), *United States* v. *McIntyre* (101 F. (2d) 650), and *United States* v. *Walker River Irrigation District* (104 F. (2d) 334). In the first two cases the doctrine that a treaty establishing an Indian reservation impliedly reserves the waters of the reservation for the benefit of the Indians was reaffirmed and applied, and in the last case this doctrine was extended to reservations created by Executive order. The decision in *United States* v. *McIntyre* marked the successful termination of some 52 cases of about 7 years' standing dealing with Indian water rights. The original suit of *Nebraska* v. *Wyoming and Colorado*, pending in the Supreme Court throughout the year, has not yet been sub-

mitted for decision. Water rights of vital Federal importance are involved.

Various important decisions on Indian matters were rendered during the fiscal year. In *Minnesota* v. *United States* (305 U. S. 382), principles long contended for by the Department, namely, that suits brought by the States to condemn Indian lands under the act of March 3, 1901 (31 Stat. 1084), must be brought in the Federal courts, and that the United States must be made a party to the suit, were sustained. In *Glenn* v. *Lewis* (105 F. (2d) 398), restricted lands allotted to Indians of the Five Civilized Tribes were held to continue under restrictions while in the hands of heirs or devisees possessing one-half or more, but less than full, Indian blood. This decision confirmed an interpretation previously placed upon the law by the Department, under which substantial savings to the Indians have already been effected. In *United States* v. *Algoma Lumber Co.* (305 U. S. 415), and *United States* v. *Harris* (100 F. (2d) 268), important legal principles applicable to contracts for the sale of Indian timber were announced. Decisions favorable to the contentions of the Government were delivered in a number of other suits pertaining to Indian administration, including 18 suits involving trespass upon Navajo lands. Among the cases of importance pending at the end of the year was a suit presenting the fundamental question whether the United States has the constitutional right to condemn State-owned lands for the use of Indian tribes.

Oil and gas litigation required much attention during the year, particularly because of the large interests involved and the complexity of the issues presented. A number of major oil and gas controversies were passed upon by the courts, while others are still pending. Several of these have to do with the refusal of certain operators to comply with the Connally "Hot Oil" Act on the basis of claims that their operations are solely intrastate, while others pertain to the enforcement of that act in various particulars.

The rendition of formal opinions upon questions of law submitted to the Solicitor for official rulings, and the preparation of land decisions in connection with appeals from the General Land Office are important functions of the Solicitor's immediate office. The following table shows the extent and status of these activities during the fiscal year 1939:

	Solicitor's opinions	Land decisions
Pending July 1, 1938	144	170
Received during the year	483	761
Total	627	931
Disposed of during the year	443	577
Pending June 30, 1939	184	354

The legal work incident to the leasing of portions of the public domain for oil, gas, or mineral development, and to the granting of leases or permits for grazing activities in public-land areas, has required the handling of much legal detail and the solution of many new problems. The following figures, showing the number of lease transactions submitted to the immediate office of the Solicitor during the fiscal year, partially indicate the magnitude of this work:

Review of oil and gas leases issued, permits exchanged for prospecting leases, and so forth	1,125
Review of coal permits, leases, and licenses issued, canceled, and so forth	163
Review of grazing leases executed under sec. 15 of the Taylor Grazing Act	2,678

Forty-nine grazing appeals involving applications to the Secretary for a review of the action of the Division of Grazing in denying or modifying grazing privileges were also disposed of during the year, leaving 28 such appeals pending.

The tendency of Indian legal problems to grow in variety and complexity as the ramifications of Indian administration increase was noticeable throughout the fiscal year. Tribes which have established business organizations under the Indian Reorganization Act and its supplements are commencing to exercise the business powers provided for under their constitutions and charters, thereby widely extending the range of the legal problems which must be solved by the attorneys assigned to Indian matters in the immediate office of the Solicitor. Since Indian activity in the economic field is steadily enlarging, and since the tribes are commencing to utilize more fully their powers of self-government, a permanent increase in Indian legal work is to be expected.

The approval of titles to real estate in process of purchase or condemnation and the performance of other legal services in connection with land acquisition transactions required considerable attention during the course of the fiscal year. The number of title and related matters passed upon in the immediate office of the Solicitor was as follows:

Title examinations and reviews	520
Formal title opinions	118
Condemnation cases and miscellaneous items	986
Total	1,624

A summary of the major types of legislative work performed by the Legislative Unit of the Solicitor's Office during the fiscal year 1939 indicates that the volume of legislative work handled was, on a conservative estimate, between 40 and 50 percent greater than the volume handled in 1938. All indications point to a further substantial increase in 1940.

Approximately one-fifth of the public laws and resolutions enacted at the first session of the Seventy-sixth Congress dealt with matters of concern to the Department of the Interior. Those of major importance are:

Public, No. 260: The Reclamation Project Act of 1939.

Public, No. 368: An act to provide for the establishment of the Chalmette National Historical Park in the State of Louisiana, and for other purposes.

Public, No. 173: An act to amend the Taylor Grazing Act.

Public No. 398: An act authorizing construction of water conservation and utilization projects in the Great Plains and arid and semiarid areas of the United States.

Public, No. 249: An act relating to the exchange of certain lands in the State of Oregon.

Public, No. 117: An act to provide for the common defense by acquiring stocks of strategic and critical materials, etc.

Public, No. 96: An act giving the consent and approval of Congress to the Rio Grande compact signed at Santa Fe, N. Mex., on March 18, 1938.

Public, No. 238: An act to provide for the distribution of the judgment fund of the Shoshone Tribe of the Wind River Reservation in Wyoming, and for other purposes.

Public, No. 325: An act providing for the disposition of certain Klamath Indian tribal funds.

Seventy-odd other statutes bearing upon departmental activities were enacted during the session.

During the fiscal year a wide variety of legal problems arising out of the administration of the public-land laws received the attention of the legal staff attached to the General Land Office. The total number of items passed upon was 38,826, a number estimated as being slightly in excess of the quantity handled during the preceding year. Institution of suit was recommended in 32 instances.

A considerable increase in the legal work of the General Land Office is expected to occur during the fiscal year 1940. One reason for this is that some 4,000 oil and gas prospecting permits are in process of transformation into leases. Another reason is the anticipated filing of numerous applications for the lease of lands covered by another 4,000 oil and gas prospecting permits, which are due to expire by the end of the present calendar year.

Geological Survey legal work increased from 1,661 items in 1938 to 2,271 items in 1939. Numerous legal documents pertaining to the leasing of the public domain for oil, gas, or mineral development, and to the conduct of drilling or other operations under such leases were drafted or reviewed. Twenty unit plans of operation involving over 360,000 acres of land, submitted pursuant to the acts of March 4, 1931 (46 Stat. 1523), and August 21, 1935 (49 Stat. 674), were approved. The administration of the unit plans approved during preceding years also presented a variety of legal problems, frequently of a complex character. Regulations and orders governing operations in

unitized areas were prepared. Legal problems incident to the sale of royalty oil belonging to the Government; to the preparation or review of cooperative agreements with States, municipalities, and other agencies; and to the obtaining of patent protection for the Government's interest in inventions made by employees of the Survey required considerable attention. Memoranda and briefs were prepared in connection with quasi-judicial proceedings affecting mineral lands.

The handling of legal work in the Office of Indian Affairs is divided between the Law Division and the Probate Division. A high degree of specialization in an extensive range of topics is required of Indian Office attorneys. The volume of work received in the Law Division at Washington is estimated as having been from 5 to 7 percent greater in 1939 than in 1938. Increases are also reported for various field offices.

Indian-tax matters may be cited as an example of the manifold legal problems requiring attention by the attorneys detailed to the Office of Indian Affairs. Questions concerning the applicability of State and Federal taxes to the Indians and their property are progressively increasing in difficulty and importance as taxing authorities seek to expand receipts. Numerous controversies and suits involving ad valorem real and personal property taxes, estate or inheritance taxes, gift taxes, license taxes, sales taxes, and other revenue measures are pending. More than 100 Federal and State tax cases involving Oklahoma Indians alone were considered during the fiscal year.

Indian probate matters are gradually enlarging in volume, with the result that the backlog of undisposed probate cases has grown to considerable proportions. Outside of the Five Civilized Tribes and the Osage Nation the number of estates probated increased from 1,793 in 1938 to 1,880 in 1939, while the number of estates awaiting probate at the end of the year increased from 1,836 in 1938 to 2,625 in 1939. More work of this character was on hand at the beginning of the fiscal year 1940 than can be disposed of during a full year with existing facilities.

The Legal Division of the Bureau of Reclamation during the fiscal year handled in its Washington and field offices more than 20,000 legal matters of a varied and often complex character. In line with the continuing expansion of Federal reclamation activities, the volume of work received was considerably in excess of that handled during any prior year.

Contracts drafted or reviewed during the fiscal year totaled approximately 6,550 in number and approximately $113,000,000 in amount, as compared with about 4,450 contracts involving some $64,000,000 reviewed or drafted during the preceding year. A considerable number

of the contracts handled dealt with the sale of power or the lease of power facilities on reclamation projects, while another important group dealt with the repayment of project construction costs by water users' associations. Land or right-of-way acquisitions for the several projects during the year necessitated the preparation of some 1,163 title opinions by field attorneys, while in the neighborhood of 4,000 legal opinions on a variety of topics were written in the Washington and field offices. In addition, water filings for various projects were prepared, special notices covering the operation and maintenance of projects were drafted, legal reports on proposed projects were written, leases were drafted and executed, purchases of lands and rights-of-way were negotiated and closed, transfers of water rights were arranged, the extent and character of rights-of-way were determined in specific instances, interdepartmental agreements and understandings were drafted, powers and duties of municipalities and irrigation or conservancy districts under their charters and the governing State statutes were determined. An important achievement was the settlement of 400 notes and warrants issued by the Verde River Irrigation and Power District.

The Reclamation Project Act of 1939 was introduced in Congress during the fiscal year and become law shortly after its close. This statute constitutes the most important reclamation legislation passed since the basic act of 1902. The principal objectives of the new measure are the establishment of equitable and economically sound bases for the repayment of construction charges by the users of project water, the readjustment of existing repayment contracts in accordance with these new standards, and the provision of appropriate criteria for determining the feasibility of proposed future projects.

The general legal work of the Bureau of Reclamation has for some time been undergoing a rapid increase in both volume and complexity. The principal underlying causes for this development are the substantial expansion of the construction program of the Bureau; the development of projects in settled areas such as the Central Valley in California, where the legal entanglements of water and other property rights are very great; and the enlarged scope of legislative activity with respect to the Bureau. Acquisition of rights-of-way, condemnation proceedings, adjudication of water rights, and contract drafting in connection with the Colorado-Big Thompson, Provo River, Humboldt, All-American Canal, Boulder Canyon, Parker Dam, Central Valley, Tucumcari, and Columbia Basin projects have contributed large items to the work load. The water-right problems arising in connection with the Central Valley project are widely recognized as the most difficult and complex ever to have arisen in California.

Varied and extensive legal services were rendered the National Park Service during the fiscal year through the office of the Chief Counsel of that Service. More than 22,000 individual items were handled. The total volume of work received in the course of the year is estimated to have surpassed by approximately 20 percent the total volume received during the preceding fiscal year, while the number of unfinished matters pending at the end of the year is estimated to have exceeded by approximately 15 percent the number pending at the beginning of the year.

Land acquisitions for park, monument, or other purposes imposed, in particular, a very heavy burden upon the legal staff of the National Park Service in 1939, and will continue to do so in 1940. The Jefferson National Expansion Memorial, Yosemite Sugar Pine, Chesapeake and Ohio Canal, Redwood Mountain, Isle Royale, Mammoth Cave, and Great Smoky Mountains acquisition projects required almost constant attention during the year, while among the important projects planned for 1940 are the Washington Coastal and Corridor, Grand Canyon, Great Smoky Mountains, Colonial Parkway, and Kennesaw Mountain acquisitions.

The principal activities of the Legal Division of the Puerto Rico Reconstruction Administration during the fiscal year 1939 and the volume of work handled over the course of the year are summarized in the following table:

	Number of major matters	
Land acquisition transactions [1]		1,329
Closed prior to end of year	979	
Pending at end of year	350	
Organization documents for 5 cooperatives		60
Contracts and leases		3,820
Construction contracts	13	
Leases	96	
Usufruct contracts	3,686	
Miscellaneous contracts	25	
Litigation		231
Suits to recover taxes	19	
Ouster proceedings	42	
Suits for specific performance of contracts to sell land	7	
Proceedings to clear title to acquired lands	158	
Miscellaneous suits	5	
Formal opinions (many informal opinions and memoranda were also prepared)		13
Total		5,453

[1] These transactions involved the handling of 3,196 notarial deeds.

Expenses of the Legal Division for the fiscal year 1939 decreased more than 25 percent as compared with those for the preceding fiscal year, notwithstanding a 20 percent increase in the total expenditures of the Puerto Rico Reconstruction Administration.

Viewing the various branches of the Office of the Solicitor as a whole it is apparent that the fiscal year 1939 was marked by a distinct increase in the size and complexity of the tasks assigned to the Solicitor and his staff. Not only was the volume of business substantially larger than in former years, but also the questions presented were in many instances more intricate and involved than ever before. A number of factors indicating the probability of further growth in the volume and complexity of the legal work of the Department during the fiscal year 1940 have already been pointed out in connection with the discussion of particular topics. To these must be added the fact that the reorganization plans which became effective on July 1, 1939, transferred a number of additional offices and functions to the Department, and thereby greatly enlarged the scope of the tasks committed to the Office of the Solicitor. If present standards of performance are to be maintained, it is imperative that legal personnel and funds be increased.

DIVISION OF INVESTIGATIONS

B. B. Smith, *Director*

THE number of employees in the Division of Investigations as of June 30, 1939, was 143, of which number 111 were paid from the regular appropriation and 32 were paid from emergency funds. The Division consists of a central office and five regional offices located at San Francisco, Calif.; Billings, Mont.; Salt Lake City, Utah; Albuquerque, N. Mex.; and Washington, D. C.

On July 1, 1938, there were pending 11,914 cases for investigation. During the year 8,257 new cases were received and 11,264 were closed. At the end of the year there remained uninvestigated 8,907 cases, which represented a net reduction for the year of over 3,000 in the pending cases.

At some time during the year the Division was called upon to make investigations for each bureau and office within the Department. The variety of these requests demanded the services of special agents with expert training and experience in law, accounting, engineering, timber cruising, land appraisals, and range control.

To pave the way for the issuance of term leases instead of temporary 1-year leases, a great amount of time was devoted to the investigation of applications for leasing isolated and disconnected tracts of the public domain, as provided for under section 15 of the Taylor Grazing Act. A total of 3,512 applications for lease were investigated and reported during the year. While it is necessary in these cases that basic information be obtained relative to the qualifications of the applicants, number of head of livestock which the lands will support, rental fees, stock-watering facilities, and numerous other facts, the most important element is the ability to work out compromises between conflicting applicants for the same lands. The thoroughness with which the special agents performed this service is reflected by the fact that few complaints have been received from applicants regarding the lands apportioned to them upon the basis of recommendations made by the special agents. The term leases issued as a result of these field examinations have produced, and will continue to produce, considerable revenue to the United States in the form of fees and rentals.

TYPES OF INVESTIGATIONS

A number of investigations have been made for the Division of Grazing relating to interference with the administration of the Taylor

Grazing Act. Attempts of individuals to control grazing through claims initiated under mining laws, and other efforts to appropriate the range without right, have been thwarted, and there are now pending a number of cases in which injunctions are being sought to prevent trespasses within grazing districts.

Numerous investigations were made concerning fraudulent schemes by groups of promoters whereby persons were induced to file applications for oil and gas prospecting permits. The perpetrators of the schemes, by means of fraudulent representations as to the possibilities of a high financial return, persuaded investors to pay disproportionate fees in return for mere acts of agency in filing the applications with the General Land Office. In many cases little or no effort was made looking toward the development of the land as required by the law and regulations, thus resulting in a complete loss to the applicants. Those reports showing violations of Federal statutes have been referred to the Department of Justice for appropriate action, while others involving violations of State laws have been submitted for prosecution in the State courts.

There were investigated a number of complaints regarding matters under the jurisdiction of the Department in connection with supervisory personnel of Civilian Conservation Corps camps. These complaints ranged from inefficiency and official misconduct to the misappropriation of Government property and funds.

The following criminal violations were investigated during the fiscal year ended June 30, 1939:

Impersonating a Government officer	1
Embezzlement	9
Forgery	1
Grazing trespass	5
Bribery	1
Fraud, sale of oil and homestead land	4
Fraudulent homestead entry	1
Conspiracy	1
Unlawful occupancy of Government lands	6
Submitting false claims against the United States	3
Depredation against Government property	1
Illegal trading with Indians	1
Coal trespass	1
Timber trespass	1

Seventeen persons were indicted during the year. Thirty-five defendants, most of whom were indicted prior to July 1, 1938, were convicted. Twenty-three criminal cases are pending action.

One assignment which required tireless effort was the task of making examinations and appraisals of approximately 660,000 acres of land in northern Arizona embraced in three exchange applications under the Navajo Boundary Extension Act. Physical inspection was made of the entire area.

As an illustration of the variety in the type and extent of the assignments which receive attention by the Division it is interesting to note that a recent case involved the examination of tracts of land which were so small that the special agent had to get off the land in order to look at it. One tract was 1 inch wide and 70 feet long; another 1½ feet wide and 17½ feet long; and another 5 feet wide and 8 feet long. These small tracts were formed between mining claims, and the examination of each required a separate trip of 20 miles on horseback. It was necessary that three days be spent on the case involving these three tracts, constituting a small fraction of an acre, whereas ordinarily a special agent can examine several hundred acres in one day.

LAND CASES INVESTIGATED

In cooperation with the Bureau of Reclamation a large number of examinations were made of lands within the Central Valley project, California, to clear the title relating to unpatented mining claims. Lands along the relocated right-of-way of the Southern Pacific Railroad Co., Shasta Reservoir, were examined, mineral appraisals made, and action taken to cancel invalid mining claims in conflict. In addition, examinations proceeded on both the Friant and Shasta Reservoir projects. A total of 1,450 cases involving mineral claims and mineral appraisals within these areas were disposed of during the year, and it is believed this work will result in saving the Government large sums of money that it might otherwise have been compelled to pay to persons whose claims were without foundation.

A similar assignment was the request of the War Department that examinations be made of all unpatented lands within the Muroc Bombing Reserve. This reserve embraces approximately 150,000 acres on the Mojave Desert in Kern and San Bernardino Counties, Calif. The area is used by the Army as a bombing range for its flying fortresses, as well as a machine gun practice range for its fighting and pursuit ships, and it is of vital importance that all questionable claims be eliminated so as to avoid subsequent damage suits. Over 1,300 reports were submitted during the year and it is estimated that the time of two men for the period of 1 year will be required to complete the assignment.

Timber trespass cases were received in approximately the same volume as during previous years. In addition to the correspondence necessarily carried on pertaining to this work, a large number of persons continue to call at the regional offices daily for the purpose of securing information concerning the laws governing the cutting of timber on public lands. The utmost cooperation is extended to these persons in providing them with the information which they seek. Close cooperation has been accorded the Oregon and California Re-

vested Lands Administration and the investigation of timber trespasses in the States of Oregon and California will be intensified during the present fiscal year.

Another of the more important investigations had to do with the validity of mining claims in the Lance Creek oil field, Wyoming. This investigation involved a determination as to whether all locators of these mining claims had made diligent efforts working toward a discovery of oil and gas prior to the passage of the Oil Lease Act of February 1920. The investigation was successfully completed, and it is probable that the Government will be able to recover the lands involved or collect substantial royalties.

An effort has been made to place the audits of the various Indian Office units on a more current basis. Many of these audits are highly involved and have necessitated detailed examination of the records and accounts of the various units. Sixty audits were made during the last fiscal year, and it is anticipated that each unit, of which there are more than 100, will be audited during the present fiscal year.

At the request of the Bureau of Mines a survey was made of the property, equipment, and records of the United States Helium Plant, Amarillo, Tex., for the purpose of determining the cost of producing salable helium. This investigation presented new and difficult problems because of the many factors entering into the cost determination of salable helium.

The more important investigations relating to the Puerto Rico Reconstruction Administration had to do with the construction of a cement plant and the organization of a corporation for the manufacture of butyl alcohol in Puerto Rico.

Investigations of mineral claims at the request of the United States Forest Service have resulted in court actions looking to the elimination of invalid claims within forest reserves.

During the fiscal year 1939 the Division of Investigations operated under an appropriation of $440,000, which was expended as follows:

Salaries:	
Departmental	$31,498
Field	268,211
Office supplies and equipment	9,208
Travel expense and per diem	78,000
Purchase, maintenance, and operation of automobiles	37,200
Communication expenses	2,100
Transportation of things	1,000
Rent of office space	2,700
Repairs to equipment	189
Stenographic services	28
Miscellaneous current expenses	1,534
Unobligated surplus	8,332
Total appropriation	440,000

DIVISION OF GRAZING

R. H. Rutledge, *Director*

CONSERVATION activities of the Division of Grazing advanced upon a broad front during the fifth year of administration of Federal range grazing districts.

Whereas a large part of the work of the Division of Grazing since its establishment in 1934 was devoted to organization and laying the foundation upon which to build an administrative structure, the last year witnessed definite advancement of the whole conservation program. Studies to secure data as to periods of grazing use, movements of stock from range to range or to shipping points, and the qualifications of present and prospective users were continued as an important feature of the program.

Steady progress was made toward the issuance of term permits, an essential step in stabilization of the livestock industry.

Agreements and cooperative arrangements with State and Federal agencies continued as important features of the land-use and land-planning program. During the year the administration developed and made effective an intensive and detailed plan for more efficient management of the Federal lands under its jurisdiction.

Following field and Washington conferences a plan for the reorganization of the Division of Grazing was approved by the Secretary of the Interior on May 13. As approved this plan is built around a strong range-control and range-development structure with the essential business and related services needed for proper range administration.

Radio facilities installed in five of the grazing regions were of exceptional value in facilitating contacts between C. C. C. camps and administrative headquarters. Much of the range territory is poorly serviced by roads and large areas are great distances from telephones. The recent drought period increased the range fire hazard and this modern means of communication was instrumental in marshalling and directing fire-fighting forces. The radio equipment proved to be both economical and effective and efforts are being made to extend such facilities to all regions of the Federal range territory.

ORGANIZATION

During the past 2 years the Division has been studying the application of its functions in order to determine the best type of organiza-

Storm on the Range in New Mexico.

Sheep at Water Provided on a Utah Range Through the Conservation Work of the Division of Grazing.

tion to carry them out. These studies were crystallized during the fiscal year in a new organization set-up. This set-up divides the work into four principal branches—Operations, Range Management, Range Improvement and Maintenance, and Land Acquisition and Control—each headed by a Chief located in Washington.

The entire field administration is carried on through nine administrative regions, each region, in charge of a regional grazier, comprising a State unit with the exception that lands in Nevada and California have been grouped as one.

Protective measures to safeguard the ranges and watersheds from fires were carried out both through the efforts of the Division of Grazing and through agreements with State and other Federal agencies which provide for inter-agency use of facilities.

The administrative staff was increased by 42 members during the fiscal year, making a total of 167 Civil Service employees attached to the Division of Grazing on June 30, 1939. For the most part, the added personnel were employed in policing the grazing districts.

In addition to the regular staff there are 629 district advisors who are elected by popular vote within the district they represent and appointed to serve in a recommendatory capacity at the call of the regional grazier. The functions and duties of these district advisory boards as provided in the Federal Range Code are as follows:

District advisors may advise or make recommendations on the following matters:

1. The carrying capacity of the Federal range in the district.
2. Applications, under the Federal Range Code, for grazing licenses or permits, either regular, free-use, or nonuse, provided that no board shall make a recommendation on an application by any of its members. Such an application shall be acted on in the first instance by the regional grazier or district grazier.
3. Proper rules for fair range practice.
4. Allotments of range by classes of livestock or for community or individual use.
5. Seasonal use of the Federal range or any part thereof.
6. Applications for the construction or maintenance of improvements on the Federal range under section 4 of the act.
7. Any recommendations made by local associations of stockmen in the district.
8. Any other matters on which their opinion may be requested by the Secretary of the Interior.

Twenty-eight additional district advisors have been appointed to represent wildlife and recreational resources, under the provisions of Circular W–164 approved by the Secretary of the Interior on January 6. These district advisors were nominated by the respective State fish and game commissions or the corresponding State authority for the States in which the districts are situated.

STATUS OF GRAZING DISTRICTS

The 257,678,500-acre area embraced within the 50 grazing districts established includes 134,858,430 acres of public land subject to grazing

use and administration. This public-land area is interspersed with private and State lands all tied together in the general-use pattern. About 10,000,000 acres of this public-land area are included in prior withdrawals, such as stock driveways, power-site reserves, military reserves, naval oil-shale reserves, public-water reserves, and reclamation withdrawals, administered by the Division of Grazing under temporary agreement.

Grazing districts range in size from less than 250,000 acres to 10,000,000 acres. The average district has an area approximately that of Connecticut which has 3,064,800 acres.

ESTABLISHMENT OF GRAZING DISTRICTS, MODIFICATIONS AND ELIMINATIONS

On July 14, 1938, the Secretary approved an order establishing Arizona Grazing District No. 3, comprising a gross area of approximately 4,915,000 acres, of which approximately 3,946,767 acres are unappropriated and unreserved public land.

During the fiscal year the Secretary approved 18 modification orders prepared by the Division of Grazing, as follows:

	Approximate gross area in acres
7 orders eliminating areas containing only small scattered tracts of public land	1,360,900
2 orders transferring land between grazing districts	425,000
6 orders eliminating land in order that it might be included in national forests, monuments, or projects by other Departments	559,000
3 orders including land within districts in response to petitions by local stockmen	470,000

LICENSES

In order to take care of the existing livestock industry pending the accumulation of sufficient data to warrant the issuance of term permits under section 3 of the act, the 1-year license system was continued during the year in all districts except Colorado No. 6. In that district, following the completion of the range survey, the temporary licenses were replaced by 10-year permits.

Grazing licenses and permits were issued to 19,342 stockmen owning 11,032,642 head of livestock in 50 grazing districts during the year. In addition, under the cooperative grazing association plan in Montana, 28 grazing associations operated approximately 240,000 livestock on lands of all ownerships. Forty-four licenses were issued for grazing a total of 4,345 livestock in Arizona grazing district No. 3, which was established at the beginning of the fiscal year.

Whereas the area of range placed under regulation increased 1.9 percent; the numbers of livestock allotted on the range increased 3.1 percent. Reducing the period of use on public land has allowed

many small operators to obtain range facilities and the increased numbers have placed no additional burden on the range due to the shorter grazing period.

FEDERAL RANGE CODE

Amendments to the Federal Range Code were approved on August 19 by the Acting Secretary of the Interior. These amendments, together with parts of the code approved on March 16 and June 22, 1938, were codified, and the codification was approved by Secretary Ickes on August 31, 1938.

This code contains the rules and regulations for administration of the range in accordance with prudent conservation principles. It outlines the procedure for adjudication of range privileges under section 3 of the act; limits the grazing use to the number of animals that can be safely carried without damage to the soil, water, and forage; sets up rules of the range as a guide to the protection and management of the resources; and outlines the processes by which the individual and the public may prosecute their respective interests in the use of the Federal range.

HEARINGS AND APPEALS

During the fiscal year 22,000 applications for grazing licenses were filed with the regional graziers. These applications were considered by the regional graziers, and action taken in accordance with the provisions of the Federal Range Code. That the action taken was satisfactory in the great majority of cases is indicated by the fact that appeals were filed in only 829 cases, which represent a very small percentage of the number of applications considered. Seven hundred and thirty-eight of these appeals have been settled and there were 91 appeals pending at the close of the fiscal year.

ENFORCEMENT

Administrative officers of the Division, assisted by range riders during concentrated seasonal livestock movements on the range, were successful in reducing the number of trespass cases during the year. Enforcement has been and is mainly a matter of education and understanding.

The accomplishments in this line are reflected in the fact that only five arrests for willful violation and 116 cases of minor infractions in which the violator had failed to comply with notices of trespass, have been reported. The five arrest cases have been brought to trial, the defendants fined, and the cases closed. In addition there were three civil cases, two of which were settled in favor of the Federal Government and the other case was dismissed.

185642—40——23

The 116 cases of minor infraction were settled without legal procedure by amicable settlement wherein the infringement in each case was settled through voluntary offer of payment for damages to the United States in the total amount of $4,654.06.

COOPERATION

Cooperative agreements with State and other Federal agencies that were arranged during 1938 were continued during 1939. Agreements concerning the loan of employees, fire fighting, range surveys, land use, experimental areas, drainage-basin areas, water-use activities, and joint management of lands on repurchased areas were entered into, renewed, amended, or extended to the extent of 34. At the end of the fiscal year, the total number of such agreements in effect was 47.

Accomplishments under the agreements have been very satisfactory and have aided materially in fulfilling the objectives of the act. The 47 agreements in effect are in many instances broad memoranda of understanding and have resulted in many local agreements being placed in execution between field representatives of the Division of Grazing and other agencies.

COOPERATIVE GRAZING ASSOCIATIONS

Cooperative agreements with State grazing associations and groups of stockmen, which were inaugurated in 1936, 1937, and 1938, continued during 1939, resulting in association agreements, including originals and amendments, amounting to 28 in number. During the fiscal year ending June 30, 1939, the number of these cooperative agreements with local associations of stockmen was increased by 6, and 14 agreements were amended. Activities of this nature were carried on under two main types of agreements with stockmen's associations. In Montana the method followed has been by the issuance of a grazing license to the association, while in Oregon the associations lease State and county lands and through agreement the Division of Grazing issues the licenses to the individuals involved. The effect is the same, however, in that the situation of interspersed land ownership, composed of State, Federal, county, tax-default, and privately owned lands is remedied to the end that a sane and proper use of all the land involved results.

Under both types of arrangements the carrying capacity of the range and the fees to be charged are fixed by the Secretary of the Interior in accordance with the Federal Range Code. The results of such cooperation in Montana led to the passage of the Grass Conservation Act in that State during the fiscal year. That act created the Montant Grass Conservation Commission, composed of five commissioners appointed by the Governor. This commission is made up

of four stockmen and one county commissioner, all of whom are officers in the State cooperative-grazing association. This new State law joins the forces of local and national conservation in dealing with one of Montana's greatest natural resources.

SOUTHERN PACIFIC LAND CO.

The cooperative agreement between the Division of Grazing and the Southern Pacific Land Co., which became effective January 1, 1937, expired December 31, 1938. It is being considered for renewal under slightly modified terms that are intended to extend further the benefits to be derived from systematic management of the public and private lands involved.

OTHER COOPERATIVE ACTIVITIES

Other cooperative activities conducted during the year included:

1. Predatory animal and rodent control work in cooperation with the Bureau of Biological Survey.
2. Insect control in cooperation with the Bureau of Entomology.
3. Joint range administration, study, and range improvement of repurchased areas within grazing districts in cooperation with the Soil Conservation Service.
4. Water spreading for natural revegetation in cooperation with the Soil Conservation Service.
5. Fire suppression and presuppression in cooperation with the Forest Service, Office of Indian Affairs, and State agencies.
6. Exchange of use and consolidation of ownership in cooperation with individuals and State land officials.
7. Maintenance of roads and truck trails in cooperation with counties.
8. Construction of range improvements in cooperation with State officials and local district advisory boards under provisions of section 10 of the act.

RANGE IMPROVEMENTS

The range improvement program became effectively coordinated in the regions through consolidation of the administrative and improvement units in the field. Plans effected under this consolidation took definite shape and resulted in economy and efficiency. Funds made available for range improvements under sections 10 and 11 of the Taylor Grazing Act were used primarily for the purchase of equipment and materials and in large part the labor was performed by the C. C. C. forces under supervision of the regional grazier.

CIVILIAN CONSERVATION CORPS

In cooperation with the Civilian Conservation Corps, the Division of Grazing enlarged its scope of activities in the accomplishment of construction and related projects for the improvement and development of natural resources in grazing districts. The Division's quota

of camps was increased from 45 to 90 during the fiscal year. This made possible a wide distribution of projects and enabled the Division to spread the improvement work over a larger area than heretofore covered. The distribution of the camps in the nine grazing regions was made primarily on the basis of public-domain acreage and the acute need for range rehabilitation. On that basis the present distribution is as follows:

	Camps		Camps
Region 2, Utah	15	Region 8, Colorado	8
Region 3, Nevada-California	19	Region 9, Arizona	5
Region 4, Oregon	9	Region 10, Wyoming	9
Region 5, Idaho	10		
Region 6, Montana	5	Total	90
Region 7, New Mexico	10		

Although many of the activities undertaken by the C. C. C. forces in the Division are of emergency nature, such as fighting fires, insects, and other destructive elements, the work in general is developed according to carefully prepared plans for a long-time range-improvement program. Major types of projects include water developments, fence construction, stock trails and corrals, rodent control, truck trails, bridges, terracing, check dams, posting of trails and boundaries, and related work of vital importance to the conservation and proper management of the range.

Water is the prime requisite of the public domain. Sections of the Federal range used partially or not at all in past years are being made available for grazing purposes largely through the development of an adequate and well-distributed stock-water supply. Dams have been built to impound the water from mountain streams and to preserve the early run-off, and check dams have been built in dry creeks for the purpose of arresting soil erosion and moderating run-off for impounding downstream. The development of springs where feasible has been accomplished, and, in many cases, wells have been drilled in an endeavor to provide reliable watering places on vast dry areas in order that the range may be more properly and seasonably serviced and thus afford a better distribution of use. In connection with this water development, storage facilities, such as troughs and tanks, have been constructed.

Closely allied with the water program is the work to open truck trails into the grazing regions and to build stock trails for the movement of animals from winter to summer range or to market. This trail construction opens up large areas of grazing lands formerly more or less inaccessible and not only furnishes much needed new pasture but also aids in the elimination of overgrazing in other areas. Holding corrals constructed along these trails allow stock to be held overnight on the way to market and are of great advantage to stockmen. A sufficient water supply is included in the construction

of each corral. Bridge and cattle guard construction are important parts of these trails and are of great assistance in expediting the movement of cattle and reducing losses of livestock.

An extensive rodent-control program has proved of great value in the conservation of soil and forage resources. More than 1,443,466 acres have been treated for the control of ground squirrels, gophers, prairie dogs, kangaroo rats, and jack rabbits. Eradication of poisonous weeds has proved very important in saving livestock, and 47,311 acres have been treated for infestations of poisonous larkspur, death camas, and other weeds which cause the death of hundreds of head of livestock.

The following table shows the accomplishments of the major work projects of the Division's Civilian Conservation Corps program for the fiscal year 1939:

Bridges	60
Fences—miles	731.5
Reservoirs	54
Springs	90
Wells—fully equipped	35
Cattle guards	101
Corrals	34
Truck trails—miles	1,285.8
Stock trails—do	493.3
Check dams:	
Permanent	177
Temporary	711
Other flood-control structures	11
Acres treated for poisonous plant eradication	47,311
Acres treated for rodent eradication	1,443,466
Impounding and diversion dams	128
Fire suppression—man-days	3,634
Other emergency work, such as flood control, snow removal, repair of damage by storms, search for lost persons, etc—man-days	11,678

SAFETY AND EDUCATION

Responsibility for the safety program during the fiscal year 1939 was placed upon the regional graziers and the camp supervisory personnel, because of the shortage of personnel qualified for this special kind of work. Despite this fact, an extremely good record has been attained by the Division in both safety and education endeavors. The Division has consistently remained among the top three or four Government agencies in the matter of the least number of accidents. For the first 5 months of 1939 there were but 138 lost-time accidents. Considering that there were 1,096,590 man-days worked, the percent of accidents per 10,000 man-days was but 1.25.

The C. C. C. unit is vigilant and aggressive in its educational program in the various camps. The enrollees are given every oppor-

tunity to learn to operate the machinery used on the work projects, and, through the daily work in connection with classroom instruction, many skilled workers have been developed from completely untrained men. The effectiveness of the education and training on the job program of these C. C. C. camps may be judged from the fact that much of the difficult construction has been done under the supervision of foremen who were formerly enrollees.

In addition to this fact, a total of 63 enrollees were discharged during April, May, and June to accept outside employment. Twenty-nine enrollees received positions as a direct result of the training they had received in camp.

WILDLIFE

The appointment of wildlife representatives on the advisory boards has brought about a clearer understanding between the stockmen and the State and National wildlife agencies in the matter of use and preservation of the natural resources. The cooperative study of the wildlife situation resulted in the following steps in furtherance of the natural wildlife resources in the districts:

1. Vigorous enforcement of all game laws within the respective grazing districts.
2. A practical means for redistribution of big game in the so-called critical big-game areas to prevent starvation which is the natural result of excessive concentration.
3. Controlled hunting so that surplus wildlife may be removed systematically in such areas where the demand for forage exceeds the safe margin of supply.
4. Control of predatory animals.
5. The development and improvement of all necessary natural watering places to be used by domestic livestock and big-game animals jointly where practicable.
6. The fencing of selected water holes as an aid to the protection of upland game birds.
7. The piping of water from certain sources to a reasonable distance in order that game birds may have a suitable natural cover, amply protected, as nesting grounds.
8. Encouragement and protection of the propagation of migratory upland wild fowl.

Definite projects in selected localities for studying the needs and initiating remedies for balanced distribution and use of ranges by selected species of big game were outlined during the year.

The program for the transplanting of beaver that was initiated in Idaho in 1937 was enlarged in that State and initiated in two other States. This work is carried on through the cooperation of the Division of Grazing with the respective State game commissions, the Forest Service, and the Biological Survey. About 420 beaver were transplanted under this program in Idaho during the year. Under the plan, the beaver are taken from canals and ditches or from streams where their food supply has become diminished and transplanted to small streams on the public domain. In their new habitat, they per-

form valuable conservation work by checking stream run-off and at the same time building rapidly the State's beaver population.

The establishment in January 1939 of the Kofa and Cabeza Prieta Game Range in Arizona Grazing District No. 3 brought the total area of game ranges in grazing districts to about 5,000,000 acres.

Under the game-range plan the public lands are set aside for the joint use of wildlife and the grazing of domestic livestock with the primary right given to a specified number and species of wildlife.

LAND CLASSIFICATION

Rigid standards of classification in accordance with section 7 of the Taylor Grazing Act have been adopted and are being adhered to by the Division in its action on homestead applications in order to prevent the disposal of public lands which have no permanent value for farming purposes. Out of a total of 357 homestead applications for land in the Western States since the passage of the Taylor Grazing Act, only 19 have been found valuable chiefly for farming.

The Division also makes appropriate recommendations on applications for land within grazing districts under the exchange, sale, and lease provisions of the act.

The recommendations for designations of land applied for under the enlarged and stock-raising homestead acts and determination of the value of watering places for public purposes, together with the preparation of appropriate orders, are other functions of the Division.

At the beginning of the present fiscal year there were 697 cases pending under sections 7, 8, 14, and 15. During the year, 643 cases were received, making a total of 1,331 cases to be acted upon. Of this number 826 were disposed of by appropriate action, leaving 505 cases pending at the end of the fiscal year. Forty-two cases under the enlarged and stock-raising homestead acts were acted upon, and on June 30 there were 22 cases pending action by the Division; 160 acres were designated under the enlarged homestead act in one State, increasing the total acreage so designated to 268,471,905 acres; 2,748 acres of land were designated under the stock-raising homestead act in 8 States, increasing the outstanding area to 102,455,810 acres. During the fiscal year, 4,720 acres in 8 States were included in water reserves, and 2,430 acres in 9 States were excluded from such reserves, increasing the gross public water reserve area in 12 States to 513,673 acres.

RANGE SURVEYS

The main function of the range-surveys organization consists of the collection and recording of information that will enable administrative officers of the Division to bring about conservation and orderly use of the Federal range and stabilization of the livestock

industry. The activities included: (1) The gathering, analyzing, selection, and presentation of pertinent material already existing which concerns the public-range area to be studied; (2) securing historical data on past and present livestock use of the area; (3) determination of the extent, character, proper season of use, forage producing capacity, and suitable rate of stocking of the public range; (4) determination of the qualifications of livestock operators who use or desire to use the public range through the examination and rating of the base properties, both land and water, owned or controlled by those claiming dependence on the use of the public range; (5) furnishing such accumulated information to the administrative force as fast as it becomes available in order to form a factual basis for administrative action in the selection of those entitled to share in the use of the range; and (6) development of essential data and preparation of maps to be used in range-management plans and correlation of proper land-use principles involving all types of ownership.

. At the end of the fiscal year, 3,257 of the 12,386 townships in grazing districts had been surveyed; status had been completed in 4,052 of the 13,349 master township plats involved; 162 of the 537 status maps had been prepared; 382 of the 537 base maps were drafted; and 10,248 of the 21,698 dependent properties had been appraised.

The objective to complete the survey of at least one district in each region during the year was realized in all regions except Utah, Nevada-California, Idaho, and Wyoming. In these regions the work is continuing with expectation of early completion.

The work of studying range plants progressed rapidly in the past year. Herbaria have now been developed in all regional offices. They average about 1,000 specimens each, with a fair representation of the important local grazing plants.

The cooperative range and ranch study, looking to the proper basis for determining Federal range adjudications and stable range and ranch use based on forage and economic factors in Nevada Grazing District No. 1, progressed very satisfactorily during the year. During this fiscal year, 6,388,590 acres of range in this district were surveyed.

Observations at the Squaw Butte Range Livestock Experiment Station in Oregon continued to emphasize the need for specific knowledge concerning optimum use of our desert and semidesert ranges. The methods used are simple and practical. A definite number of animals are kept on a definite pasture for a definite period and the before and after conditions of the forage are recorded. Results obtained are a guide to the proper stocking of similar areas. Some of the results already of recognized value are: (1) Conservation value and practicability of pasture rotation; (2) Improved grass cover by

systematic removal of sagebrush; (3) Value of properly distributed stock-water reservoirs; (4) Actual test data on maximum distance cattle should travel to water; and (5) Exclusion of the predator hazard. Livestock management is being studied in connection with the grazing research.

UTILIZATION RECORDS

During the past year, refinements and further development of a system of making utilization checks, have been made. A uniform method of describing the several classes of under, proper, and over use, and of recording and tabulating observations on utilization and records of actual use, was developed.

The method, which is called "primary forage plant method," is based on the plan of recording at the close of a grazing season specific information about each of the main forage plants, which carry the principal load of grazing use on a range area. Information concerning soil conditions, erosion, and other factors which influence the grazing use made, are considered and a conclusion reached which assigns the area under observation to one of nine described classes of degree of use. A sufficient number of such observations are made within each administrative unit to afford a picture of what is happening to the whole area under the existing conditions of use. Subsequent examinations, year after year, for comparative purposes in the same approximate locations, will give definite information as to the trend of range conditions. The locations at which the observations are taken are platted on a map to permit return for subsequent examinations and also to show diagrammatically the portions of the unit which are subjected to different degrees of grazing use. After the conclusions reached for the several observation locations within a unit have been summarized into a consolidated report for the unit, the findings are compared with data on the actual use made on that unit by livestock during the preceding grazing season. From these results, significant carrying capacity figures may be determined for the unit after several years' observations have been made.

The particular objectives of the method used are to start a definite record of range conditions in all grazing districts. This will provide specific information in the form of records used, uniform terms to describe the conditions observed, and give definite backing in record form for recommendations for range management.

RIO GRANDE BOARD

During the year the Division continued its activities in the joint study of the land-use problems of the Upper Rio Grande watershed. This study, sponsored by the Departments of Interior and Agricul-

ture, was initiated in 1937 by representatives of the Division of Grazing, General Land Office, and Office of Indian Affairs in the Department of Interior, and representatives of the Soil Conservation Service, Bureau of Agricultural Economics, and Forest Service in the Department of Agriculture. By agreement that year, the two Secretaries set up the Interdepartmental Rio Grande Committee to devise ways and means for improving the social and economic conditions of the native-rural population of the Upper Rio Grande Valley based on the possibility of reestablishing these people on the land which was their ancestral home.

The committee submitted a preliminary report in August 1937 outlining a plan for further study of the problem with the view of coordinating the procedure of the various Federal agencies for the restoration of the soil and water resources that play the dominant part in the support of the dependent population.

This resulted in the designation of the Interdepartmental Rio Grande Board composed of seven members—one each from the agencies mentioned and one from the Bureau of Reclamation.

During the fiscal year 1939 this board crystallized the former recommendation into a definite plan for shaping the land-use pattern into one that would give primary consideration in certain units of the area to fostering the benefit of the native rural population. About 200,000 of these people inhabit the area, usually the poorer areas, and derive their livelihood from four sources: (1) irrigated agricultural land, (2) livestock, (3) wage work, and (4) emergency relief, direct and through work projects. .

With that in view the board solicited and obtained the cooperation of the State planning boards and other public and private interests to bring about needed adjustments in land use.

SUMMARY

The Division of Grazing operated on a regular appropriation of $650,000 and collected $833,385.27 from grazing fees.

High lights of activities and accomplishments in the various regions included the following:

UTAH REGION 2

The Utah region accommodates a larger number of livestock (2,600,000 head) and deals with more licensees (5,190) than any other Federal range State. Its 24,000,000 acres of public land are practically all included in the eight grazing districts established in 1935. The number of livestock licensed during the fiscal year 1939 represents a decrease of about 80,000 head during the four years of record.

Major Accomplishments

Subdivision of the 127 major range units into 361 smaller group and community range allotments.

Amicable settlement by adjustment in the field of most of the 45 appeals that were filed.

Collected delinquent grazing fees, which amount to approximately $160,000 annually, to within 1 percent of the total assessed.

Closed 56 of the 74 trespass cases through approval of voluntary propositions of settlement.

Added five new C. C. C. camps.

Developed practical methods of reseeding depleted ranges.

Opened new territory to use and management by the construction of truck trails.

Cooperated with the State Fish and Game Department in obtaining an official estimate of big game animals grazing in the districts.

Adjusted livestock grazing in selected areas to improve range conditions for the conservation of wildlife. Established protective areas around certain springs and reservoirs to facilitate nesting for upland game birds.

Perfected the communication system between regional headquarters and C. C. C. camps by means of short-wave radio sets.

Cooperated with Federal and State agencies in the prevention and suppression of range fires.

Treated 200,000 acres of Federal range infested with rodents, using 17,000 pounds of bait.

Cleared 494 miles of snow-bound trails to enable stockmen to reach stranded stock with feed.

Completed field examination of 365 dependent properties, involving 730,453 acres of land, and conducted range surveys covering 848,619 acres of Federal range.

NEVADA-CALIFORNIA REGION 3

The Nevada-California region embraces seven grazing districts with a total area of 37,679,221 acres of public land. During the year 2,479 licenses were issued to graze 386,785 cattle, 18,258 horses, 1,494,710 sheep, and 2,437 goats.

Major Accomplishments

Installed district offices in six grazing districts, resulting in a more efficient patrol and administration of the resources.

Expanded the grazing control program by the addition of 450,000 acres to Nevada Grazing District No. 4.

Completed range surveys on 6,388,590 acres of land. Completed landownership checks on 2,060 townships.

Conducted a reconnaissance study of the Meadow Valley Wash for inaugurating erosion control activities and installed control structures in the main tributaries of that drainage.

Added 10 C. C. C. camps, bringing the total operating in the region to 19 camps.

Eradicated poisonous weeds on 13,191 acres and Mormon crickets and grasshoppers on 16,186 acres.

Completed a preliminary count of wildlife inhabiting the grazing districts, finding the principal species to include 25,500 deer, 11,000 antelope, and 400 bighorn mountain sheep.

OREGON REGION 4

The 21,000,000-acre area of Oregon's seven grazing districts includes 11,298,981 acres of Federal range. During the year, the Federal and non-Federal lands in the districts were welded further into a closely knit land-use pattern through cooperation with the owners and operators of the private, State, and county lands involved.

Major Accomplishments

Improved communication between the C. C. C. camps and headquarters by the installation of radio sets.

Completed range surveys in Oregon Grazing Districts Nos. 1 and 7 and prepared these districts for term permits.

Inaugurated a program for transplanting beaver to small streams in the grazing districts.

Eradicated Mormon crickets from the most critical sections of an 800,000-acre cricket-infested area.

Participated in suppression and presuppression of range fires, involving large areas of Federal range.

Conducted intensive erosion-control work in a 30,000-acre area.

Developed cover-protective areas around springs suitable for the protection of game birds.

Eliminated about 1,000 unclaimed wild horses from the Federal range in southeastern Oregon.

Installed four new C. C. C. camps during the year.

Completed the checking of land status records for the region, involving 1,026 townships, and surveyed 552,960 acres of Federal range.

IDAHO REGION 5

The four grazing districts in Idaho blanket the southern part of the State on either side of Snake River, embracing a gross area of approximately 22,000,000 acres, of which 11,644,745 acres are Fed-

eral range. Idaho ranks second among the regions in the number of licensees. During the year 4,000 licenses were issued to graze 1,952,222 head of stock. Seventy percent of the sheep and 35 percent of the range cattle and horses owned in Idaho use Federal range during some part of the year.

Major Accomplishments

Conducted a wildlife reconnaissance survey showing the following game animals and birds in the districts: 15,875 sage hens, 8,152 grouse, 10,940 deer, 855 elk, 775 mountain sheep, 725 mountain goats, and 6,956 antelope.

Posted fire-prevention signs and prepared fire-plan maps for the entire region.

Added eight new C. C. C. camps during the year.

Engaged in fire presuppression and suppression work on 39,150 acres of Federal range, constructing 200 miles of fire guards and fire breaks.

Transplanted 129 beaver to small streams of the Federal range.

Treated 241,775 acres for rodent control, 138,000 acres for the eradication of jack rabbits, and 6,700 acres for insect control.

Rid the range of 497 predatory animals.

Laid out and posted 128 miles of stock driveway.

MONTANA REGION 6

Five C. C. C. camps were installed in Montana grazing districts during the year. Montana ranges recovered substantially from the severe drought of 1933 to 1936. Intensive studies were made to determine the injurious effects of the drought on important forage species. The field work involving the gathering of all essential data for term permits was completed in Montana Grazing District No. 4.

NEW MEXICO REGION 7

Three new district offices were set up at Deming, Alamogordo, and Roswell, respectively. Seasonal and related conditions that influence the stock business caused a reduction of range use in the region from 858,024 head of livestock on April 30 to 777,125 head on June 30.

Preliminary range surveys were made on 5,552,640 acres during the year. Utilization studies were made and detailed information was assembled for New Mexico Grazing District No. 5, placing this district in readiness for transition from temporary licenses to term permits.

The 80-mile Magdalena stock driveway, accommodating 25,000 cattle and 50,000 sheep annually, was fenced during the year. Due

to control afforded by this fenced driveway, forage within the driveway showed a marked improvement over that on adjoining ranges. Two hundred sixty-six miles of miscellaneous stock-driveway boundary were fenced and 35 miles of stock trails constructed.

Approximately 439,761 acres of land were treated for extermination of rodents. The eradication of poisonous weeds was undertaken on 4,093 acres.

Thirty-one reservoirs were constructed, having a total capacity of 17,464 acre-feet, directly benefiting approximately 75,000 acres of Federal range. Small erosion-control projects included the construction of 585 check dams.

COLORADO REGION 8

Colorado Grazing District No. 6 was placed on a term-permit basis during the year upon the completion of the range survey in August 1938. Sixteen townships (368,640 acres) were surveyed during the year.

An agreement was reached during the year with the Colorado Fish and Game Commission whereby 240 acres of Federal range were set aside as a game-bird refuge.

Three new C. C. C. camps were installed in the region during the year.

A deer and beaver census was conducted in Grazing District No. 1. A comprehensive wildlife-cooperative program was inaugurated, looking to harmonious resource management in the interest of both livestock and wildlife.

Principal accomplishments in the range improvement program included the construction of 15 bridges, 13 diversion dams, 2,651 rods of fence, 1,450 feet of open ditches, 81 miles of truck trails, 74 miles of stock driveway. Also, 4,709 acres were treated for the eradication of poisonous weeds and 256,870 acres were treated for rodent extermination.

ARIZONA REGION 9

An additional 3,946,767 acres of public land were brought under the program in Arizona during the year by the establishment of Arizona Grazing District No. 3 on July 14, 1938. The gross area of Arizona's grazing districts is 15,179,000 acres of which 9,375,110 acres are public land. Licenses for grazing domestic livestock in this new district were first issued on January 1, 1939. On January 25, 1939, the Kofa and Cabeza Prieta Game Range in Arizona Grazing District No. 3 was established.

A forward step in the program was the subdivision of the Arizona strip (Arizona Grazing District No. 1) into individual and group allotments.

Federal range aggregating 921,600 acres was surveyed for carrying capacity during the year, and 64 individual ranches were examined for rating grazing privileges on the public lands.

Eighteen base maps were compiled, covering a territory of 20,736 square miles, and land status records were completed on 161 townships.

Five hundred ninety-one licenses were issued to graze 54,759 cattle, 2,259 horses, 119,107 sheep, and 32,382 goats.

WYOMING REGION 10

Wyoming's five grazing districts cover a gross area of 21,735,700 acres, of which 12,996,801 acres are public land. Licenses were issued to 1,478 applicants to graze 152,728 cattle, 14,104 horses, 1,444,840 sheep, and 254 goats. This represents an increase of 38,716 livestock and 22 licensees over the previous year. The number of sheep was increased by 48,807 head, and the number of other livestock was decreased by 10,091 head. The total range use was actually reduced due to the shorter time the animals were allowed to graze the public land.

Six new C. C. C. camps were established during the year.

DIVISION OF TERRITORIES AND ISLAND POSSESSIONS

Ernest Gruening, *Director*

THE Division of Territories and Island Possessions has continued its rapid expansion of duties and responsibilities during the fiscal year 1939. Under the President's Reorganization Plan No. 2, which became effective July 1, 1939, the personnel was more than doubled by the transfer of the Bureau of Insular Affairs from the War Department to the Division, thus bringing within its jurisdiction the Federal affairs pertaining to the Philippine Islands. Although the actual transfer did not become effective until the beginning of the fiscal year 1940, considerable preliminary planning was necessary during the two months which elapsed between the date of the issuance of the reorganization plan and the date of the actual transfer.

Early in February 1939 interest was aroused in various Government Departments in favor of an expedition to the Antarctic regions for the purpose of establishing sovereignty in the name of the United States to those areas which had been explored previously and claimed as a result of the Ellsworth and Byrd expeditions. The sum of $10,000 was appropriated in the Second Deficiency Appropriation Act, Fiscal Year 1939, approved May 2, 1939, for initial expenses of this undertaking. Later in the Urgent Deficiency Appropriation Act of 1939, the additional sum of $340,000 was appropriated for the purpose of outfitting and equipping the expedition. Although the proposed expedition was later designated as the United States Antarctic Service, whose policies were to be determined by a Board consisting of the Director of the Division of Territories, representatives of the Navy Department, United States Coast Guard, and the Department of State, with Rear Admiral Richard E. Byrd, United States Navy, being designated as the commanding officer of the expedition, the responsibility for its organization devolved largely upon the Division of Territories of the Department of the Interior.

In September 1938 the stock of the Alaska Rural Rehabilitation Corporation, which at that time was held in pledge by the Honorable Harry L. Hopkins, then Administrator of the Works Progress Administration, was transferred to the Secretary of the Interior, and the Federal supervision of the Matanuska Colony program was assigned

THE WORK OF THE DIVISION OF TERRITORIES AND ISLAND POSSESSIONS REACHES FROM ALASKA TO THE TROPICS.

Upper: Field of cabbage on one of the farms of the Matanuska Colony, Alaska.
Lower: Part of the harbor at St. Thomas, tourist center in the Virgin Islands.

to the Division of Territories and Island Possessions. There are at the present time approximately 142 families in the Colony who appear to be satisfied with their present status and it is believed most of them will continue to reside in the Colony.

During the year the Division continued its administrative functions of coordinating and supervising the activities under its jurisdiction, which includes the governments of Alaska, Hawaii, Puerto Rico, and the Virgin Islands; also the Alaska Railroad, Alaska Road Commission, Alaska insane patients, the Consolidated Purchasing and Shipping Unit at Seattle, the economic and social program of the Virgin Islands Company and the colonization projects on Jarvis, Baker, Howland, Canton, and Enderbury Islands in the Pacific Ocean.

On April 13, 1939, a contract was entered into between the Department of the Interior and the Pan American Airways, Inc., whereby certain areas on Canton Island were leased by the Federal Government to Pan American Airways for use as an intermediate station in connection with its commercial trans-Pacific transport service between California and New Zealand. This contractual arrangement was ratified by Great Britain, which country also claims sovereignty and reserves certain rights and privileges to use the Pan American facilities for a period of 50 years.

THE TERRITORY OF ALASKA

The Division took an active part in the affairs of the Territory of Alaska during the fiscal year 1939 in presenting the budget requirements of the Office of the Governor of Alaska, the Alaska Railroad, the Alaska Road Commission, and for the care of the legally adjudged insane of Alaska as well as in supervising the activities of the Seattle Consolidated Purchasing and Shipping Office and the affairs of the Matanuska Colony. The Division also cooperated with the several branches of the Interior Department, of other Departments and agencies of the Government having activities in Alaska in determining matters of policy and beneficial legislation affecting the Territory.

Important legislation passed during the Seventy-sixth Congress pertaining to Alaska included an act granting authority to the Postmaster General to contract for steamers and other power-boat service from Seward to the Bristol Bay area in order to secure a safe and sea-worthy vessel of sufficient size to provide adequate space for mail, passengers and freight; a House resolution authorizing an investigation of the fisheries of Alaska; substantial steps in the program for the defense of Alaska including authorization and appropriation for construction of naval and other air bases; as well as an appropriation

to provide for the purchase of reindeer for the purpose of establishing a more complete and self-sustaining economy for the natives of the Territory.

During the fiscal year 1939, the Alaska Railroad operated continuous transportation service between Seward and Fairbanks, a distance of 407.3 miles, and on branch lines totaling 30.5 miles into the Matanuska and Nenana coal fields. The passenger train schedule in effect during the summer of 1938 provided for three round-trips each week between Seward and Fairbanks, while the supplementary service out of Seward to Anchorage and Palmer, and out of Fairbanks to Nenana and Mt. McKinley National Park was operated in conjunction with the arrival of passenger steamers at Seward and of Yukon River steamers at Nenana. A reduction in passenger train service was made on September 9 to one round-trip weekly, the schedule continuing throughout the winter until June 28, 1939, at which time the summer schedule was again adopted. Extra passenger trains were operated in addition to the scheduled service when required to furnish special transportation, or to furnish connections with steamers arriving at Seward from Seattle. Mixed train service between the Anchorage and Matanuska branch line points was operated variously, depending upon the coal to be moved. Freight train service between Seward and Fairbanks varied from weekly to semi-weekly depending upon steamer schedules at Seward, and the volume of traffic. Extra freight trains also were operated when required. River service on the Tanana and Yukon rivers was carried on from the middle of May to the first of October. A regular trip by river steamer was made every two weeks between Nenana and Marshall.

Although the railroad was operated at a deficit of $19,830.85 for the fiscal year 1939, the financial results as a whole were considered encouraging. The revenues of the railroad, both for freight and passenger service, showed a considerable increase over the revenue for 1938. The deficit was caused by an increase in the cost of operation due to wage increases, and the extension of leave privileges to practically all employees of the Alaska Railroad.

Rail-line passengers numbered 27,436 with revenues of $259,452.20. Rail-line freight amounted to 157,904 tons, of which 104,066 tons consisted of coal. Operating revenue amounted to $2,353,927.49 and operating expenses were $2,371.490.42.

During the summer of 1938 the sum of $168,400 was provided by the Works Progress Administration for employment of relief labor in ballasting and surfacing the track and replacing deteriorated ties. This amount was fully expended for that purpose during the 1938 season. A subsequent allotment of $71,000 was made available in the spring of 1939, which provided employment for approximately 350 men from the fifteenth of May to the thirtieth of June.

On October 23, 1938, a fire originating in an outfit car destroyed a warehouse at Anchorage with the railroad stock of materials, supplies, equipment, and commissary; also a recently completed cold storage plant and its contents. A deficiency appropriation in the amount of $200,000 was obtained, which included $45,000 for the construction of a new warehouse, the balance to be used for the replacement of destroyed supplies and equipment.

A new hotel constructed with Public Works funds at the entrance to Mount McKinley National Park was placed in operation June 1, 1939, and will continue in use during each tourist season. The hotel will provide accommodations for tourists traveling on the Alaska Railroad who may desire to stop over to visit Mount McKinley National Park.

The Alaska Road Commission is charged with the construction and maintenance of roads, bridges, and trails in Alaska outside National Forests. The construction and maintenance of air fields, telephone lines, and shelter cabins are also undertaken for the Territory.

Funds are made available by Congressional appropriation from the Alaska fund, and from contributions by the Territory and others. A total expenditure from all sources by the Commission during the year was $828,598.

The road system in Alaska maintained by the Road Commission consists of approximately 2,100 miles of roads and tram roads; 1,500 miles of sled roads and 7,000 miles of trail. The only funds available for construction work during the year were contributed by the Territory, municipalities, and other sources.

The legally adjudged insane of Alaska are cared for under contract negotiated by the Secretary of the Interior with the Sanitarium Co. of Portland, Oreg., which has provided care and treatment for the insane patients from Alaska since 1904. The operations of this institution are under the immediate supervision of a psychiatric supervisor employed by the Department. The present contract became effective January 15, 1938, for a period of five years at the rate of $648 per patient, per annum. At the beginning of the fiscal year 312 patients were receiving treatment. During the year 56 patients were admitted, while those deceased, discharged, or transferred numbered 63, leaving 305 persons in the institution on June 30, 1939.

THE VIRGIN ISLANDS

Developments during the past fiscal year have sharply revealed the fundamental differences in the basic economy of the two municipalities of the Virgin Islands.

The sugar business, the basic industry of the island of St. Croix, suffered another severe set-back caused by a drought in 1939 fol-

lowing the drought of the previous year, which has again gravely affected agricultural activities. Both the sugar and cattle businesses have suffered heavy losses which have been reflected in the fiscal affairs of the municipality.

St. Thomas, on the other hand, continued to show improvement due to substantial increases in the shipping business and in the tourist trade. Eight hundred and fifty ships with a total tonnage of 3,682,121 called at this port during 1939 as compared with 814 ships with a total tonnage of 3,239,975 in 1938. The transhipment of bauxite has continued, bringing 33 ships to the port for discharging and loading. Twenty-four cruise ships with 11,715 passengers called at St. Thomas as compared with 6,487 passengers from 13 ships in 1938. Ninety-five war vessels called at the port. Most of these were vessels of the United States Navy which conducted extensive maneuvers in the Caribbean area during the winter.

To improve the economic situation an effort was made to secure relief from discrimination against the Virgin Islands' sugar industry. A bill was introduced in Congress to authorize the return to the Virgin Islands Treasury of Internal Revenue taxes on articles imported from the islands into the United States; the repeal of the export tax of $6 per ton on sugar raised in St. Croix, and the granting of benefit payments to growers of sugar in the Virgin Islands. The urgency of the matter caused each of the municipalities to send official delegations to Washington who, together with the Governor and officials of the Department of the Interior, presented the Virgin Islands' case before a subcommittee of the Ways and Means Committee of the Congress. In spite of the fact that sugar grown in the Virgin Islands is the only sugar grown under the American flag which is subject to these handicaps, the bill failed to pass. If the bill had been in force in 1939, 338 small farmers who received an average of $24.947 per acre this year, a yield below the cost of production, would have received $36.547 per acre. On an average holding of 7 acres, this would have meant a gross income to them of $269.82, as against $174.82 actually received.

To safeguard the only available market (Puerto Rico) for Virgin Island cattle, a tick-eradication program was inaugurated under local laws closely modeled after Puerto Rican law. Restrictions imposed on the shipment of cattle and the severe drought, which has caused great loss of animals, have combined to endanger this industry, which is of second importance in each island.

Additional work-relief allocations were made, permitting the continuation of a road-improvement program which has made substantial progress. Steady progress has also been made in improving the sanitary facilities of the three towns in the Islands. A mattress-

making project in St. Thomas and sewing projects in both municipalities furnished employment to a considerable number of women, most of whom are heads of families. The success of the nursery-school program encourages its expansion in the new fiscal year.

The Farm Security Administration has established a field office in the Virgin Islands, through which loans to small farmers are being advanced. It is proposed to have this agency take over the administration of the various homestead projects in the islands.

Approximately 750 persons in St. Thomas are engaged in the production of goods for sale through the Virgin Islands Cooperatives. Sales of the three units—Handicraft Cooperatives, the Cabinet Makers Cooperatives, and the Farmers Cooperatives totaled $60,752.31 during the fiscal year.

The Legislative Assembly for the Virgin Islands enacted a uniform Electoral Law for the Islands, and a law to standardize leave of absence for Government employees.

The revenues of the municipality of St. Thomas and St. John again showed substantial increase over the previous year, while those of the municipality of St. Croix showed a very considerable decline. This decline was due in part to the decrease in revenue from the sugar business resulting from drought and also because the factories withheld shipments of the 1939 harvest in the hope that Congress would repeal the export tax on sugar.

THE VIRGIN ISLANDS CO.

The Virgin Islands Co. by a special ordinance enacted by the Colonial Council for the Municipality of St. Thomas and St. John was chartered as a Government-controlled corporation on April 16, 1934, to aid in the economic rehabilitation of the Island of St. Croix.

That the activities of the corporation cover a wide variety of endeavors is evidenced by the following: It grows and buys sugarcane for the manufacture of raw sugar and sells this sugar to United States refineries; it manufactures and sells light and heavy "Government House Rum" for sale in the United States, Hawaii, Alaska, and the Virgin Islands; it manufactures and sells a special distillate to the Angostura-Wuppermann Corporation in St. Thomas for the making of bitters; it has a poultry farm and sells chickens and eggs in St. Croix and St. Thomas; it crushes rock and sells this to the Government for the construction of St. Croix roads; it rents tractors, farm equipment, land, trucks, and other equipment to the people of St. Croix; it sells cane seed; it does general repair work at its machine shops; and it sells cattle and milk. It sells alcohol to the Government hospitals. It does business with the Federal homesteaders and the Federal Homestead Authority. It rents equipment

to the La Grange Sugar Factory, sells cane to and buys molasses from this company as occasions arise.

Raw sugar represents about 60 percent of St. Croix's exports and the sugar quota for the island established by the Sugar Act of 1937 amounts to only thirteen ten-thousandths of the United States consumption. Rum makes up about 35 percent of the island's exports, and this same rum is estimated to be less than 4 percent of the United States consumption. In other words, raw sugar and rum together represent close to 100 percent of the exports from St. Croix, and these same articles are almost unnoticed in the United States consumption.

The raw-sugar business is the only business to which people can look for employment, and the internal revenue on rum is the only income the municipal government (St. Croix and St. Thomas and St. John) might secure to balance its budget without continually and annually appealing to Congress for deficit appropriations as is the present practice.

The Virgin Islands Co. has in 4 years made the following important contributions to St. Croix economic rehabilitation:

1. Employed directly 1,000 persons, which is 20 percent of the island's laborers. This indirectly has given employment to about 15 percent more of the island's laborers.

2. Has improved the laborers' pay, housing, sanitation, provision gardens, and community centers.

3. Reestablished the bankrupt properties and put them to economic use to create commerce in sugar and rum and pay about $35,000 per year in taxes to the local government.

4. Furnished a steady market for 700 small growers and Federal Homesteaders with mill capacity to take care of more than four times as much cane as they can grow.

5. Reestablished a rum business which pays $136,000 per year in internal-revenue taxes.

6. Rents modern tractors and farm equipment and sells the best varieties of cane seed to the small grower.

7. Brought new manufacturing business to St. Thomas (Sarthe-St. Croix Co. and Angostura Wuppermann Corporation) by contract.

Although the figures for the fiscal year 1939 are not yet available, the progress of the Virgin Islands Co. in reestablishing a sugar- and sugarcane-products industry is indicated by the following analysis of sales:

Gross Sales and Miscellaneous Income for Year Ended June 30

	1935	1936	1937	1938
Raw sugar			$101,820.16	$195,335.60
Government House Rum	$954.81	$8,609.50	92,984.71	106,351.13
Special distillate			1,532.58	11,435.74
Tomatoes	170.79	2,624.12	4,979.65	
Other income	1,797.60	42,386.15	20,372.30	31,375.70
Total	2,923.20	53,619.77	221,689.40	344,498.17

The Island of St. Croix is the largest of the Virgin Islands group and its 15,000 inhabitants depend almost entirely upon the cultivation of sugarcane and the processing of raw sugar and rum for a livelihood. The cotton business was wiped out by the pink bollworm. Ventures in tomatoes, citrus fruits, sisal, tobacco, cocoa, coffee, and onions proved to be without economic success and were discontinued. However, the cattle business and the rum industry have survived and seemingly have permanent places in the economic structure. The 939 growers of sugarcane come under the restrictive provisions of the Sugar Act of 1937 which subject their sugar to the quota and processing taxes, but Congress did not extend the benefit-payment provisions of the Act as an offset. Unlike growers in Hawaii, Florida, Puerto Rico, Louisiana, and the other sugar areas, the St. Croix grower is the only one under the American flag so discriminated against. In addition, he pays an export tax of $6 per ton on all the raw sugar shipped to the United States and is the only American citizen required to pay a tax on goods for interstate commerce as the wage and hours legislation which was extended to the Virgin Islands defines these sugar shipments.

It is essential that remedial legislation be enacted by the Congress to (1) make it possible for the grower of sugarcane to earn a living by his own labor and gradually replace the hundreds who are now on the relief rolls, (2) make available to the treasury of the Virgin Islands the revenues from the Internal revenue taxes collected on articles of Virgin Islands manufacture so the island legislators for the Municipality of St. Croix and the Municipality of St. Thomas and St. John can, from the growth and products of their own communities, derive revenue for the costs of their schools, hospitals, institutions, sanitation and police, as other island possessions have been authorized to do, and at the same time end the unworkable system of municipal deficit appropriations which have been made annually by the Congress ever since the United States Government acquired the Virgin Islands in 1917.

PUERTO RICO

The finances of the Insular Government made a very satisfactory showing. Total revenues available during the year aggregated $58,203,348.39, while the expenditures amounted to $44,496,702.25, leaving a cash balance of $13,706,646.14 on June 30, 1939. Imports were valued at $82,724,182, of which $75,684,719 worth came from the continental United States. Exports were valued at $86,263,926, of which $84,560,006 worth were shipped to the continental United States.

The total receipts for the various municipal governments during the year were $11,594,155.10 and disbursements aggregated $12,068,-

733.67. The cash balance on June 30, 1939, was $3,825,656.38, as compared with $4,300,234.95 on July 1, 1938.

The Puerto Rico Lottery, established in 1934, made available during the fiscal year $475,270.99 to the Insular Government for the eradication of tuberculosis, and a similar amount to municipalities of the second and third class to be used exclusively in the service of health and public charity.

The number of visitors to Puerto Rico during the year, including Navy personnel, was 47,529. The total revenue derived during the year from the tourist business, including expenditures of approximately $400,000 by Navy personnel, is estimated at more than $1,100,000.

The potentialities of developing, in connection with the University of Puerto Rico, an inter-American university as a center for the exchange of American and Latin culture, had gratifying recognition in the visit to Puerto Rico this year of a Commission of noted educators, selected by the President to make a thorough study of the problem. The report of the Commission was favorable and outlined a tentative plan for procedure, which included the proposal for establishment of six graduate and research units.

The strategic importance of Puerto Rico for the defense of the Panama Canal, the South Atlantic, and Gulf States, and the trade routes of the Caribbean, has been recognized by the National Government. The Island recently was made a separate military department, the establishment of naval and military air bases and a submarine base has been authorized, and the number of troops is to be increased substantially. In this defense program, the people of Puerto Rico are cooperating loyally. Isla Grande, in San Juan Harbor, the estimated value of which is $10,000,000, has been ceded to the Federal Government for use as a naval air base. The dredging of San Juan Harbor has been virtually completed, at considerable expense to the Insular Government, and will provide a safe and convenient anchorage for heavy war craft. A large graving dock of the most modern type, which will be at the disposition of the Navy as well as of commercial vessels, also is under construction at San Juan.

Puerto Rican troops served with distinction in the World War. Many individuals were overseas with A. E. F. organizations, and two regiments from the island garrisoned the Panama Canal Zone throughout the period of hostilities. There are now many more applicants for enlistment in the Sixty-fifth Infantry and the Puerto Rican National Guard than there are vacancies. An increase in the authorized strength of the guard and the formation of aviation and coast defense units will be welcomed by the Puerto Rican people.

Benefits of sections 5 and 6 of the Social Security Act were extended to Puerto Rico by act approved August 10, 1939.

TRAINING FOR ALL IN PUERTO RICO.

Upper: Smiling pupils leaving Eleanor Roosevelt School, built by the Puerto Rico Reconstruction Administration.

Lower: The whole family practices new farming methods under PRRA Conservation program.

PUERTO RICO RECONSTRUCTION ADMINISTRATION

Miles H. Fairbanks, *Assistant Administrator*

IN 1935 the Puerto Rico Reconstruction Administration, made a part of the United States Government's vast relief program by President Roosevelt, was established to help the Puerto Rican help himself, to aid in the restoration of general employment, and to improve the standard of living for Puerto Rico's 2,000,000 American citizens.

The P. R. R. A. operates under the jurisdiction of the Department of the Interior with Secretary Ickes as Administrator. P. R. R. A. funds are derived from appropriations under the Emergency Relief Act. During the fiscal year just closed the P. R. R. A. obligated a total of $12,938,150.36. This was divided as follows: For the purposes of rural rehabilitation, $4,368,117.83; engineering $3,950,966.86; loans and assistance to farmers and cooperatives $1,919,179.57; rural electrification $1,051,662.85; forestation $333,763.83; social and medical service $284,801.86; food commodity distribution $179,931.82; housing management $99,733.46; administration $657,760.99, and miscellaneous $92,231.29. This left an unencumbered balance of $1,737,849 on June 30, 1939.

The work which has been done during the past four years by the P. R. R. A. cannot be referred to strictly as emergency relief. Because of the permanency of its work, future generations will benefit extensively from reconstruction accomplished by the P. R. R. A.

The reason for this is that behind the works of the P. R. R. A. stands the conclusion that the primary need for Puerto Ricans is not a direct dole-like service from the Federal Government, but a carefully developed economy, upon which in years to come the people can erect a stable trade and draw therefrom a measure of self-sufficiency.

The P. R. R. A. program has gone further than this. It has attempted to bring into the lives of Puerto Ricans who need it at least a minimum of medical aid and social service, and the beginnings of cultural development.

COORDINATED ACTIVITY

It has been fundamental with the present administration of the P. R. R. A. that it cooperate wherever possible with other Federal and Insular agencies in the solution of Puerto Rico's problems. There

has been direct cooperation in the Island's forestry program involving the United States Forestry Service, Insular Forestry Service, and P. R. R. A. Forestry Division; the P. R. R. A.'s rural electrification program has been for the express purpose of aiding the Insular Government in developing the Island's natural resources; the United States Department of Agriculture's Bureau of Animal Husbandry and the Insular Government have cooperated in the P. R. R. A.'s cattle-tick-eradication program; schools built by the P. R. R. A. have been designed and located in accordance with the program of the Insular Department of Education; roads, waterworks, public buildings, and other works have been projected only after deliberation with insular and municipal officials.

A series of conferences called by the Assistant Administrator of the P. R. R. A. in August 1938, and attended by representatives of various Federal and Insular Government agencies, resulted in effective measures.

As a result of these conferences, the Program of Coordinated Activity in connection with agricultural development was drafted and approved October 26. Those attending the conferences were the Insular Commissioner of Agriculture and Commerce, Director of the Insular Agricultural Extension Service, Director of the Insular Agricultural Experiment Station, Dean of the College of Agriculture and Mechanic Arts, Vocational Director of the Insular Department of Education, Director of the Puerto Rico Tobacco Institute, and the Director of the Puerto Rico Experiment Station of the United States Department of Agriculture.

As its part in this cooperative program the P. R. R. A. assigned from its rural rehabilitation funds the sum of $118,650 for furnishing personnel, equipment and materials to carry out the coordinated activities.

An excellent example of the cooperation inaugurated by the program is the P. R. R. A.'s aid to the subsistence planting project of the Insular Department of Agriculture and Commerce. P. R. R. A.'s Rural Rehabilitation Division provided $3,000 for the services of two supervisors and 18 inspectors to direct the subsistence planting project. This work is to be continued through the coming year. Various sugar mills and farmers donated 16,040 acres of land for development of this program, the objective of which is to enable needy and idle persons to obtain a plot of land upon which to grow subsistence crops.

In connection with the work of the Insular Agricultural Extension Service, an affiliate of the University of Puerto Rico, the P. R. R. A. has allotted funds for the appointment of 26 assistant agricultural agents to work under the Director of the Extension Service. They will assist in the development of 4–H Club work, soil conservation, commercial and subsistence crops, livestock and poultry, farm management and organization.

Home demonstration among resettlers has been expanded through the coordinated activities of the P. R. R. A. and the Insular Agricultural Extension Service. Thirteen home demonstration agents have been appointed. They give instruction in sewing, interior home improvement, exterior home beautification, home sanitation, handicraft, home accounts, vegetable gardening, livestock and poultry raising.

The work of five assistants in agricultural economics in developing the economic program of the Insular Agricultural Extension Service also has been made possible through the Program of Coordinated Activity, with money from the P. R. R. A.'s rural rehabilitation funds.

An assistant specialist in animal husbandry, devoting his activities to advising county agents with regard to poultry improvements, is a part of this program.

Cooperating with the Insular Agricultural Experiment Station, the P. R. R. A. has made possible personnel and equipment for the continuance of parasitological investigations.

In the search for substitute products in the coffee and tobacco regions, attention has been fixed upon the animal industry. The question of feed is paramount but, with P. R. R. A. aid, the Insular Agricultural Experiment Station is now experimenting with 22 grasses, the nutritional values of which are being tested at the School of Tropical Medicine.

For research projects on the pathology and physiology of the vanilla plant, conducted by the Department of Botany and Plant Pathology of the College of Agriculture, the P. R. R. A. has furnished the personnel and equipment. The P. R. R. A. has also furnished personnel to the Tobacco Institute of Puerto Rico for collecting certain statistical material with reference to that industry.

As a part of its cooperation with the Puerto Rico Agricultural Experiment Station of the United States Department of Agriculture, the P. R. R. A. has made possible further progress in the propagation of bamboo species believed to be industrially important to Puerto Rico. With P. R. R. A.-financed materials and labor, the Station has added 10 acres to the bamboo nursery beds and 30 additional species of bamboo were imported during the year.

Vanilla experiments at this Station were augmented with P. R. R. A. help in the Coordinated Program. Three additional acres of land in the Maricao Insular Forest have been cleared and prepared as experimental vanilla nurseries.

Work with perfume products also has been fostered by the P. R. R. A. The Station built a number of lath houses and provided them with photometers in order to study the effect of light intensity upon the oil-yielding lemon grass. Propagating material of lemon grass, ylang ylang, vetivert, and acacia farnesiana is now ready for distribution among island farmers.

Interesting accomplishments have been obtained with quinine plants at the Station. To the existing plantings at Maricao and Las Mesas, the P. R. R. A. made possible the addition of large seed beds during the year. The ample rainfall, good drainage, protection from the wind and the altitude (nearly 3,000 feet), provide excellent conditions for the production of quinine. In the line of medicinal plants, the Station is endeavoring to introduce coca into Puerto Rico.

Spice crops such as cloves, nutmeg, cinnamon and black pepper are in the preliminary stages of development. More than preliminary work has been done with Jamaica ginger, which is thriving in the Island and should prove a valuable cash crop.

COOPERATIVES

In an island where the swelling population depends almost entirely upon agriculture for a living, one of the biggest difficulties in the way of small-scale enterprise is the large corporation controlling large amounts of land and capital. One way for individuals to compete with large-scale operations is for groups of farmers and tradesmen to organize into cooperatives for the purpose of producing and marketing Puerto Rican products.

First and largest of these groups is the Lafayette Sugar Cooperative. It now has had two years of successful operation. The Lafayette central during the recent crop season produced from 222,436 tons of cane a total of 225,843 bags of sugar (250 pounds each), having an average yield of 12.794 pounds of sugar per 100 pounds of cane.

The leadership which Lafayette has shown in the matter of extracting valuable by-products from sugarcane is a striking example of the type of progress which is coming from Puerto Rico's cooperative groups of individuals.

Further progress in the P. R. R. A. sugar program was made when the organization of the Los Caños Sugar Cooperative was completed on March 10, 1939. The cooperative paid to the original owners, the Plazuela Sugar Co., for the mill and 42 acres surrounding the mill, a total of $619,000 through a loan made by the P. R. R. A. The members of the cooperative either lease or own the 8,000 acres of land in the vicinity of the central. The P. R. R. A.'s loan was for the purchase of the mill and immediately surrounding acreage only.

Although the P. R. R. A. is setting up no specific program for resettlement in the Los Caños community, as was the case in the organization of Lafayette, the articles of incorporation for Los Caños call for the setting aside of a certain sum of money for community benefit after operating and replacement expenses have been paid.

It is intended to improve substantially the Los Caños mill and property before the start of the next grinding season. These improvements will entail an expenditure on the part of the cooperative members, of approximately $200,000. During the crop season just ended Los Caños produced from 145,890 tons of cane 128,005 bags (250 pounds each) and 21,000 bags (100 pounds each) of raw sugar, having an average yield of 11.811 pounds of sugar per 100 pounds of cane. Proceeds for the crop year totaled $51,004.49 (depreciation not deducted).

Cooperative groups are successfully reviving old industries as well as stimulating new ones. The growing of cotton in Puerto Rico died out with the closing of a thread company ginnery several years ago. But in 1935 the Puerto Rico Marketing Association for Minor Crops provided a mill and marketing facilities, and was so quick to pick up the thread of the old industry that today the Island is growing more cotton than ever before and the Cooperative is handling all cotton grown.

The marketing of Puerto Rican wild oranges in the United States had been stopped by embargo because of the fruit fly until this year when the Arecibo Fruit Growers' Cooperative prepared to market the oranges in the form of canned juice. These are but two examples of the manner in which cooperative groups have been able to revive dying industries and, on a small scale, make them pay.

In the true cooperative the producer controls his own purchase of supplies, planting, production and marketing. Thereby he shortens considerably the route between producer and consumer. The hope of the P. R. R. A. in sponsoring these cooperatives is that by helping the people to do these things for themselves through collective action, more of the consumer's dollar will be secured for the producer.

The P. R. R. A. Cooperative Division now works with 13 of the 15 cooperatives on the island. Three of these were financed by F. E. R. A. funds, 3 by the Insular Department of Agriculture, and seven have been organized and financed by the P. R. R. A.

Among the 13 there are 8 handling farm products. These include 3 for vegetables, 2 for sugar, and 1 each for tobacco, cotton and fruit. Of the remaining 5, one purchases farm supplies and the others handle needlework, earthenware, string rugs and novelties.

The fruit growers' cooperative at Arecibo has built, with P. R. R. A. loans, a $52,000 cannery equipped with $34,000 worth of machinery, and are using $20,000 of P. R. R. A.-loaned money as working capital.

The purchasing cooperative, organized and financed by the P. R. R. A., bought more than 10,000 tons of fertilizer during the year for its members, among whom are all cooperatives using fertilizer. It is developing an excellent business in cattle feed. During the com-

ing year, it will add to its purchasing all the seed, crates, insecticides, and other supplies used by the P. R. R. A. vegetable cooperatives.

The manual arts cooperative is a P. R. R. A.-sponsored handcraft group which will market, through its own shop in San Juan, needlework, straw and wood products, and other art objects of shell and horn.

Among important plans for the coming year are those for the P. R. R. A.'s Castañer project of approximately 1,600 acres, which is being reorganized as three separate land cooperatives whose products will be marketed by a service cooperative. The manager of the latter will direct the cultivation of the land, the operation of the central service farm and the coffee-curing plant. Members of the land cooperatives will till the land collectively.

TABLE 1.—Cooperatives With Which the Division of Cooperatives of the PRRA is Working

Name	Financing agency	Year organized	Products	Members	Amount invested	Annual business
1. Cooperative Handcrafts, Inc., of Puerto Rico.[1]	F. E. R. A.	1936	Needlework	286	$184,296.41	$125,319.67
2. Primus Potteries Cooperative, Inc.[2]	F. E. R. A.	1938	Earthenware	42	29,529.86	
3. Puerto Rico Rug Cooperative, Inc.	F. E. R. A.	1938	String rugs	202	2,500.00	1,095.08
4. Puerto Rico Tobacco Marketing Association.	Insular government.	1934	Tobacco	2,170	35,400.00	763,521.06
5. Puerto Rico Marketing Association for Minor Crops.	do	1935	Cotton	525	12,775.00	64,587.18
6. Arecibo Fruit Growers Cooperative Association.	P. R. R. A.	1937	Fruit	85	106,000.00	15,545.00
7. Sociedad Agrícola Cooperativa de Puerto Rico.	P. R. R. A.	1938	Farm supplies	463	170,463.00	216,000.00
8. Cooperativa de Productores de Hortalizas de Jayuya, Inc.[4]	P. R. R. A.	1937	Vegetables	24		6,493.00
9. Asociación Cooperativa de Trabajadores en Artes Manuales.[3]	P. R. R. A.	1939	Handcraft		20,000.00	
10. Asociación Cooperativa de Productores de Vegetales de Puerto Rico.	Insular government.	1930	Vegetables	15	2,000.00	12,000.00
11. Asociación Azucarera Cooperativa Lafayette.	P. R. R. A.	1936	Sugar	454	4,976,434.71	2,043,634.48
12. Asociación Azucarera Cooperativa Los Caños.	P. R. R. A.	1939	Sugar	482	819,000.00	902,294.88
13. Cooperativa de Cosecheros de Vegetales de Rio Grande.[3 4]	P. R. R. A.	1939	Vegetables	23		
Total				4,771	6,858,398.98	4,150,490.35

[1] Cooperatives organized by Puerto Rico Self-Help Corporation with F. E. R. A. funds.
[2] Statistics not available.
[3] Not in production.
[4] Application for loan pending.

The Lafayette Sugar Cooperative is attempting to increase the growing of sugarcane despite quota restrictions. This is to be accomplished through the sale of sugarcane by-products, mainly butyl alcohol, for the manufacture of which a $500,000 plant has been built at Lafayette. This plant will extract the alcohol from sugarcane residue by a fermentation process developed in Puerto Rico. As the

marketing of solvents increases, it is planned to increase the production of the plant. A number of solvents which may be obtained from sugarcane residue, namely acetone and glycerin, would be exceptionally valuable in case of war.

Coconut growers on the island, since coconuts can no longer be marketed as such, have petitioned the Insular Department of Agriculture, the Insular Agricultural Experiment Station and the P. R. R. A. to organize a cooperative for the processing of coconuts. One of the uses of the coconut husk is in the manufacture of gas masks.

The fishermen of Puerto Rico have requested the organization of a cooperative for the fishing industry. None of the individual fishermen has refrigeration facilities or marketing channels, and hence is placed more or less at the mercy of a few speculators. In the meantime the Island imports thousands of pounds of dried and frozen fish.

The growing of vanilla in Puerto Rico has reached such an advanced state, largely because of encouragement given growers by the P. R. R. A. through the construction of its pilot vanilla curing plant at Castañer, that the growers are asking for a cooperative to cure and market their product. It is planned to organize this group during the coming year.

A small vegetable growers' cooperative was set up some time ago by the Insular Agricultural Experiment Station. It is at present selling vegetables in New York and local markets. At the request of its members, it is now being reorganized by the P. R. R. A. Division of Cooperatives.

It will be noted that the P. R. R. A. cooperative work has spread over a large field. It was believed that only through this method of research could the true value of various types of cooperatives be determined. Future progress of the cooperative movement will depend largely upon the initiative and training of cooperative members. To add to that training and to encourage that initiative is the purpose of the P. R. R. A.'s cooperative division during the coming year.

RURAL REHABILITATION

Cornerstone of the P. R. R. A. program is its rural rehabilitation. The division handling this group of projects has been subdivided into sections supervising land utilization, soil conservation, agronomy and marketing, tick eradication and medical service.

LAND UTILIZATION

These sections are improving the knowledge of resettlers along the lines of modern agricultural practices; providing them with good seed, purebred swine, goats, and poultry; cooperating in the har-

vesting, classification, and marketing of their crops; and establishing necessary demonstrations of approved methods.

The central service farm operated in each large resettlement project is the center of activities. It serves as a practical school of agriculture for the resettlers as well as a center of distribution for seed and animals. In accordance with the program of coordinated activity established this year by the P. R. R. A. and other Insular and Federal agencies, benefits derived from the operation of central service farms also have been made available to farmers in general.

The land utilization sections supervise resettlers in the coffee, tobacco and fruit regions, where a total of 4,674 parcels of land has been acquired by the P. R. R. A. and upon which 667 houses, built by the P. R. R. A., are now occupied by resettlers.

In the eight large rural resettlement projects 2,598 houses have already been built, of which 2,209 are now occupied. A total of 541 houses was under construction at the end of the fiscal year and it is planned to build 2,000 additional resettlers' homes with the new funds assigned for the 1939–40 fiscal year.

Various utility improvements have been made for resettlers with an emphasis placed on waterworks. Water systems have been installed at seven of the resettlement projects and a number of deep wells have been drilled in several of the smaller projects.

The vanilla unit of the land utilization sections, cooperating with interested independent farmers, has secured a total planting of more than 300 acres of vanilla throughout the Island during the past year.

The P. R. R. A. has constructed a model pilot curing plant at Castañer Farm, to which the farmers have already sent 573 pounds of green vanilla beans. It is expected that during the coming year the plant will receive a ton or more of green beans as the growing of vanilla, a slow process, gets under way.

The planting of onions has been fostered by the P. R. R. A. among resettlers during the past year and 86 acres were successfully planted, harvested and locally marketed.

Plans have been made for setting out 110 acres of onions during the coming year. Onions have never been produced in Puerto Rico on a large enough scale to be called a cash crop but have been imported originally from Spain and more recently from the United States in large quantities.

SOIL CONSERVATION

In addition to the four areas established in 1938 on Federal-owned land, the demonstration of soil conservation and land utilization was inaugurated in the areas of Arroyo, Trujillo Alto and the

island of Vieques, where there are 75 P. R. R. A. resettlement farms. As a result of this expansion, a larger number of farmers received instructions and demonstrations. Two intensive research projects were maintained during the year, one in cooperation with the United States Agricultural Experiment Station at Mayaguez and the other with the Insular Agricultural Experiment Station at Rio Piedras. Employment was given to approximately 3,000 laborers and technical advisers during the year with the result that about 80 percent of the total allotment for soil conservation was spent for relief labor.

Proposed work in 1939–40 will be more extensive than in the past year as plans have been outlined, in cooperation with the Insular Agricultural Extension Service and other allied agencies, to carry out on lands now occupied by needy farmers the same type of program being followed on Federal property.

LIVESTOCK AND POULTRY

Aim of the P. R. R. A. poultry project has been to introduce a new breed of birds which would feather uniformly, mature rapidly, and begin to lay eggs or develop into broilers in the least possible time.

The main poultry breeding plant at La Plata, designed to house about 1,400 layers and pullets and 210 roosters, has an output of approximately 30,000 chicks per year, consists of 25 breeding pens, and 2 brooder houses, 1 office and a 2,663-egg incubator.

Since July 1937, the poultry project has produced 26,610 baby chicks, of which 8,800 were distributed to resettlers, 7,769 were sold to the public at broiler age, 176 were loaned to the Insular Government.

SWINE

The P. R. R. A. began its swine project in July 1937, in order to provide the P. R. R. A. resettlers with early maturity gilts and to foster the hog industry of the Island by supplanting the mongrel razorback native breed with a more economical animal. At the same time boars are kept at stud so that by cross-breeding there may be a systematic improvement of the common hog. In the P. R. R. A. swine herds at Castañer, La Plata, Lafayette, Marini, San Just, Vieques, Zalduondo, in the various vocational schools and at the University of Puerto Rico's Agricultural Extension Service farm, there are a total of 1,115 swine of which 785 are suckling pigs. The average farrow of the entire P. R. R. A. swine project has been approximately 9 pigs. During the past year 298 gilts were distributed among resettlers and 442 males were sold to farmers outside the jurisdiction of the P. R. R. A.

185642—40——25

TICK ERADICATION

The purpose of the cattle tick eradication program, which has been developed by the P. R. R. A. with the Insular Department of Agriculture and Commerce and the Bureau of Animal Husbandry of the United States Department of Agriculture, is to eradicate the fever ticks affecting cattle in Puerto Rico, thereby improving the health of dairy herds and ultimately the quality of milk and meat products for the island.

To facilitate the program the Island was divided into western, central and eastern zones, each being separated by an established quarantine line. Eradication has been completed in the western zone. This year construction work was completed in the central zone and 226 vats have been built in the eastern zone, a total of 991 vats on the Island. Systematic eradication is now being conducted in 448 vats in the central zone where approximately 210,000 head of cattle, horses, oxen, and goats are being treated every 14 days.

MEDICAL CARE

P. R. R. A. medical experts have been instructing rural families in modern sanitation, conservation of health and preventive medicine.

Work has been performed through a number of dispensaries in both rural and urban sections as well as treatment units which travel from farm to farm in the agricultural projects of the P. R. R. A.

The dental service, manned by 3 full-time dentists and 5 part-time dentists, treated a total of 3,374 patients.

The treatment units of the medical section are in charge of inoculations. During the fiscal year more than 4,000 were inoculated for typhoid fever, 3,741 for smallpox, and nearly 2,000 for uncinaria. The control of malaria was also undertaken by the treatment units and more than 600 received this phase of medical protection. The work of the ambulatory units was supplemented by lectures and information for resettlers in matters of hygiene and sanitation.

The medical section also operated 21 dispensaries, of which 5 were urban and the rest rural. The combined results of the work of these dispensaries show that 2,272 persons were inoculated against typhoid fever; 759 were vaccinated and 87 revaccinated against smallpox; 210 persons treated for syphilis. The rural and urban dispensaries also treated 2,473 persons for malaria. A total of 7,597 physical examinations was performed.

In cooperation with the laboratories of the School of Tropical Medicine and the Insular Department of Health, the medical section carried on extensive tests of water supplies in the various P. R. R. A. resettlement areas. Incident to this work of sanitation and preven-

tive medicine, the medical section handled 78,565 compensation cases for the P. R. R. A. itself.

SOCIAL SERVICE

The political history of the Island tended to produce among Puerto Rico's rural folk an accepted limitation of the possibilities in life. Officials of the P. R. R. A. discovered a complete lack of opportunities for adult education, recreation or cultural development when projects of reconstruction first were inaugurated in the rural zones. Purposely, the P. R. R. A.'s social service has gone hand in hand with its rural rehabilitation.

Aim of Social Service is to create among resettlement families the ideals of citizenship, to further mutual understanding and to foster constructive work; attempting thereby to improve the individual's habits, through those habits to improve the family, and through the family to improve the community.

Social Service conducts its work through 14 community centers located in the P. R. R. A. rural projects. Social workers in charge of community centers are assisted by an athletic director and a teacher who conducts the kindergarten and classes in sewing and other avocations.

Seventy-nine clubs and 158 athletic teams carry on social service activities. Social Service workers have conducted 22,998 office interviews with members of resettler families who have come for advice and help. They have made 12,696 visits to homesteaders. The boxing rings, athletic fields, theaters, games, kindergartens, sewing classes, etc., which make up the various community centers, were used by thousands of men and women during the year.

Advice in the proper methods of preparing meals, balancing of diets, care of children, consultation as to appropriate reading material for adults as well as children and the general supervision of social life in the communities of the P. R. R. A. resettlement projects are among the details of this valuable service.

HOUSING MANAGEMENT

Total rental collections from all P. R. R. A. housing projects (average rents range from $7.91 to $12.57) during the fiscal year amounted to $209,045.02 as against total obligations of $124,307.76, leaving a net return of $84,737.26 or a percentage of 59.48 of total obligations to income. This was a substantial gain over the previous year when total rental collections of $44,141.32 against total obligations of $40,410.26 presented a percentage of 91 of obligations to income.

At the end of the fiscal year P. R. R. A. housing developments were well occupied. Among urban projects the Falansterio, consisting

of 216 living units, was 99.07 percent occupied; Eleanor Roosevelt development of 471 units, 95.75 percent; Juan Morell Campos development of 150 units, 93.33 percent; Mirapalmeras project of 131 units, 100 percent; and La Granja project of 78 units, 100 percent.

Of the larger projects in the rural zones the American Suppliers of 459 units, was 96.95 percent occupied; San Just project of 263 units, 93.15 percent; Castañer Farm project of 200 units, 100 percent; Lafayette project of 718 units, 85.09 percent; and the Coffee, Tobacco, and Fruit project of 883 units, 72.14 percent.

During the fiscal year new community centers were built at the Eleanor Roosevelt development (where 26 new houses were constructed), the Juan Morell Campos development and the Mirapalmeras development. Each of these centers contains space for the director, kindergarten, workshop, clubroom for tenants' meetings, and an office for physician and nurse.

FORESTRY

The Insular Forestry Service, the United States Forestry Service, and the P. R. R. A. Forestry Division are working together on the general forestry program for Puerto Rico. Land quotas set up at the beginning of the program, for the purchase of forest lands, include for the Insular Service 50,000 acres, of which 39,190 acres have been purchased to date; for the Federal Service, 100,000 acres, of which 26,000 acres have been bought; for the P. R. R. A. Division 100,000 acres, of which 24,000 acres have been purchased.

Approximately one-fourth of the land area of Puerto Rico, amounting to 500,000 acres, is so steep, rocky and eroded as to be of little value in agriculture. The general forestry program has aimed at the purchase, development and management by government agencies of at least one-half of this area as public forests for the purposes of increasing the income of non-agricultural lands, preventing soil erosion not only on the non-agricultural lands but also on the agricultural lands below them and regulating run-off and stream flow to increase the efficiency of hydroelectric plants and irrigation services.

One of the most promising rehabilitation activities of the past year has been the establishment of forest homesteads (parceleros) in various forest areas. Every large tract of forest land has been mapped to show the three classes of land contained—first, small scattered areas of good agricultural soil, rarely exceeding 5 percent of the gross area; second, large areas of submarginal or agricultural forest land, amounting to from 10 percent to 20 percent of the gross area, on which restricted cultivation is possible only when combined with the growing of forest trees; and third, pure forest land with no agricultural possibilities.

Residence and cultivation permits are issued free of charge for from 5 to 10 acres of land, including a proportionate amount of each class of soil. In return for the privilege of residing and raising food crops on the land, permittees must reforest 2 acres of non-agricultural land. Additional benefits given the permittee include free native material from the forest with which to construct and repair houses and other farm improvements, and part-time employment not exceeding 2 weeks per month on nearby forestry projects. As they become available, materials from the forest, from which charcoal, stakes, posts, and other wooden products may be manufactured and sold, will be wholesaled to the permittee as a means of increasing his income.

As this activity increases, it will replace Government employment. The system will eventually make each forest unit self-supporting and will provide a permanent home and living for several thousand families. During the fiscal year just ended 250 additional families were established on 409 acres of forestry land. The accumulative total at the end of the year was 700 families on 2,148 acres. Additional permits are being issued as rapidly as suitable lands can be made available.

A total of 3,991.24 acres of land costing $50,260.61 was purchased during the year, bringing the total land purchase to 22,672.56 acres at a cost of $294,287.79 or $12.22 per acre.

The three large nurseries in Rio Piedras, Cayey and Mayaguez were abandoned this year except for part-time use. Small local nurseries, established on each forest unit, produced a total of 2,000,000 trees. Total production of 4,000,000 trees this year cost $5 per thousand. Up to June 30, 1939, approximately 18,000,000 trees had been produced for less than $5 per thousand.

Plantation maintenance work during the year covered 7,858 acres at a cost of $10.20 per acre. New plantations were established on 569 acres of newly acquired land, costing slightly more than $21 per acre. The total net area planted by the end of the fiscal year was 7,858 acres, costing less than $50 per acre for original planting and maintenance.

A total of 10.46 miles of roads, costing $9,550 per mile, was constructed during the year. These low standard development roads are necessary to make land accessible for planting, protection and administration. A total of 27.9 miles of trails was constructed during the year at an average cost of $130 per mile. Boundary surveys and monumentation of 69.75 miles of forest land were made during the year, bringing the total surveyed to date to 102.53 miles. These surveys help prevent trespass, adverse claims and boundary disputes in the future.

ENGINEERING

Public health, social service, housing, education, transportation and industry were among the purposes served by the construction and

repair program of the P. R. R. A.'s Engineering Division during the fiscal year.

The Division administered 81 projects, 44 of which were done under contract and 37 by the P. R. R. A. force. Work done on 37 projects by the P. R. R. A. force totaled an expenditure of $3,257,858.20; that on 44 projects under contract, $1,682,770.65.

Projects at the School of Tropical Medicine, considered one of the outstanding institutions of its kind in the world, constituted the largest expenditure in the Engineering Division allocations, a total of $456,780.95.

These projects included partial construction of the School's three-story concrete library building; four-story concrete laboratory building; ventilation and air-conditioning, and vitreous wall and floor tile installation for the School's hospital.

For the completion of a new auditorium, other buildings and improvements at the University of Puerto Rico, the Division expended $453,346.58. This included partial construction of four-story concrete engineering building of the University's College of Agriculture and Mechanic Arts in Mayaguez.

A total of $560,000 of W. P. A. funds was administered by the P. R. R. A. for the reconstruction of ancient fortresses and works at El Morro and for other improvements for the Army.

Two one-story concrete R. O. T. C. armories, one at Rio Piedras ($89,400) and one at Mayaguez ($56,100) were partially completed. Practically finished are two new wings on the Insular Police headquarters ($41,000) in San Juan. A headquarters building for Insular Police was constructed at Coamo ($12,000). Excepting mill work, the pilot plant for the Puerto Rico Tobacco Institute in Rio Piedras ($17,160) has been finished. A Home for Aged Women ($61,250) has been partially completed.

Completing the Insular Home for Boys at Guaynabo, which consists of four two-story concrete dormitories, a two-story concrete dining hall containing extra classrooms, a concrete vocational school, and a concrete infirmary building, required an expenditure of $386,273.91.

Important were the central service farm projects under which $31,-568 33 was spent for storehouses, community centers, stables, garages, mill shops, breeder houses, incubators, water-supply systems, etc., appurtenant to the central service farms. A total of $125,000 was spent for the construction of 1,200 animal-shed sets consisting each of a granary, chicken coop and hog pen for the farmers' houses.

Rural and urban schools numbering 53 concrete buildings comprising 131 classrooms were built during the year at a cost of $1,843,-697.35. This project included nine schools started the previous year, which were finished. Repairs to rural and urban schools totaled $71,000.

From an appropriation of $100,000, four concrete vocational schools and a second story for the E'eanor Roosevelt School were started. A total of $2,000 was spent for repairs to vocational schools built previously by the P. R. R. A.

Twenty-six concrete urban houses were built at the Eleanor Roosevelt housing development. A total of 543 rural farmer's houses were built during the year and 541 were under construction on June 30, 1939.

Important to the general health conditions and especially to the checking of malaria were the swamp drainage and filling on 28 projects ($1,111,000) throughout the Island. An extensive project of swamp drainage, filling and piping at Arroyo in the vicinity of the Lafayette Sugar Cooperative cost $113,862.50.

A model medical dispensary was constructed for the municipality of Arroyo during the year, at a cost of $48,181.99. By special arrangement with the nearby Lafayette Sugar Cooperative, the municipality has turned over operation of the hospital to the Cooperative.

Water-supply systems installed in 15 resettlements on Federal land were built for $64,236.02. This was in addition to the completion of three municipal water-works systems totaling $8,025.68.

For buildings, garages, sewer and water systems for the United States Naval Radio Station in San Juan, the P. R. R. A. spent $85,000. This amount included a'so a water and drainage system for the Navy property on Culebra Island.

On P. R. R. A. resettlement projects a total of 19 kilometers of macadam roads, 9 kilometers of trails, and 5.4 kilometers of grading were completed under an allotment of $11,000. Roads on Federal property or gaining access to Federal property from insular or municipal roads totaling 18.4 kilometers were constructed under an allotment of $175,000. Included also were 11 kilometers of trails, 7.8 kilometers of grading and 2.2 kilometers of streets (macadam).

The Division's aerial map unit supplies hundreds of prints to various Federal, Insular and municipal agencies. The survey unit completed 1,437 survey cases covering 13,941.72 acres of land. The average employment of the Engineering Division throughout the year was 11,807. The total expenditure of the Division was $4,940,628.85.

RURAL ELECTRIFICATION

This project of the P. R. R. A., designed to aid the Insular Government in the development of the Island's natural resources, aims at ultimately replacing, to the largest extent possible, other forms of fuel with water power.

Three projects, Toro Negro No. 1, Toro Negro No. 2 and El Carite No. 3, have been completed to date and have a total power

potentiality of 40,000,000 kilowatt-hours. A fourth project, Las Garzas, partially completed, was transferred to the Insular Government in December 1938, since negotiations were under way at that time to secure a loan and grant from the P. W. A. to complete the project. The request has since been approved. The fifth project, Dos Bocas, is still under construction by the P. R. R. A.

Extensive studies of rainfall and run-off statistics have proved the P. R. R. A. hydroelectric projects to be economically sound and capable of earning an adequate return on investment.

Work accomplished on the Garzas project during the year up to the time when activities were suspended by the P. R. R. A. included the construction of the diversion tunnel; stripping of the river bed at the dam location; construction of core walls in the dam foundation across the river channel; excavation of the power tunnel to within 2,524 feet of completion; and miscellaneous activities such as the construction of the surge shaft near the outlet portal, Rio Chiquito diversion channel, and excavation for the switchyard, power plant and penstock foundations.

During the fiscal year construction activities on the Dos Bocas project included excavation on both east and west main dam abutments, spillway apron and retaining walls, penstock and powerhouse.

One section of cofferdam No. 2 was completed in June. About 35,000 cubic yards of concrete were placed in the dam and approximately 5,000 cubic yards in the spillway apron and west retaining wall. Work on the 4.5-kilometer road to replace part of Insular Road No. 6, which will be inundated by the reservoir, was advanced to 70 percent of completion.

Installation was completed on the 25-ton cableway and the crushing and screening plant. A concrete mixing plant was completed in November and the entire construction plant was being efficiently operated by the end of the fiscal year.

As much labor as was practical was utilized on this project. In the concrete pouring work, three shifts were employed most of the time. The monthly average of men employed varied from 185 to 1,677, the yearly average being 1,200.

Plans for the 1939–40 fiscal year include the continuance of the following activities at the Dos Bocas project: diversion of the river during the construction of the dam, excavation and concreting of main dam structure, spillway apron and retaining walls, construction of penstock at sluices, and relocation of the highway.

THE FUTURE

No one who views the Puerto Rican situation through realistic eyes can say that the aspect of the Island's immediate future is a pleasant one.

There are evidences on every hand of splendid beginnings in reconstruction and rehabilitation. There are more signs of success and happiness, fewer signs of destitution than in years. However, it took centuries to produce the condition which the P. R. R. A. is attempting to help rectify and it will take many more years before the Island is back on its feet economically.

The immediate need is serious. Thousands have been deprived of employment through the establishment of the quotas in the sugar industry. The sudden application of the Fair Labor Standards Act to Puerto Rico has violently disrupted its industries, notably needlework. A reexamination and revision of this legislation as it affects the peculiar economy of Puerto Rico would go far toward aiding the Island in the solution of its own economic problems.

Fundamentally, the basic problem of Puerto Rico is that of finding a way to supply an increased income to support its population on a standard of living commensurate with its American citizenship. This means full utilization of its tropical resources in such a manner as to supplement and complement rather than compete with agriculture and industry on the mainland. Only in part can this be accomplished by a program of relief spending. A more fundamental recommendation by this Administration is the coordination of agricultural and industrial development and the provision of proper credit facilities for Puerto Rico's farmers and tradesmen.

If capital can be made available to eligible Puerto Rican farmers and business men for the next few years, the hope is that Puerto Rico's economy will reach a stable level.

PETROLEUM CONSERVATION DIVISION

George W. Holland, *Director*

THE PETROLEUM CONSERVATION DIVISION was established to assist the Secretary of the Interior in administering the Act of February 22, 1935, 49 Stat. 30, the so-called Connally law; to cooperate with the Interstate Oil Compact Commission and the oil- and gas-producing States in the prevention of waste in oil and gas production and in the adoption of uniform oil- and gas-conservation laws and regulations and to keep informed currently as to the movement of petroleum and petroleum products in interstate commerce, in order to be in position to report to the President a lack of parity between the supply of and the consumptive demand for petroleum and petroleum products.

The Connally law was to have expired June 30, 1939, but by an act of Congress approved June 29, 1939, it was extended to June 30, 1942. This law regulates interstate and foreign commerce in petroleum and petroleum products by prohibiting shipment in such commerce of petroleum and its products produced in violation of State law. By Executive Order petroleum or petroleum products shipped from Louisiana or Texas ports are required to be reported. Likewise, the discharge of these cargoes in the United States also is required to be reported. During the fiscal year, 12,722 reports on shipments were received and handled by the Division.

OPERATIONS IN THE EAST TEXAS AREA

Federal Tender Board No. 1 operates in a designated area known as the East Texas oil field and is required upon application to issue certificates of clearance, or tenders, permitting the shipment in interstate commerce of petroleum or petroleum products whenever it determines that the petroleum or petroleum products do not constitute contraband oil as defined in the act.

During the fiscal year, 4,708 applications for tenders, of which 3,643 were for 192,467,730 barrels of crude oil and 1,065 for 21,018,814 barrels of petroleum products, were received and considered. At the beginning of the period there were 19 tenders for crude oil and 2 tenders for products pending; consequently, the Board took action

on 4,729 tenders. It did not approve 60 tenders amounting to 350,244 barrels of crude oil and one tender for 250 barrels of products. At the end of the period there were pending 13 tenders for crude petroleum, amounting to 127,197 barrels, and one tender for products amounting to 624 barrels. During the year crude-oil tenders were reduced before approval by 1,737,319 barrels and products tenders by 121,287 barrels. The aggregate quantity of petroleum approved for shipment in interstate commerce was substantially larger than that actually produced in the east Texas field, owing to the retendering monthly of legally produced oil held in storage and oil previously tendered but not shipped, the approval of tenders covering oil produced elsewhere but received in the East Texas area, and the issuance of tenders on oil interchanged between companies operating in the area.

During the fiscal year the reported actual production of petroleum in the east Texas field was 142,906,798 barrels, or 391,500 barrels daily; withdrawals of east Texas crude oil from field storage totaled 383,315 barrels; and 121,712 barrels received from reclamation plants and other similar sources, making a total of 143,411,825 barrels. Of this amount, 138,285,609 barrels, or 96.43 percent, was shipped from the area through the 13 trunk pipe lines; 5,080,515 barrels, or 3.54 percent, was received for processing at refineries located in the field; and the balance of 45,701 barrels, or .03 percent, includes crude used in the field, inventory adjustments, and losses.

There were 25,858 producing oil wells in the East Texas field on June 30, 1939, of which 903 were completed during the fiscal year, as compared with 2,457 new wells completed during the previous fiscal year. The average well density of the field was increased from one well to 5.2 acres on June 30, 1938, to one well per 5.1 acres on June 30, 1939. The average reservoir pressure declined from 1,120.84 pounds per square inch on June 8, 1938, to 1,085.08 pounds per square inch on June 10, 1939, a decrease of 35.76 pounds. An average of approximately 4,000,000 barrels of crude oil was produced for each pound of decline in reservoir pressure as compared with 3,740,000 barrels for the preceding year.

Eight refineries were operating on Federal tenders in the East Texas field at the beginning of the fiscal year. These plants processed 6,120,163 barrels of crude oil, of which 5,118,161 barrels, or 84 percent, was obtained from the East Texas field, and 1,002,002 barrels, or 16 percent, was obtained from other fields. All of the crude oil from sources other than the East Texas oil field was run to stills during the first eight months of the fiscal year. East Texas crude constituted their sole source of supply during the remainder of the fiscal year.

Summary of East Texas Refinery Operations, 1939 Fiscal Year

	Barrels	Percent
East Texas crude charged to stills	5,118,161	83.63
Southwest Texas crude charged to stills	72,499	1.18
Louisiana crude charged to stills	852,689	13.93
Arkansas crude charged to stills	66,466	1.09
Gas well distillate and other Texas crude charged to stills	10,348	.17
Total crude distilled	6,120,163	100.00
Products manufactured:		
Gasoline and naphthas	3,519,122	57.50
Kerosene	366,777	5.99
Gas oils and distillates	240,480	3.93
Fuel oil	1,352,143	22.09
Unfinished oils	359,385	5.87
Losses in refining	282,256	4.62
Total	6,120,163	100.00

Sixteen natural gasoline plants connected to 24,168 wells on June 30, 1939, reported operations to Federal Tender Board No. 1 during the fiscal year. These plants processed 46,249,778 m.c.f. of lease and still gas and manufactured a total of 6,722,181 barrels of products. This represents an average of 6.09 gallons of natural gasoline, butane and propane per m.c.f. of gas processed, as compared with 5.5 gallons during the previous fiscal year. The average gas-oil ratio of the 24,168 wells connected to these plants during the fiscal year was 336.71 cubic feet per barrel of crude oil.

EXAMINATIONS OUTSIDE OF THE EAST TEXAS AREA

During the fiscal year the Secretary of the Interior authorized several investigations outside the East Texas area. The examination, authorized April 21, 1938, of the oil proration procedure in the States of Arkansas, Kansas, Louisiana, New Mexico, Oklahoma, and Texas for the purpose of determining the manner in which such procedure affects the administration of the Connally law and contributes to the ultimate recovery of oil and gas resources was completed during the fiscal year by Federal Tender Board No. 1. On July 23, 1938, an investigation of operating conditions in the KMA area, Wichita and Ocean Counties, Tex., with particular attention to the possibility of violations of the Connally law, was authorized. On April 3, 1939, an investigation of the LaBelle field, Texas, was authorized. On April 25, 1939, investigations to determine whether any contraband oil was being shipped from the Old Ocean field, Yates field, Plymouth field and the Corpus Christi area, Texas, were authorized. On May 24, 1939, a preliminary investigation concerning oil production methods in Michigan was authorized. During the fiscal year members of the Petroleum Conservation Division testified before legislative committees concerned with proposed legislation on petroleum conservation in California and Illinois.

REPORTS ON PETROLEUM SHIPMENTS BY WATER

The methods used in reporting and checking on petroleum shipments by water as outlined in the Annual Report of the Secretary of the Interior for 1938 have been continued. These reports covering the loading of cargo of petroleum or petroleum products provide the procedure for checking a substantial portion of the petroleum shipped in commerce in Louisiana and Texas.

COST OF ADMINISTRATION

The administration of the Connally law is essentially a field activity. Of the 83 persons employed at the close of the fiscal year, 69 were in the field and 14 in Washington.

The following table shows the expenditures made of available funds:

	Appropriation
Personal Services:	
Petroleum Conservation Division	$42,516
Federal Tender Board No. 1	179,912
Total	222,428
Miscellaneous:	
Materials and supplies	11,425
Communications	2,032
Travel	8,042
Transportation of things	455
Printing and binding	952
Rent of buildings	6,600
Equipment	5,824
Total	35,330
Total obligated	257,758
Unobligated	2,242
Total funds available	260,000

OFFICE OF EXHIBITS

G. C. Dickens, *Supervisor*

GOVERNMENT participation through presentations at national and international expositions, State fairs, and at scientific and educational conventions, has become an established policy. One important function of all Government Departments and independent establishments should be to acquaint the general public with the numerous and varied services being carried on by them for the benefit of the people.

Experience has proved that one of the most satisfactory methods of informing the public is through participation in expositions, fairs, and this type of event. In this work the use of motion pictures, animated dioramas, cycloramas, and panoramas, models, stereopticon slides, colored transparencies and murals, has proved to be highly successful. In making presentations relating to our island and Territorial possessions and the American Indian, experience has proved that the display of native handicraft is essential.

During the past year the Office of Exhibits of the Department of the Interior designed and constructed the complete conservation exhibit, and six dioramas for the foods exhibit, which are on dis play the Federal Building at the New York World's Fair. The Office likewise designed and constructed an animated (also day and night effects) diorama of Juneau, Alaska, which has been displayed at various travel exhibits.

At the present time, the Office of Exhibits is finishing the construction of a large diorama of San Juan, Puerto Rico, which will have animation and day and night effects. This exhibit is being made for the Institute of Tourism, Government of Puerto Rico, and will be displayed in the Puerto Rico Pavilion at the New York World's Fair. At other times it will be displayed at various points throughout the country for the purpose of stimulating and increasing travel to Puerto Rico.

The Office of Exhibits is likewise finishing a series of four dioramas for the Division of Education of the Office of Indian Affairs, which will be used in educational work among the Navajo Indians, and is designing and constructing two exhibits for the Bonneville project. One of these will be an animated diorama model of Bonneville Dam

itself, showing the power plant, locks, fish ladders, and the like. The other will be a lighted and animated map of the Pacific Northwest, showing transmission lines, the locations of various mineral resources, etc.

Only recently the Office designed and constructed a "Future Farmers of America" exhibit for the Office of Education.

Another important feature of the work of the Office of Exhibits involves assistance to the various bureaus and divisions of the Department in executing plans relating to miscellaneous small exhibits throughout the country, and in designing large exhibits that will effectively portray the activities and functions of the various Bureaus and Divisions.

In addition to its regular work of designing and constructing Departmental exhibits, the Office of Exhibits during the past year has furnished considerable material for display at various travel and outdoor-life shows in this country, and in London. The demands for attractive and informative Department of the Interior exhibit material for display at expositions, fairs, conventions, and travel and out-door life shows is constantly increasing.

CIVILIAN CONSERVATION CORPS

FIVE agencies of the Department continued, during the fiscal year, to supervise the work of Civilian Conservation Corps camps assigned to various types of conservation projects throughout the country. These Bureaus supervised the work of an average of 438 camps during the year. Detailed reports on C. C. C. activities of the various Bureaus will be found in the respective Bureau reports.

In addition to its C. C. C. work to control Federal coal deposit outcrop fires in Wyoming, with which it has been occupied since 1933, the General Land Office assumed technical supervision of four new camps established on the Oregon and California Revested Lands in Oregon. These camps are engaged in general forest conservation work to assist the Oregon and California Administration in administering these lands on a sustained yield basis for the purpose of providing a continuous crop of forest products for the benefit of local communities. In addition to fire suppression and fire protection improvements, the principal work of these camps is the construction of a permanent transportation system to permit the most efficient conservation of the timber resources through a planned sustained yield program. Without a planned road system, the forests closest to the markets are exploited without provision for future crops. Under such a method, two or three cuttings would probably be made on the same area before the less accessible timber would be

utilized. This would result not only in removing the young trees just when they reach an age to put on valuable growth, but also in the more disastrous practice of repeated slashing fires which destroy the seed source and ruin the soil for natural reforestation. By having a road system in existence, the young and thrifty forest can be left to reach maturty, while the older and more decadent stands can be utilized to supply the demands of industry.

The work of the Oregon and California C. C. C. camps is considered to be a sound financial undertaking. It is of untold value and the cost of operation of the camps will eventually be realized many times by the country through increased timber values and more efficient utilization.

A total of 27 miles of truck trails were constructed during the fiscal year, and the camps worked on 72 forest fires which covered a total of 39,000 acres. One lookout tower was constructed and a total of 27 miles of forest protection telephone line was strung in addition to 40 miles of line maintained and improved. In the spring, 400,000 trees were planted on 500 acres of cut-over, deforested land. One hundred and fifty seed beds were planted which will produce approximately 250,000 trees for field planting in 2 years. Fire hazard reduction work was done along 32 miles of roads and on 910 acres of forest land. For further utilization of the lands, certain camping and picnicking facilities were built. Approximately 120 miles of fire-protection truck trails were maintained and improved.

The Wyoming coal outcrop fire work continued on 13 projects, including the reconditioning of older projects and construction of truck trails leading to various other projects. In the execution of this work a total of 293,812 cubic yards of earth, coal, shale, and burning material were removed. Control of the fires involves removal of burning material where possible, and filling of all cracks in the surface with fine earth or sand. Terracing is used extensively to insure proper and uniform cover of fire areas. Small check dams are also used to prevent washing away of the toes of slopes.

The Office of Indian Affairs carried forward with C. C. C. projects on 71 Indian reservations, continuing operations for the building of basic structures for conservation of land and water, and preservation of forest stands and forage cover of the reservation lands for the protection of the great national watersheds.

Improvements completed by Indian enrollees are rapidly being incorporated into the advancing economic life of the Indian people. Although at first emphasis was placed upon improvement of forest protection and development of range resources, as the more urgent needs for such facilities were satisfied attention was given to various

activities to enhance the value of Indian lands or contribute to the social welfare, happiness, and contentment of the people.

Many dams constructed are serving the dual purposes of supplying water for range stock and irrigation water for subsistence gardens on the lands below. Lands heretofore open and exposed to trespass are protected by hundreds of miles of new and rebuilt fences. Lookout towers, trails, telephone lines, and radio facilities, augmenting trained crews of C. C. C. enrollees, have brought fire detection and suppression to a state of preparedness undreamed of 6 years ago.

Indian C. C. C. activities resulted, during the fiscal year, in the construction of 500 springs, small reservoirs, and well development jobs; 115 impounding and large diversion dams; 950 miles of fences; 900 miles of truck and horse trails, and advancement of insect and tree pest control over 100,000 acres.

Not only have thousands of Indians obtained the current necessities of life through the C. C. C. program, but hundreds of Indian homes today contain facilities and furnishings purchased from the wages received by enrollees, and in many instances a substantial portion of the cost of new homes has been met from savings accumulated from C. C. C. wages.

Under technical supervision of the Bureau of Reclamation, C. C. C. camps continued their work for rehabilitation of Federal reclamation projects, development of supplemental water supplies, construction of new reclamation projects, and development of recreational facilities at irrigation reservoirs. The number of camps on reclamation projects was increased from 35 to 44, permitting the undertaking of several new projects of importance. Foremost of these is the construction of the Deschutes project in central Oregon, designed to save, through irrigation, a well developed dry-farming community of 50,000 acres.

The C. C. C. rehabilitation programs made excellent progress. They include replacement of deteriorated water-control structures with concrete structures; lining of porous sections of canals with concrete; rock riprapping of canals where erosion is serious; construction of water-measuring devices and improvement of operating facilities. The better physical condition of the reclamation projects resulting from these permanent improvements is reflected in increased savings of irrigation water, a conservation matter of vital importance to the farming regions of the far West.

The National Park Service continued its cooperation with the States and its direction of C. C. C. projects for the protection, conservation, and development of park and recreation areas in all parts of the country. During the fiscal year operations were carried on by an average of 54,410 enrollees in 311 camps, including 91 in con-

185642—40——26

tinental national parks and 220 in State, county, and metropolitan parks and recreation areas and Federal recreational demonstration areas. Work considered sufficient for present recreational needs was completed during the fiscal year on 27 State, county, and metropolitan parks. Besides general conservation treatment, such operations in both national, State, and local areas includes construction of roads and trails, bridges, park buildings, and other facilities for administration and use.

The Department was assigned 1,600 enrollees for projects in the territories and insular possessions, including Hawaii, Alaska, and the Virgin Islands. In the Territory of Hawaii the enrolled strength was increased by 100 over the previous year, and of the total of 900 authorized, 225 were assigned to projects in Hawaii National Park and 675 were employed on lands under the jurisdiction of the territorial government.

Five hundred enrollees assigned to the Virgin Islands carried forward projects on the Island of St. John in addition to work previously inaugurated on St. Thomas and St. Croix. Their operations included nursery work, such as seed collection and field planting; road and trail work, erection of telephone lines, fencing of important areas to prevent wild goats, sheep, and boars from destroying vegetation; fire-hazard reduction and other conservation measures.

At Mount McKinley National Park, Alaska, summer work was continued by a 200-man company transported from the States for the second season of occupation. Fire-hazard reduction, construction of minor roads, and sanitary facilities were among the chief projects.

On recreational demonstration areas, some 3,000 enrollees continued projects for construction of organized camping buildings and facilities and general conservation treatment of the Federal areas. Facilities for both group camping and day use are taking shape under their hands.

The peak of productiveness and accomplishments was reached in the spring of 1939 by camps assigned to the Grazing Service for conservation projects on the Nation's public range lands. The Division's full quota of 90 camps was attained in November 1938 for improvement work in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming.

These projects, designed to aid stockmen who themselves contribute to support of the range, include spring developments, wells for water storage, rodent control, construction of range fences, cattle guards, stock driveways, etc. The C. C. C., under the Grazing

Service, has constructed projects far beyond the scope or resources of any individual or group and consequently has made possible the steady improvement and rehabilitation of the range. This program has also proved of inestimable value to livestock owners as a whole and doubtless has gone a long way to assist in the stabilization of the industry.

The Department continued its work of education and training for C. C. C. enrollees in order to give them a better understanding of their jobs and fit them for employment after leaving the Corps. Efforts were also increased to promote the safety of enrollees on the job and in camp, and substantial reductions in the frequency and severity of accidents were reported generally throughout camps under the Department of the Interior.

OFFICE OF ADVISER ON NEGRO AFFAIRS

W. J. Trent, Jr., *Adviser*

THE activities of the Office of Adviser on Negro Affairs during the fiscal year may be divided into two groups, namely, those matters which concern the Department of the Interior and those which concern the Public Works Administration.

DEPARTMENT OF THE INTERIOR

In the Department of the Interior the majority of the work of the Adviser on Negro Affairs had to do with the integration of Negro citizens into the expanding program of recreational facilities sponsored and developed by the National Park Service. This expansion took the form of Recreational Demonstration Areas and provision of other recreational facilities in parks in Southern States.

During the past year this office worked toward and aided in carrying out the plans proposed in 1938 to develop several recreational demonstration areas for Negro use. As a result, three new areas were opened for the 1939 season: Swift Creek near Richmond, Va., Lake Murray near Ardmore, Okla., and Cuivre River near St. Louis, Mo. This makes a total of five areas in operation during the 1939 camping season. Field trips were made to other areas to determine the need and feasibility of developing similar areas. Plans were put forth and work undertaken for the development of other areas in Kentucky, North Carolina, and Maryland.

With the great expansion of the recreational program in the national parks in the Southern States, this office submitted memoranda and participated in conferences with officials of the Department on the question of the policy regarding such facilities in that section of the country.

It also consulted with the Branch of Buildings Management of the National Park Service on personnel problems within the custodial force. Investigations were initiated and recommendations made to decrease the possibility of discriminatory action against Negro workers.

In November 1938, the Adviser investigated charges of discrimination on the Grand Coulee Dam project. As a result of this trip and negotiations entered into, the situation improved slightly and more

Negroes were given job opportunities. Monthly reports which show the actual number of Negro workers employed are rendered to the office by the Bureau of Reclamation.

PUBLIC WORKS ADMINISTRATION

Under the 1938 P. W. A. program this office has concentrated on three main problems: (1) The review and recommendation of applications for funds for Negro schools and hospitals in the South; (2) personnel adjustments; and (3) investigation of alleged labor discrimination on the projects in violation of the agreement between the Public Works Administration and the public agency.

In keeping with the express policy of the Administrator, applications involving grants for Negro schools in the South were reviewed by this office and recommended for consideration in order that the great lack of adequate facilities might be improved through the aid of the Public Works Administration.

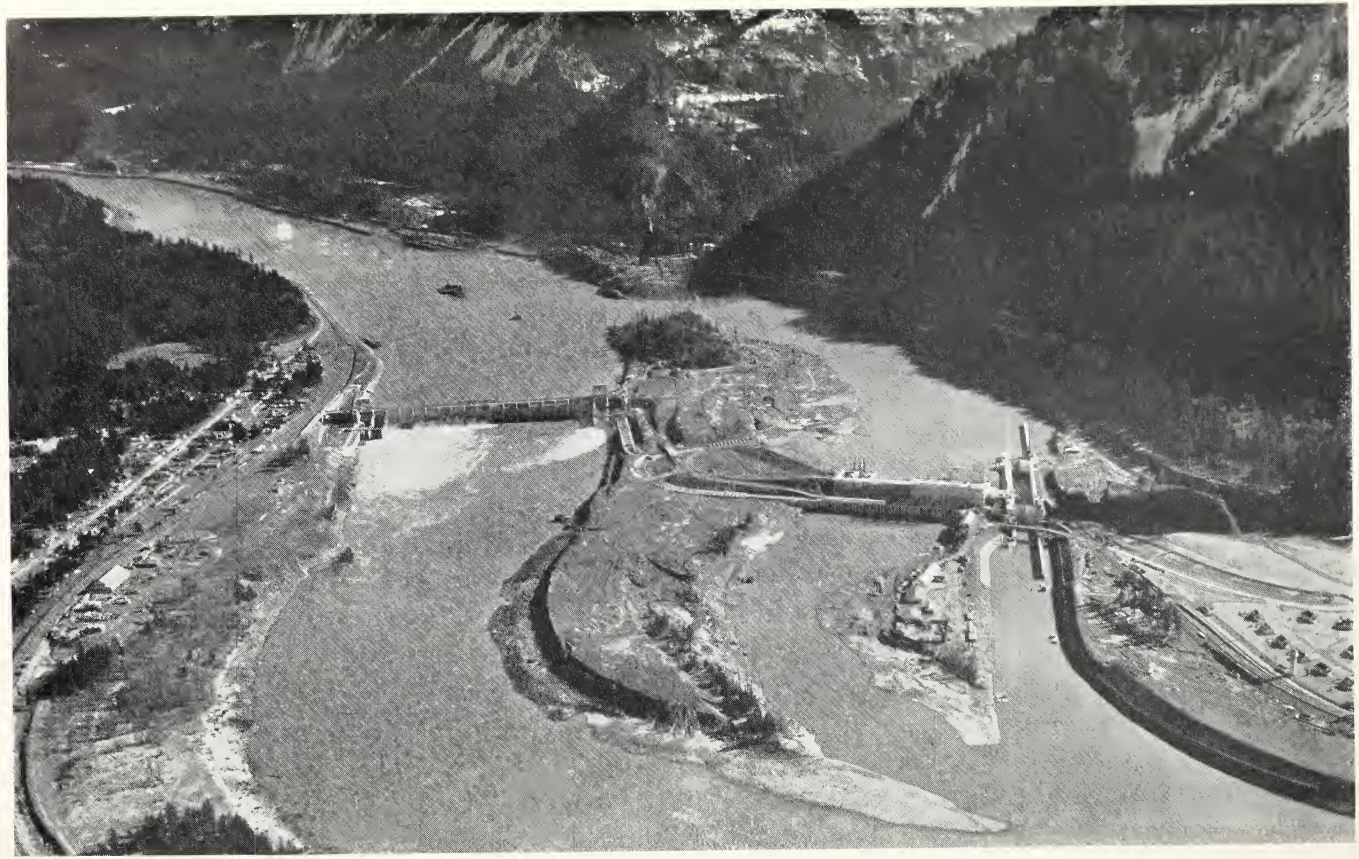
This office also consulted with and advised the Assistant Administrator and Executive Assistant to the Administrator on the difficulty of Negro employees in securing promotions and reclassifications. During the year this situation improved greatly. In cases where instances of discrimination had been voiced, the Adviser initiated investigations and reviewed corrective measures undertaken.

In conjunction with the Labor Relations Division, the Adviser on Negro Affairs made investigations of alleged discrimination against Negro workers on P. W. A. jobs. The following cities were visited for such investigations: New York, N. Y., Pittsburgh, Pa., St. Louis, Mo., Philadelphia, Pa., Chicago, Ill., Nashville, Tenn., Raleigh, N. C., Atlanta, Ga., and Seattle, Wash.

OTHER ACTIVITIES

One of the tasks of the Adviser on Negro Affairs was to analyze data and compile information from the material gathered through the medium of the Survey of the Training and Employment of White-Collar and Skilled Negro Workers sponsored by this office in 1936. During 1938, 25 clerks and statisticians were assigned to the office by the Works Progress Administration for the purpose of preparing data for the third volume of the study. The second volume, The Male Negro Skilled Worker in the United States, 1930–36, was prepared by Dr. Robert C. Weaver, formerly Adviser on Negro Affairs. It is in press at the present time. It is expected that the third volume, The Urban White-Collar Worker, 1936, will be ready by June 1940.

The Adviser on Negro Affairs maintained contacts with other governmental agencies and submitted memoranda, suggestions, and advice to these agencies in response to their requests. He prepared speeches and articles relating to the Negro and the various programs of the Department of the Interior and the Public Works Administration, and cooperated with the United States Information Service in answering hundreds of requests relative to various phases of the Negro's economic, educational, and social status in this country.



POWER AND NAVIGATION ON THE COLUMBIA RIVER.

Air view of Bonneville project, major factor in preserving natural resources in the Oregon-Washington area.

THE BONNEVILLE PROJECT

F. A. Banks, *Acting Administrator*

COMPLETION of the Bonneville project, first Federal navigation and hydroelectric development on the Columbia River, will make available to residents of the Pacific Northwest an increasing supply of low-cost electric power. The project was created by an act of the Seventy-fifth Congress (approved Aug. 20, 1937), and J. D. Ross was appointed first Administrator. Mr. Ross died March 14, 1939. To replace him, on May 4, 1939, the Secretary of the Interior appointed Frank A. Banks, construction engineer of the Bureau of Reclamation, as Acting Administrator of the Bonneville project. Mr. Banks also retained the position of construction engineer of Grand Coulee Dam and administered both posts simultaneously.

Constructed by the Corps of Engineers as a multiple-purpose project Bonneville Dam is intended to aid in the development of a vast inland empire rich in natural resources. The largest single-lift lock in the world will make the Columbia River accessible to ocean vessels to a point 187 miles inland. The benefits of this development have been felt in reduced freight rates even before completion of the channel. River steamers already are carrying greatly increased tonnages of wool, wheat, and other products from this inland empire.

To help pay the cost of this major navigation development, more than 500,000 kilowatts of hydroelectric power ultimately will be generated at the dam site. The present installation of the dam consists of two units, with a combined capacity of 86,400 kilowatts. Two additional generators now are being manufactured with a total of 104,000 kilowatts, and funds have been appropriated by Congress for two further units of 104,000 kilowatts. Installation of these generators will provide a capacity of 294,204 kilowatts. The present demand for power indicates that the capacity of these generators will be utilized as rapidly as they are installed and the necessary transmission system is completed.

Although the Bonneville power plant has been in the position to generate power since the summer of 1938, only limited distribution has been made. This has been due to the lack of transmission facilities for taking this power away from the plant, there being in existence on July 1, 1938, only one light transmission line owned by the

Northwestern Electric Company. A contract was made with that utility, and by the end of the fiscal year 1939, 35,476,000 kilowatt-hours of power had been sold.

The fiscal year 1939 was the first year during which funds were provided by Congress for construction of a transmission system to market power from Bonneville Dam. During its second session the Seventy-sixth Congress appropriated the sum of $3,500,000 for the construction of initial lines, and in addition, the Public Works Administration made an allotment on August 18, 1938, of $10,750,000 for the construction of further transmission lines and substations.

The transmission network under construction at the close of the fiscal year, together with additional lines for which plans have been completed, will make Columbia River power available to most of the population centers of Oregon and Washington. A 220,000-volt line will connect Bonneville with the Federal project at Grand Coulee, to form part of a grid which will encircle the Portland, Seattle, and Wenatchee areas.

Lines of 110,000 volts and less will extend down the fertile Willamette Valley, westward toward the coastal counties, and inland to the rich, irrigated lands of Oregon and Washington. Plans have been prepared for erection of suitable substations to meet growing local demands for Columbia River hydroelectric power.

Major work of the project during the fiscal year was commencement of construction of an initial network of 550 miles of high-voltage lines. Lines scheduled to be completed in November 1939 include a twin-circuit 220,000-volt line from Bonneville Dam to the major substation at Vancouver, from which power will be dispatched to Western Oregon and Washington communities.

Construction of this "backbone" line was 65 percent completed at the close of the fiscal year. For a short distance the line traverses the famous Columbia River gorge, and towers and conductors have been designed to withstand 60-mile-an-hour gales when the cables are swollen with ice to the size of a man's arm. A considerable section of the line is constructed through a heavily timbered mountainous region. Completion of this line, including initial substation facilities, is scheduled for November 1939.

The other major line on which construction was started during the fiscal year is designed to serve Portland, Oregon City, Salem, Eugene, and the well-settled Willamette Valley in which approximately half the population of Oregon is located. Construction of this 128-mile line, which will operate at 110,000 volts, involved the erection of numerous river-crossing towers. Two of these towers, situated on the banks of the Columbia River at Portland and Van-

couver, are each 534 feet high, and are among the highest river-crossing towers in America. This line was 25 percent completed at the close of the fiscal year, and will be finished before the end of the 1939 calendar year.

Plans and specifications were completed during the fiscal year for the longest single line of the program, a 220,000-volt circuit to connect Bonneville with Grand Coulee Dam. Linking these two projects will permit interchange of approximately 100,000 kilowatts of energy over the single circuit. Completion of this line and a connecting line of similar voltage from the Vancouver substation to Kelso is scheduled for June 30, 1940.

Other 110,000-volt lines, for which plans and specifications have been prepared, will extend from the dam eastward through Hood River and Wasco Counties in Oregon, and from Chehalis westward to Raymond on the Pacific coast. Both of these lines will be completed by the end of the 1940 fiscal year.

The line construction approved during the fiscal year involves a total of 550 miles and includes the purchase of 1,736 steel towers, 2,692 wood pole structures, 2,141 miles of conductors, and 274,625 insulators purchased to date.

At the end of the fiscal year, construction was well under way on substations at Vancouver, North Bonneville, Eugene, Portland, and Bonneville. Plans are being prepared for erection of other substations during the next fiscal year.

Construction of the initial Bonneville network presented major engineering and administrative problems. These, however, were solved rapidly. Staff of the project grew from 138 persons at the beginning of the fiscal year to 969 at the close of the period. A large number of skilled workmen also are employed by contractors who are erecting the lines. Clearing of the heavily timbered right-of-way is being done by the Work Projects Administration. At the close of the fiscal year approximately 5,760,000 man-hours of W. P. A. labor had been used.

In addition to the foregoing lines a short low-voltage circuit to Cascade locks was completed at the beginning of the fiscal year. This community, situated 5 miles from the dam site, now is being served with Bonneville power.

Construction of the initial network is being hastened to meet requests for power which have been received by the Administrator from private utility companies, public power districts, municipal electric systems, and rural cooperative associations. None of these systems (except the Northwestern Electric Co., which already is being served, and the agencies adjacent to the dam) can receive Bonneville power

until completion of the necessary circuits. Present lines in the area are either heavily loaded or are inadequate to carry required quantities of power from the dam site. The Bonneville transmission network has been designed to permit full utilization of practically all generation and transmission facilities of existing systems. The Bonneville network is planned to meet the growing power needs of the region and to avoid duplication of lines.

Plans for the next fiscal year include erection of a 220,000-volt line to extend northward from Kelso into the Puget Sound area. It is planned to have this circuit ultimately run eastward through the Cascade Mountains and connect directly with the Grand Coulee project. The line to be constructed next year will reach the most densely populated sections of Washington, and enable the major municipal plants situated there to interconnect with the Federal system. Other lines to be constructed include a 110,000-volt circuit through the rich irrigated counties of Yakima and Kittitas.

Hydroelectric energy from the Columbia River dam will be available along the entire transmission system at a uniform wholesale rate of $17.50 per kilowatt-year for prime power. This policy is intended to encourage exploitation of local resources throughout the region and to aid in the establishment of decentralized industrial developments. At the dam site the rate for prime power is $14.50 per kilowatt-year for customers who construct their own lines.

Wholesale power rates, based on the kilowatt-year sales unit, are intended to encourage continuous use of energy. Existing fuel and older hydroelectric plants may be used advantageously by utilities and public systems in conjunction with energy purchased from the Federal dam, and such plants will be especially useful for meeting peak-load requirements. To assist smaller customers such as districts, municipalities, and cooperative associations in building up their loads, the acting administrator has prepared for submission to the Federal Power Commission supplementary schedules for the sale of power on a month-to-month basis. He has also prepared schedules for the sale of "dump" energy.

Oregon and Washington, at the present time, are served by 64 private utility companies, 30 municipal plants, and 8 cooperative associations. Twenty-five county-wide public districts have been formed in Washington and five districts in the State of Oregon. The majority of these agencies are looking to completion of the Bonneville transmission network for hydroelectric power from the Federal projects on the Columbia River. Congress has directed that these public and cooperative purchasers be accorded preference in the sale of energy from Bonneville Dam.

Forms of contracts under which Bonneville power will be sold now are under preparation. Particular attention has been given to the terms of contracts with private agencies and public agencies to insure the resale of energy to the public at rates that are reasonable and nondiscriminatory. It is expected that these forms of contracts will be completed shortly after the end of the fiscal year. Approval by the Federal Power Commission of supplementary wholesale schedules is expected within a short time after submission.

Harnessing of the vast power potentialities of the Columbia River is expected not only to increase use of electricity in the home and on the farm, but also to encourage development of the resources of the region. Low retail rates will stimulate supplementary irrigation and reclamation of large blocks of potentially fertile land. Extensive deposits of mineral ores await the availablity of low-cost hydroelectric power for profitable exploitation. In the Pacific Northwest, large farm surpluses and waste timber can be converted into valuable products by electrical and mechanical processes.

Studies made by the Bonneville project disclose the fact that the Northwest suffers from marked deficiencies in most industries—chemical, rubber, textile, iron, transportation, and others.

Development of multiple-purpose projects such as Bonneville and Grand Coulee can assist in solving the major economic problems of the Northwest: depletion of timber resources, greatly increased population caused by migration from the drought regions, and an unbalance of trade resulting from lack of industrial development. Low-cost hydroelectric power, deep water transportation, and reclamation of vast acreages of fertile land will enable many more citizens to enjoy the potential bounty of a region which embraces 13 percent of the area of the nation, but has a population of less than 3 percent. Development of the resources of the Columbia River Basin in accordance with the principles of progressive conservation may provide a new frontier for hundreds of thousands of marginal farmers and artisans who look hopefully westward for the chance to earn a livelihood in the traditional American way.

DIVISION OF INFORMATION

Michael W. Straus, *Director*

ESTABLISHED in 1937 to facilitate reporting to the public the facts on the various research, economic, and conservation programs and policies of the Department of the Interior and its various agencies, the Division of Information, during the year, successfully added radio to the media employed to disseminate information.

The Division also served throughout the year as the informational agency of the Public Works Administration until the transfer of that organization to the Federal Works Administration on July 1, 1939, in accordance with the President's reorganization plan.

Maintaining supervision over the preparation of publications, public announcements, and releases to the press, with the exception of purely scientific and technical papers, over radio programs sponsored or authorized by the Department, and over the production and distribution of official photographs, the Division coordinated the various informational activities of the Department.

Responding to public demand for information, 635 press releases were issued during the year, covering features of operations within the 25 separate agencies of the Department. More than 93,000 booklets on conservation, prepared as a supplement to radio-broadcasting activities, were distributed, and numerous other publications of the Department were provided for public information.

A total of 51 coast-to-coast radio broadcasts, reaching an estimated 153,000,000 listeners during the year, constituted the record of the Radio Section of the Division, which operates the only official Government radio studio for the benefit of the public and the several Federal establishments.

Through the program, "Mr. President," the annual report of the Secretary of the Interior was dramatized in a radio broadcast for the first time in governmental history, while 22 weekly programs in the "What Price America" series carried the message of the Nation's history and the development of conservation into thousands of homes, schools, and colleges.

Altogether, 18 separate governmental agencies were furnished with the facilities of the Radio Section during the year. The broadcast "This, Our America," which served as a medium of information concerning the 1938 edition of the official map of the United States,

compiled by the General Land Office of the Department of the Interior, resulted in greatly increased sales for this publication. Total sales of the 1936 edition of the map amounted to 557 copies. This year, 2,197 copies have been sold, and extra demands resulted in the necessity for securing 4,000 additional prints of the master map of the United States.

These maps are sold through the Superintendent of Documents. Radio networks, nationally distributed publications, and the Division of Information cooperated in presenting the new map with the result that all sales records were broken. Radio networks and stations generally contributed facilities, air time, and production personnel to the presentation of Department of the Interior programs, without expense to the Government in instances when the Division of Information was willing and able to undertake the preparation of feature or dramatized scripts and supervise arrangements. They continue to offer such cooperation. The result has been that radio has proved the most economical method of reporting governmental research and activity to citizens.

The Division of Information prepared or assisted in preparing published reports on the work of the Department and its agencies and responded to a vast volume of inquiry concerning such work. Demands made upon the Division reflected an increasing public interest in conservation policies and requirements accompanied by a public willingness to cooperate in those policies through educational rather than policing programs.

INTERIOR DEPARTMENT MUSEUM

H. L. Raul, *Museum Curator*

THE MUSEUM of the Department of the Interior, a unit of the Office of the Secretary, visualizes and explains the history, organization, and activities of the various bureaus of the Department. The Museum consists of office quarters and 10 exhibit galleries, containing more than a hundred modern, built-in, indirectly lighted display cases. There are approximately 1,000 specimens, 250 charts and maps, 500 special photographs, 100 models, together with 12 large hand-painted wall maps, 14 mural paintings, 11 dioramas, and numerous miscellaneous items; there are over 1,450 explanatory labels, making a total of over 3,300 items.

The Museum renders a unique service by maintaining a constant and direct personal contact with the public. With this fact in mind, a progressive program is carried forward under the following policy: (*a*) To maintain close cooperation with the Bureaus of the Department; (*b*) to maintain continual and courteous contact with the public, relating to the many and varied activities of the Department; (*c*) to extend the influence of the Museum in its services to the Department and to the public.

An average of 3,000 to 4,000 persons visit the Museum monthly. Visitors have registered from every State in the Nation, as well as from Alaska, Hawaii, Puerto Rico, and the Canal Zone. Among Museum visitors represented in the visitors' register were callers from the following countries: Argentine Republic, Bavaria, Bulgaria, Canada, China, England, Finland, France, Germany, Iceland, Iran, Ireland, Italy, Japan, Mexico, the Netherlands, Poland, Scotland, South Africa, South America, Sweden, Switzerland, and Venezuela. During the past 12 months representatives, seeking new ideas in America, have come from museums of foreign countries and have visited the Museum and inquired into its methods. Museum representatives have come from Montreal, London, Liverpool, New Zealand, South Africa, and China, as well as from Boston, New York, Philadelphia, and Los Angeles.

A rotating series of special temporary exhibits has been inaugurated, the first of which was a three months' exhibition, by special invitation of the Secretary, of the collection of honorary gavels presented by numerous States and organizations to the Hon. Edward T.

Taylor, of Colorado, in recognition of Mr. Taylor's outstanding accomplishments in the field of conservation. Other special exhibits include current features relating to the work of the various bureaus.

During the year a large number of special groups, including school and college classes, visited the Museum for conducted tours. School classes which paid organized visits to the Museum came from New York, New Jersey, Pennsylvania, and from such distant points as Ohio and Alabama. Visits from student and organized groups from Maryland, Virginia, and the District of Columbia are of almost daily occurrence. Many calls were received by the Museum for assistance in preparing study courses for schools in such subjects as conservation, reclamation, the national parks, and Indian affairs. A pamphlet was printed by the Museum containing descriptive material. Other pamphlets pertaining to the work of the Department were distributed from the information desk.

The Museum is growing in its influence, in its services, and also in its needs. Natural changes and improvements continually should be expected. No museum should be allowed to become stagnant. A petrified forest is a national asset, a petrified museum is not. It is desirable to maintain the Interior Department Museum in a condition that is strictly up to date, fluent, and alive. The interest manifested by the officers of the Department and the cooperation extended by the Bureaus is gratefully acknowledged.

OFFICE OF DIRECTOR OF FORESTS

Lee Muck, *Director*

ALTHOUGH approximately 1,000,000,000 acres of the 1,500,000,000 acres that at one time comprised the public domain of the United States have been disposed of, and about 150,000,000 acres reserved for national forests and other purposes have been placed under the administration of other departments, there are still approximately 265,000,000 acres of public lands under the jurisdiction of the Department of the Interior in the continental United States. This is by far the largest public-land area under the jurisdiction of any Federal Department, exceeding by more than 100,000,000 acres that of any other Department. In addition to this vast and far-flung area in the United States proper, the Department of the Interior also has 335,000,000 acres of public lands under its supervision in the Territory of Alaska, thus making the Department responsible for the administrative management of a 600,000,000-acre estate, or approximately three-fourths of all lands now in Federal ownership.

This highly valuable public asset is comprised of a wide range of resources including the primeval forests of the National parks, the productive forests of the revested and reconveyed grant lands of Oregon, the valuable timber stands on Indian reservations, the forests and woodlands of the unappropriated and unreserved public lands, vast areas of productive grazing lands, extensive water and mineral resources, valuable coal and oil deposits, and unique scenic areas. As a consequence of the diversification in the character, extent and distribution of these resources, management policies are naturally also diversified and must be harmonized and made sufficiently broad and flexible to permit of the use of a wide variety of acceptable practices ranging from the preservation of areas in a primeval state for esthetic and recreational purposes to the intensive development and management of areas for industrial advancement and the sustaining of dependent communities.

The forest resources under the jurisdiction of the Department of the Interior in the United States and Alaska are as follows:

Agency	Forest area, United States	Forest area, Alaska	Total forest area
Biological Survey	750,000		750,000
Grazing Service	[1] 25,000,000		25,000,000
General Land Office	[2] 3,000,000	[3] 150,000,000	153,000,000
Oregon and California Lands	2,680,000		2,680,000
National Park Service	[4] 8,000,000	100,000	8,100,000
Office of Indian Affairs	[4] 16,000,000		16,000,000
Bureau of Reclamation	10,000		10,000
Total	55,440,000	150,100,000	205,540,000

[1] A rough estimate.
[2] Located principally in Oregon, Washington, and Idaho.
[3] Includes 40,000,000 acres of comparatively dense spruce and 110,000,000 acres of open woodland.
[4] Includes juniper-piñon type.

The forest lands under the jurisdiction of the Department of the Interior, excepting those included in the public domain proper, were set aside for specific purposes, the major objective to be realized being set forth in congressional enactments. These objectives vary from the preservation of the forests in their natural condition in the case of the national parks, to logging them with due care for their replacement in the case of Indian forests and Oregon and California forests. Specific legal restrictions thus apply to the national parks, but on other lands full use of all resources is permitted under sound conservation principles and practices. The Department thus finds itself the custodian of a vast domain divided into several categories of permitted use, each category being administered by and under the jurisdiction of a separate office or bureau.

FORESTRY PROBLEMS HANDLED

Inasmuch as several administrative units of the Department are concerned with the use and management of forest resources and since different laws apply to the lands under the jurisdiction of each, the Secretary of the Interior, by Departmental Order No. 1283, dated May 18, 1938, created the Office of Director of Forests for the purpose of bringing about the fullest possible measure of coordination and integration of forestry functions and activities within the Department.

The major problems with which the Office of Director of Forests was concerned during the fiscal year 1939 were:

1. The organization of the Oregon and California Revested and Reconveyed Grant Lands Administration.

2. The conducting of a survey and the compilation of a report covering the forest resources and the administrative organization for forestry under the jurisdiction of the Department of the Interior, for presentation to the Joint Congressional Committee on Forestry.

185642—40——27

3. The administrative direction of Indian forest and range lands.
4. The direction and control of Departmental forestry business.
5. The rendering of technical advisory service to the Department and its several bureaus dealing with forestry matters.

OREGON AND CALIFORNIA REVESTED LANDS

Among the new and larger forestry responsibilities of the Department is the administration of the Oregon and California revested and reconveyed grant lands, comprising an area of 2,680,000 acres, located in 18 counties in western Oregon. According to the Federal Forest Survey, the total timber volume on these lands is approximately 46 billion board feet, thus placing them in the front rank of American forests. The act of August 28, 1937, provided for a plan of sustained-yield forest management covering this far-flung forest property and limited the cost of administration to 25 percent of the gross income. This special fiscal provision requires planning within income, and places the entire set-up on a sound business basis.

Major forward steps were taken during the fiscal year in the organization of the Oregon and California forest administration; regulations providing for the sale of the timber under forestry principles were placed in effect; an administrative and supervisory personnel was appointed and organized; a classification of the lands required by the 1937 act was started; tentative sustained-yield units were outlined; a large number of forest improvements were constructed; a comparatively substantial volume of timber was advertised and sold; and, finally, the entire business set-up was brought under direct administrative control. Much remains to be accomplished in connection with the development and improvement of this important forest enterprise. However, a consideration of the progress made during the fiscal year ended June 30, 1939, leaves little doubt of the continued success of the undertaking under the sound forestry principles provided by the authorizing legislation.

OTHER WORK ACCOMPLISHED

For the first time in the history of the Department a specific authorization was given and funds were provided for the protection of the interior forests of Alaska. An amount of $37,500 was made available for the fiscal year beginning July 1, 1939. The fact is recognized that a much larger appropriation is necessary to adequately protect the vast forest and range resources of this territory. However, a foundation looking to effective protection and administration has been laid down and a small but efficient organization is now functioning in the field under the direction of an experienced forester. Much progress

is being made through the cooperation of the Civilian Conservation Corps and other Federal and private organizations operating in Alaska, and a reasonable degree of success is assured although the funds available for direct administration are comparatively limited.

The Division of Forestry and Grazing of the Indian Service and the Branch of Forestry of the National Park Service functioned effectively during 1939 and closed the year with comparatively good fire records. Neither of these organizations receive adequate funds for the protection and administration of the valuable resources under their supervision and have found it necessary to depend in large measure upon the assistance rendered by the Civilian Conservation Corps. A high degree of cooperation in the field has been developed between these two forestry organizations and the Oregon and California Administration. These cooperative efforts have already demonstrated their mutual advantages especially in the control of forest fires.

The Forestry and Grazing Division of the Indian Service maintained its established record of operating well within income for the fiscal period 1939. The forests and lumber manufacturing plants under its supervision returned substantial values to the Indians and the cost of operations approximated 15 percent of the gross income. The facts concerning the management of Indian forests are contained in the section of the annual report devoted to the Office of Indian Affairs.

The Office of Director of Forests was given congressional approval in the Appropriation Act of the Department of the Interior for the fiscal year beginning July 1, 1939, and three positions were authorized. Consequently it is planned to increase the staff by employing an additional trained forester and to enlarge the scope of its functions and activities. A comparatively large volume of work was accomplished during the year. Several field investigations were conducted, and much correspondence and legislation were reviewed and acted upon. A number of court cases covering forestry matters were completed. The forestry functions and activities of the whole Department both in the field and the Washington Office were more fully coordinated and integrated and all administrative units of the Department dealing with forestry were drawn more closely together in the interest of efficiency and economy.

ST. ELIZABETHS HOSPITAL

Winfred Overholser, M. D., *Superintendent*

I HAVE the honor to submit herewith the annual report of St. Elizabeths Hospital for the fiscal year ending June 30, 1939. The year has been on the whole a successful one. Every effort has been exerted to maintain the care of the patients, the prime duty and interest of the hospital, on a level worthy of the fine traditions of the hospital, thanks to the interest and intelligent cooperation of the medical staff and ward personnel. The growth of the hospital has continued, and shows no sign of immediate decrease. The general health of the patients has been maintained, and no epidemics or strikingly unusual occurrences have taken place. The physical plant has been efficiently maintained, and the teaching and research programs have been vigorously prosecuted.

MOVEMENT OF POPULATION

On June 30, 1930, 6,274 patients remained in the hospital, as compared with 5,968 on June 30, 1938, an increase of 306.

The total number of patients under treatment during the year was 7,024, as compared with 6,696 the preceding year, an increase of 328.

The total number of admissions during the year was 1,056, as compared with 1,029 the preceding year, an increase of 27.

The total number of discharges for the year was 469, as compared with 461 in the preceding year, an increase of 8.

The total number of deaths for the year was 281, as compared with 267 for the preceding year, an increase of 14.

The total number of discharges and deaths, combined, was 750, compared with 728 for the preceding year, an increase of 22.

There were 66 burials in the hospital cemetery, as compared with 64 the preceding year, an increase of 2. All honorably discharged service men are entitled to burial in the Arlington National Cemetery. All bodies not buried at the hospital or Arlington Cemetery were taken by registered undertakers for burial in other cemeteries.

The daily average patient population was 6,108, as compared with 5,835.7 the preceding year, an increase of 272.3. Seven hundred and seventy-seven District patients were admitted, as against 741 for the previous year. It is probable that the proposed modification to

One of the Nation's Foremost Institutions for Care of the Mentally Ill, St. Elizabeths Hospital, in Washington, as Seen From the Air.

the act created as the "Commission on Mental Health" will result in considerable increase in District patient admissions for 1940, but probably due to the fact that these patients will be admitted during the early part of their disease the number of hospital days per patient should be somewhat decreased.

An interesting feature of the admissions is that although a net increase in admissions of 27 is noted over the preceding year, there were actually 32 more colored males and 41 colored females admitted than in 1938, or an increase of 73; in other words, a decrease of 46 white admissions took place. No explanation is offered at this time, but the trend will be carefully observed during the coming years.

Movement of Patient Population, Fiscal Year 1939

	Male			Female			Total
	White	Colored	Total	White	Colored	Total	
Remaining on rolls June 30, 1938	2,959	940	3,899	1,315	754	2,069	5,968
Admitted during year ended June 30, 1939	457	201	658	243	155	398	1,056
Total number under care and treatment during year ended June 30, 1939	3,416	1,141	4,557	1,558	909	2,467	7,024
Discharged as—							
Not insane	10	3	13	0	0	0	13
Recovered	96	22	118	49	17	66	184
Improved	84	27	111	23	11	34	145
Unimproved	77	15	92	26	9	35	127
Total discharged	267	67	334	98	37	135	469
Died	106	52	158	71	52	123	281
Total of patients discharged and died	373	119	492	169	89	258	750
Number of patients remaining on rolls June 30, 1939	3,043	1,022	4,065	1,389	820	2,209	6,274

MEDICAL DEPARTMENT

Medical services.—The number of admissions during the fiscal year 1939 totaled 1,056, or approximately 40 percent more than 10 years ago; the increase in admission rate has been fairly consistent throughout the 10-year period. At the same time the total number of discharges has increased with equal consistency, reaching 469, or 44.41 percent of the admissions during the past fiscal year. There has been an increase of 48.4 percent in the number of discharges since a decade ago, as compared with an increase of approximately 40 percent in admissions over a similar period of time. The discharge rate during the past fiscal year has been 1 for every 13 patients under care. The death rate has decreased in recent years, there being 281 deaths during the past fiscal year. The death rate during the past fiscal

year has been 1 per 22 patients under care. Out of 281 deaths during the year autopsies were held on 211, or 75 percent.

At the end of the fiscal year there were 336 patients on visit. Extended visits have been granted to approximately 263 patients during the past fiscal year.

It is believed that a psychiatric follow-up clinic should be organized for patients who have been released from St. Elizabeths Hospital. Also, a neurosyphilis outpatient department might be worthy of consideration, because these patients who have had fever therapy and chemotherapy at the hospital can obtain more satisfactory follow-up treatment by continuing under the supervision of the staff members who are familiar with their cases. A psychiatric outpatient department for the purpose of following patients who have been released from the hospital would not only render a service to the hospital patients but perhaps result in a saving to the District. Possibly a more liberal policy with regard to the release of patients would be feasible if provision should be made for their nominal psychiatric supervision in the community.

On account of the increased number of patients during the year it was necessary to make several changes. Sycamore and Oak Wards have been transferred from the West Side Service to the West Lodge Service to take care of the increased number of colored male patients.

Ward No. 3 in the Women's Receiving Building has been set aside for giving insulin and metrazol therapy, which was carried on from September 12, 1938, to May 31, 1939. Seventy-two patients were given insulin therapy, and 101 patients were given metrazol therapy. One patient received triazol therapy. Twenty-four patients were given combined insulin and metrazol therapy, and 15 patients received insulin therapy followed by a course of metrazol; in all, a total group of 39 received a combination of both insulin and metrazol therapy during the year.

Moving pictures were taken of the metrazol therapy, particularly the cases of depression that were treated, these being taken in color.

Special blood chemical work was done on 37 of the patients treated.

In all there were given 3,955 insulin injections, a total of 362,850 units of insulin used; 1,509 metrazol injections were given, and a total of 1,415 gm. of metrazol were used.

There were comparatively few complications noted during the course of the shock therapy. The combined insulin-metrazol therapy appears more effective in the treatment of schizophrenia than the treatment with either metrazol or insulin alone. We regret to note that after 2 years, during which 225 patients have been treated by

these methods under nearly ideal conditions, 171, or 76 percent, of them still remain in the hospital.

Female Cottage No. 2, formerly used for tuberculous patients, is now used for housing colored female patients; 22 additional beds were provided for this purpose. Female Cottage No. 1 has been repaired and painted, and is to be used for the same purpose.

The new equipment purchased for a beauty parlor in Q Service has been installed, and this parlor has been opened in the basement of the building with a full-time beauty operator. It is functioning in a very satisfactory manner, and the patients seem to appreciate this additional therapeutic procedure.

The colored women's service, known as the Q Service, continues to be extremely overcrowded on account of the increase in admission of colored female patients.

The large number of days off makes a material shortage in personnel, as in this institution there is required service 24 hours each day and 365 days a year. It has been found that with the time off noted two extra employees are required for every three employees on duty. Thus, although the personnel appears generous in number, it is actually not fully adequate for that degree of personal attention to patients which is required by modern standards.

The hydrotherapy treatments in all departments have been very materially increased; it will be necessary to give consideration at an early date to installing a hydrotherapy department in Howard Hall Building, West Lodge Service, and West Side Service.

The beauty parlors in the Women's Receiving Service and in the Toner Building continue to be extremely popular with the patients and apparently have a decidedly beneficial effect on many of them.

In the white women's service there has been a definite increase in the percentage of cases of dementia precox admitted to the hospital during the year, 36.8 percent as compared to 30.2 percent last year. At the same time there has been a decrease in the percentage of cases of psychosis with cerebral arteriosclerosis admitted, namely from 23.7 percent last year to 19.7 percent this year. There appears to be an increase in the percentage of functional mental illness admitted to the hospital; 55.2 percent this year as compared to 46.1 percent last year. There is a corresponding decrease in the cases of organic mental disease; 35.6 percent this year as compared to 44.4 percent last year. Epilepsy and mental deficiency were placed in an unclassified group together with the undiagnosed psychoses. These constituted 9.2 percent.

Among the research activities on the Women's Receiving Service was a study of hyperostosis frontalis interna, which has been completed; involutional psychosis and amniotin therapy, which has been

completed; a project on the study of the relationship between hearing defects and paranoid tendencies, which has been completed; a project is being instituted to study the effect of a special new drug—a belladonna derivative—on Parkinsonian syndrome; and another project of a clinico-pathologic nature has been begun to obtain further knowledge regarding the differentiation between senile and arteriosclerotic psychoses.

During the year an office was opened in the Men's Receiving Building with a podiatrist in charge for treatment of the feet of the various patients.

The heliotherapy deck in the Men's Receiving Building has been remodeled and the entire roof covered with wire mesh, which will not keep out the light and will give protection and freedom to a greater number of patients.

During the year the ward exit, glass-paneled doors in the Men's Receiving Building were replaced by solid wood doors; this became necessary because patients were breaking these panels and making successful elopements.

Arrangements have been made for additional occupational therapy in the Men's Receiving Building. In addition to the occupational department in the basement, a course in printing is given to the patients.

Every effort has been made to reduce the number of seclusions and restraints, and it appears during the past year that these have been reduced to a negligible point.

Medical and surgical service.—The medical service during the past year has been occupied chiefly with the routine medical care of patients and employees in the hospital.

The modern, nonsurgical treatment of tuberculosis, as reported last year, has continued.

The various types of treatment of paresis consisted of the use of both the quartan and tertian malarial therapy, foreign protein therapy to produce fever, reinforced with chemotherapy of various types.

There was no very pronounced epidemic of an infectious disease of the respiratory system during the past winter.

The treatment of the pneumonias was begun during the first part of the winter with the use of the new drug sulfanilamid. During the last part of the winter a supply of the newer drug sulphapyridin was obtained, and such cases thereafter were treated with this drug. The number of cases in which it was used was too small to permit us to draw any conclusions, but it can be said that in each instance the therapy was promptly and entirely successful. The experience, however brief, was sufficiently encouraging to lead us to decide that

during the coming winter the sulphapyridin treatment should be the treatment of choice in all cases of pneumonia on their first admission.

Aside from the usual run of surgical procedures during the year the use of the Smith-Peterson nail has been availed of for internal fixation of fracture of the neck of the femur on many occasions.

A new combination ether-aspiration machine, of the fireproof type, was purchased for use in the operating room during the year.

A professional anesthetist has been added to the list of part-time physicians.

The work of the antiluetic clinic continues to increase, the past year showing the largest number of patient-visits during any one year in its history, the number running approximately 11,000.

The experimental investigation of the value of aldarsone, reported last year, continued during a part of the current year. In the period elapsed since initiating this type of therapy no definite clinical improvement and only very slight serological improvement has been observed in this group.

The serological survey which was mentioned in the report of last year, has been under way but is not completed.

The number of patient-visits to the Ophthalmological Clinic has increased by approximately 25 percent over the number of visits of the previous year.

The work of the Otolaryngological Clinic has increased about 10 or 12 percent over the preceding year.

The work of the Dermatological Clinic has slightly increased over that of the preceding year.

The work of the Genitourinary Clinic has not increased during the year, the number of patient-visits being approximately the same as during the preceding year.

The number of visits to the Gynecological Clinic has increased about 1 percent during the year over the previous year.

The work in the Physiotherapy Clinic has increased over the preceding year by about 8½ percent in the number of clinic visits, the number of the latter during the current year having been well over 11,000.

The high-frequency short-wave apparatus purchased at the end of the preceding fiscal year has been in use a great deal during the current year and has given eminent satisfaction.

The number of radiographs in the radiographic department of the X-ray division has increased 11 percent over the preceding year, and the number of treatments in the radiotherapy section has increased by 20 percent over the previous year.

During the year a special apparatus has been purchased and installed for encephalographic work. Such work has been under way since about the first of last September and a large number of encephalographic studies have been made.

The number of visits to the Dental Clinic has increased by only a relatively few visits during the course of the year.

The visits to the Minor Surgical Service have increased by 17 percent during the past year over the preceding one.

The Clinical Laboratory established in the Medical and Surgical Service has continued to operate with very great satisfaction.

In Glenside Building, set aside for women tuberculous patients, there have been added seclusion rooms with the result that conditions which necessitated these rooms have been very much improved.

As mentioned earlier, a podiatric service has been set up in the Men's Receiving Building. From September 1938 to June 30, 1939, about 800 cases have been treated. The podiatrist in charge has examined and directed the care of 650 patients who needed treatment for postural and acquired deformities of the feet.

The basement of Continuous Treatment Building No. 3 has been opened as a recreation center for the patients in the Continuous Treatment group. The American Red Cross has arranged to detail one of their workers to this section, and this gives an outlet for patients who otherwise would have no opportunities to participate in recreation affairs.

Laboratory.—The Director of Laboratories, who assumed his duties on July 15, 1938, put into effect a reorganization program which brought about more efficiency and was thus worth the cost, chiefly in manual labor, which it required.

The laboratory has been in the last few years handicapped by vacancies in the technical personnel. We have been fortunate in filling the positions of junior technician and junior chemist, and there has been created a position of physician to take care of the electroencephalography division.

A great deal of additional equipment has been furnished to the laboratory which relieves the handicap existing due to this condition.

Biochemical division.—In addition to the usual work of chemical analysis of the blood, cerebrospinal fluid, and other body fluids for the clinical needs, this division has been active in extensive studies of blood of patients under insulin and metrazol treatments. Moreover, a great deal of work has been done in putting into practice methods of analyses more specifically for research work—analyses of lipids, gases, potassium, sodium, and other minerals.

Electroencephalography division.—The work in this division has already proven its practical usefulness in patients with certain organic diseases in which there is a need for localizing the lesions and also in those cases in which one suspects organic involvement. Electroencephalography is, however, still in the experimental phase, particularly with respect to its significance in psychopathology. Thanks to the fund donated by the Supreme Council, Thirty-third Degree Scottish Rite Masons of the Northern Jurisdiction, United States of America, we were enabled to obtain a three-channel apparatus which will facilitate the work in this division.

The brain-wave studies carried out during the fiscal year are as follows:

Helium and increased pressure experiment	68
Schizophrenia with and without sodium amytal	65
Miscellaneous: Brain tumor, epilepsy, traumatic, normals	20

Research activities in the various departments of the hospital.—Research projects now in progress include:

1. Clinical and histopathological studies of cases of cerebral arteriosclerosis.
2. Study of post-encephalitic psychosis.
3. Study of the conditioned reflex in normals and patients.
4. Study of cases with pituitary tumor.
5. Studies on the distribution of sulfanilamide between blood, cerebrospinal fluid, and urine in organic and functional psychoses.
6. Electroencephalographic studies in schizophrenic patients before and after injection of sodium amytal.
7. Experimental studies in animals on the effect of insulin on the histology of the cerebrospinal nervous system.
8. Experimental studies in animals on the effect of metrazol on the histology of the cerebrospinal nervous system.
9. Biochemical studies with special reference to lipids. A great amount of work was carried out to establish the method.

Department of psychology.—While in the great majority of the cases examined the test given has been the Stanford Binet, old form, some experimental use has been made of other tests with a view to finding the best all-around instrument for the measurement of the intelligence of adult psychotics and the best techniques for determining such questions as organic damage or responsiveness to shock therapy, and for studying the personality structure. Among the tests tried out have been the new form of the Stanford Binet, as a scale for general use, various sorting tests—the Weigl, B. R. L., and Vigotsky—and the Rorschach as predictive of results in shock therapy, and the Rorschach also and the Murray thematic apperception test for special personality studies. Again, as for several years

past, the department has employed the Bernreuter personality inventory together with the Binet test in the examination of all students admitted to the training school.

In research in this department the completed series is as follows:

I. Dementia precox and general intelligence.
II. Patterns of mental function in dementia precox.
III. Dementia precox and the concept of deterioration.

Besides this completed work a number of shorter studies are under way which it is hoped may be finished during the coming year.

1. A comparison of the performance of a group of patients on the Binet test before and after pharmacological shock therapy.

2. A comparison of the performance of a group of patients on the new and the old forms of the Binet test.

3. A study of the value of the new sorting tests—the Weigl, B. R. L., and Vigotsky—in predicting the results of pharmacological shock therapy in different types of psychosis.

4. A study of the value of the Rorschach test in predicting the results of pharmacological shock therapy in different types of psychosis.

5. A study of the performance of groups of patients suffering from various types of organic brain disease on the new sorting tests—Weigl, B. R. L., and Vigotsky—and on the Kohs block test.

Nurses' Training School.—A committee of the Nurses' Training School was appointed during the year with Dr. Reichenbach as chairman, Dr. Eldridge, Dr. Hall, and Dr. Silk. Under their direction the School of Nurses for training student nurses opened on October 15, 1939, with a class of 38 students—9 men and 29 women.

During the past year postgraduate courses for nurses have been much more satisfactorily carried on and this course reorganized.

The affiliating schools have been carefully selected; the type of affiliates obtained and quality of work have improved.

Students Enrolled in the Nurses' Training School

JULY 1, 1938		JUNE 30, 1939	
St. Elizabeths students	18	St. Elizabeths students	28
Third year	18	Third year	0
Second year	0	Second year	0
First year	0	First year	28
Affiliated students in psychiatry	42	Affiliate students	33
Affiliate students in medicine	1	Freedmen's Hospital affiliate students	8
Postgraduates enrolled July 1, 1938 (2 other postgraduates reported July 5, 1938.)	5	Postgraduates enrolled July 1, 1939	9
Total enrolled	66	Total enrolled	78

St. Elizabeths students:

Total in school July 1, 1938	18
Graduated during the year	18
Enrolled in school Nov. 16, 1938	36
Resigned during the year	8
Total in school June 30, 1939	28

Of the 18 students who were enrolled in the third-year class as of July 1, 1938, and have all completed their course of training, 11 have been appointed to the hospital as graduate nurses (8 of these nurses are now on the staff, 3 having resigned).

An agreement was arranged by the School of Nursing of St. Elizabeths Hospital and Freedmen's Hospital School of Nursing whereby the Freedmen's students reported to the hospital daily for classes and experience in psychiatric nursing. The first group of students reported as of December 1, 1938.

Libraries.—The medical library (including the nurses' library and the deposit libraries in the Medical and Surgical Building and in the laboratory) received the addition of 71 new books purchased, and 21 books received as gifts. Five hundred and twenty-seven books in the nurses' collection were transferred to the medical library. This makes a total of 10,121 volumes and a large number of miscellaneous pamphlets, reports, and bulletins of our own hospital in the library. The library subscribes to 54 periodicals, including the Index Medicus.

The library was very fortunate in receiving through Mrs. William A. White the gift of Dr. White's private collection of over 1,500 books and a number of reprints. The books were formally presented January 31, 1939, and while in the possession of the hospital have not yet been transferred to the medical library.

A total of 1,003 volumes were added to the patients' library during the year. Of these, 168 were new books purchased by the hospital, 554 were donated, and the balance were magazines obtained from the bindery. Total number of books on hand, 17,533. Thirty-three popular magazines and 5 newspapers, daily and Sunday, were regularly received. Approximately 300 books are drawn daily, two-thirds of them being fiction, and about 3,500 books were in constant circulation.

RECREATIONAL, VOCATIONAL, AND OCCUPATIONAL WORK

Occupational therapy.—During the year 1,053 patients working in the occupational therapy turned in 13,607 pieces of craft work and 48,742 pieces of industrial work.

The printing department turned out 120,720 copies of various items.

Social service.—During the year the total number of patients looked after by the social service was 366. They obtained 82 histories; service was rendered for 233 in-patients, and they made 354 visits to make surveys.

Red Cross.—The local representatives of the American Red Cross under the field director have continued their program of former years, in cooperating with the hospital and increasing the amount of work. Certain special projects have been undertaken during the year which have been a source of much pleasure to the patients.

There are now nine persons on duty daily at the hospital who are paid by the American National Red Cross. The Red Cross House has been kept open daily from 10 a. m. to 8 p. m. The daily house population of individual patients and of patients in groups is between 300 and 400. During the year the Red Cross workers chose the moving pictures and paid for the operation of 94 films furnished to the hospital. They initiated and conducted 273 parties and entertainments, 16 band concerts, and distributed 2,778 tickets to theater and baseball parties. During the past year the patients had three boat rides down the river; these boat rides were given through the American Legion, and transportation was supplied partially by the Legion, by the District Chapter Motor Corps, and by the hospital. The American Red Cross furnished transportation for the patients to the White House lawn party. During the year there were 509 ward activities, parties, music, dances, etc., and the Red Cross distributed 1,050,000 cigarettes.

The W. P. A. Trio and the W. P. A. Dance Orchestra played several times a week and permitted us to have a tea dance and bridge party every Thursday during the year for both men and women patients. The W. P. A. has now secured a music teacher for the colored patients.

There were special parties for the Indians.

On January 31, 1939, the Honorable the Secretary of the Interior unveiled a large photograph of the late Superintendent, Dr. William A. White, in the lobby of the Men's Receiving Building, in the midst of a large gathering of employees in the hospital and friends of the former Superintendent and Mrs. White. This painting, executed by Mr. Henry R. Rittenberg, was paid for by voluntary gifts from the employees and friends of Dr. White.

ADMINISTRATIVE DEPARTMENT—OFFICE OF THE ASSISTANT TO THE SUPERINTENDENT

Supplies.—The supplies produced on the hospital reservation, including farm and garden products, included the following: 281,092

gallons of milk, 173,642 pounds of fresh pork, 4,051 pounds of chicken, 481 bushels of beans, 16,583 bunches of beets, 1,071 bushels of cabbage, 51,057 bunches of carrots, 656 bushels of collards, 42,400 ears of green corn, 113 bushels of cucumbers, 6,650 bunches of endives, 1,826 bushels of kale, 39,600 heads of letture, 10,579 bushels of dry onions, 62,400 bunches of green onions, 11,142 bunches of parsley, 237 bushels of parsnips, 697 bushels of green peppers, 641 bushels of sweetpotatoes, 3,174 pumpkins, 17,217 bunches of radishes, 672 bushels of spinach, 406 bushels of mustard spinach, 761 bushels of squash and 483 single squash, 3,317 bushels of Swiss chard, 2,561 bushels of ripe tomatoes and 53 bushels of green tomatoes, 1,607 bushels of turnips, and 644 bushels of turnip greens.

In addition to the items mentioned, 26,448 gallons of ice cream were manufactured by the hospital. The farm produced forage as follows: 31 tons of alfalfa hay; 37 tons of blue grass and timothy, mixed; 510 tons of corn ensilage; 75 tons of soybean hay; 24 tons of soybean and sudan grass hay; 25 tons of timothy hay; 58 tons of wheat hay; and 3,000 bushels of ear corn.

The shoe shop produced 6,966 pairs of shoes and slippers for men, 1,617 pairs of shoes and slippers for women, and 27 pairs for boys. It repaired 1,991 pairs of shoes and slippers. It produced 2,664 belts and 3,851 suspenders, all made in the same department.

The mattress shop produced 2,688 mattresses and 2,415 pillows. The brush shop turned out 1,888 of various kinds of brushes. The broom shop made 4,201 common brooms and 156 whisk brooms. In the bakery there were baked 917,161 loaves of bread, 3,403,608 rolls, and 64,092 pounds of pastry. The laundry washed, dried, and ironed 14,435,569 pieces. The power plant manufactured 532,952,000 pounds of steam; the electrical department generated 3,916,140 kilowatt-hours of electricity; there were pumped 433,433,000 gallons of water, and the main refrigeration plant produced 7,491 tons of ice and refrigeration. All the steam, electricity, ice, and refrigeration used on the reservation was manufactured by the hospital.

In addition, large quantities of clothing for men and women were made in the sewing rooms, tailor shops, and occupational therapy departments, including 3,808 aprons of various classes, 2,435 pairs of bloomers, 850 covers, 2,416 curtains, 2,700 pairs of drawers, 32,000 dresses of various classes, 22,690 sheets, 2,150 shirts, 12,228 slips, 6,882 pairs of step-ins, 1,445 tablecloths, 2,560 mattress ticks, 1,637 pillow ticks, 20,800 towels, 3,000 berets, 637 woven rugs, 633 embroidered runners, 3,646 linen towels, and other items.

Dairy and cow barn.—The Holstein-Friesian herd was again tested for tuberculosis in March 1939 and found to be practically free from this disease. The herd, consisting of 437 cows, heifers, calves, and bulls, is one of the largest accredited herds in the country. The last test for Bang's disease was made April 10, 1939, and the herd is free of this disease.

The output of milk has slightly decreased during the year, but additional cows have been purchased in order to keep up the average. Lack of space prevents the caring for the number of cows to furnish all the milk required, and about 200 gallons per day additional milk were purchased to meet requirements. The lowest daily production of the herd during the year was August 1939, 596 gallons; the highest daily production was March 1939, 894 gallons. With the increased population, the hospital will require a daily production of over 1,000 gallons of milk. Compared to the maximum production of 894 gallons and the minimum of 596 gallons, we will probably require a herd of between 325 and 350 milking cows to produce the estimated quantity of milk required. This would require at all times over 600 cows, heifers, etc., on hand.

Hogs.—The herd of hogs is in excellent condition. No contagious or infectious disease existed during the year. The hogs numbered 797, which produced 173,642 pounds of fresh pork during the year.

Poultry plant.—There was an outbreak of disease in the poultry during the previous year which resulted in the killing off of all fowl. The land was plowed over to rid the premises of parasites and diseases. New chicks were purchased, numbering 2,000 baby white leghorns and 500 New Hampshire reds, and at the beginning of the season, in March, an additional 2,000 white leghorns and 700 New Hampshire reds. The records show that broilers were available in December 1938 and the new pullets began laying in February. During the balance of the fiscal year these new arrivals furnished the hospital with 4,051 pounds of chicken and 4,962 dozen eggs.

Of particular importance has been the introduction of a number of crops, the purpose being to ensure a more steady flow of vegetables to the hospital, vary the patients' diet, improve the land, etc. Some failed to answer the purpose; others were highly successful. Among the latter may be mentioned Swiss chard, first tried in 1930, which has proven to be one of the most reliable, as well as the best producer per acre among the crops grown for table greens in the past eight years.

Another crop worthy of mention is soybean, introduced into the cropping system as a hay crop.

This intensive use of land was a natural result of the ever-increasing pressure for more foodstuffs for the growing population of the hospital. The need of additional farm land is vital. The location of the dairy and piggery in the center of a large growing city population is meeting with objection, while a small production is not in keeping with the needs of the hospital.

Lawns and grounds.—The increased number of buildings with lawns around them has materially increased the work of this department. Lawns have been arranged in connection with all new buildings, and flowerpots have been set out in all portions of the grounds.

Personnel.—The total number of employees on the hospital rolls June 30, 1939, was 1,786. There were 441 appointments during the year, and 381 separations.

During the year 19 of the old employees were retired from the service on account of age and disability.

Administrative promotions (salary rating increases) were granted to 59 employees. Promotions in grade and position were granted to 43 employees.

There was a 13½ percent turn-over in the permanent personnel, occurring chiefly in the force of attendants. This was an increase of about 1½ percent over the previous year.

Those retired were the following:

Lucy Gaddis	Assistant cook.
Milton F. Colburn	Carpenter.
George Hooper	Assistant foreman of laborers.
Mary E. Barnard	Seamstress.
Harry L. Kelly	Foreman plumber.
Bessie M. Sawyer	Waitress.
Mary E. Bush	Kitchen helper.
Katie Martin	Do.
Hilda Moore	Do.
Richard E. Craig	Cook.
Matilda A. Butler	Assistant cook.
Frank Stewart	Junior laborer.
Edith Jones	Laundress.
Margaret C. Burch	Do.
Daniel Boswell	Attendant.
Harvey E. Miller	Do.
Wilmer A. Higgs	Do.
Rosie King	Assistant supervisor.
Albert Corum	Chauffeur.

Among the appointments was Dr. Riley H. Guthrie, first assistant physician, who took office on January 16, 1939.

Purchases.—Supplies were ordered in the amount of $1,709,833. Of this amount, $789,679 were open-market purchases. There were 300

formal contracts entered into, including one for Continuous Treatment Buildings Nos. 5 and 6, amounting to $609,000.

Financial office.—During the year disbursements approved through the financial office amounted to $4,045,885.31 on a total of 4,653 vouchers. Collections received and deposited totaled $3,034,826.66.

Chief Clerk's office.—During the year 1939 in the stenographic office 20,109 letters were written, 3,495 handwritten notes typed, 16,776 Dictaphone cylinders transcribed, and 952 histories pertaining to patients, totaling 10,394 pages, were written.

Post office.—The post-office work has continued to increase, largely on account of the growth of the patient population.

Fire department.—Regular inspections were made of the whole hospital by the fire marshal for the purpose of protecting it from fire. The fire siren is tested monthly, and also the fire-alarm system. The fire pumps at the powerhouse were tested weekly, and the triple combination pumper was tested daily and put in service once a week. Inspections are made weekly with officers and privates of the District of Columbia Fire Department, and occasionally with inspectors from the fire marshal's office. Fire drills are held weekly in various wards of the institution.

During the year there have been 21 alarms, the property damage amounting to $15.50. Approximate loss from fires from June 19, 1917, to June 30, 1939, was $5,874.05, an average of $267 a year.

Continuous Treatment Building No. 3.—Work was completed on this building on August 8, 1938, and it was turned over to the hospital for occupancy. About 186 patients have been moved into this building.

Continuous Treatment Building No. 4.—Ground was broken July 11, 1938, for Continuous Treatment Building No. 4. The contract provided for completion within 350 calendar days, and with extensions it will be completed and turned over to the hospital at the beginning of the new fiscal year. This will make available for the hospital 186 additional beds.

Continuous Treatment Buildings Nos. 5 and 6.—Specifications were prepared and a contract awarded for Continuous Treatment Buildings Nos. 5 and 6 and a dining-room addition to the kitchen building with connecting corridors. The work was started April 26, 1939, and on June 30, 1939, was 1.68 percent completed, slightly behind schedule. This was due in a measure to labor difficulties in the Washington, D. C., area.

Construction department.—The underpass under Nichols Avenue, together with paving for pedestrian underpass and steps and walk to the employees' cafeteria, was completed.

Also completed was the restoration of the porte cochère at the front entrance to the old Center Building.

The wooden stairway in the Center Building, which has long been considered a fire risk, has been replaced with terrazzo steps, a fireproof enclosed stairway with metal door frames and calamined doors on all floor landings.

The abandoned kitchen in the basement of Q Building was remodeled and converted into a beauty parlor. A new tile floor was laid, walls repaired, storeroom built, and entire room repainted.

Two rooms in the basement of the Center Building which had been used for storage of furniture, etc., were renovated and converted into a barber shop for the West Side patients.

Laundry.—The work of the laundry has increased to such a degree that it is difficult to see how more pieces could be washed and ironed without a larger building, more equipment, and additional employees, or putting the employees on two work shifts.

The number of pieces laundered, dried, and ironed during the year was 14,435,569.

During the year there has been installed an extra drying tumbler to take care of the increased drying of linens.

Culinary department.—The dietetic force, like other departments, has been under pressure due to the increased number of patients.

New coffee urns and electric refrigerators have been installed in both Howard Hall dining rooms.

An electric refrigerator was installed in the diet kitchen of the Nurses' Training School.

Electric can openers have been put in use in general, detached, Toner, and continuous-treatment kitchens.

Food carts, upright vegetable steamers, electric oven, gas ranges, a coffee and tea urn, and bain-marie tables have been ordered to complete the installation of the continuous-treatment kitchen. When this kitchen was first opened for operation it was only half equipped. It is now cooking for 1,400 patients and reached the limit of the amount of work that could be turned out with this equipment. Additional equipment was ordered and is being installed.

An upright vegetable steamer has been installed at the employees' cafeteria, and two for the general kitchen.

Classes in dietetics were taught from March 20 to June 30, inclusive. There were 28 students in the class.

Visits are made regularly by the dietitians to the dining rooms in each service.

Creamery.—During the year the dairy pasteurized 280,936 gallons of milk, a daily average of 770 gallons. About 1,100 quarts of milk

were bottled daily; the remainder was canned for use in the kitchens and bakery and for making ice cream. Altogether, 51,500 gallons of milk were purchased.

An average of 20 gallons of buttermilk was made daily by the cultured starter method.

The ice-cream department manufactured a total of 26,448 gallons of ice cream, a daily average of 72 gallons.

Heating and plumbing department.—A new refrigerating machine was installed in the laboratory.

New valves and gauges have been installed in the various hydrotherapeutic departments and on the shower baths throughout the hospital.

At the dairy barns a complete system of water supply to the drinking cups used by the cows has been installed to replace old pipe lines that were in bad condition and leaking.

There has been installed a pipe line from No. 2 deep-well pump to the reservoir at the water-pumping plant. On completion of this well it will give the hospital approximately 2,000,000 gallons a day of clear, cold spring water for its use. At the present time the hospital is consuming about 1,250,000 gallons of water each day.

Electrical department.—The work of the electrical department has continued to grow, not only being required to provide hospital radio service for the patients in the various buildings but many of the patients have their own private sets which are installed under the supervision of the hospital. Fourteen such sets were installed during the year.

Automatic telephone.—The hospital automatic telephone system traffic amounted to 1,470,480 calls, the daily average being 4,028, and the hourly average 167.

NEW LEGISLATION

In the last report reference was made to Public, 582, Seventy-fifth Congress, providing a new procedure for commitments to St. Elizabeths Hospital. Chiefly, this act set up a commission on mental health as an arm of the court to hear evidence and make recommendations to the court regarding the commitment of persons alleged to be suffering from mental disorder. The compulsory jury trial which had previously been a disgrace was eliminated, although the subject or anyone on his behalf may still demand such trial. It is significant that in only about 4 percent of the cases heard by the commission has this right been exercised—a fact which illustrates effectively the unnecessary nature of the previous procedure. It was recognized at the time of passage of

Public 582 that certain defects were present in the legislation, especially the requirement that 10 days must elapse between the recommendation of the commission and the issuance of an order of commitment by the court. As a result, the admission of patients in need of the care available at St. Elizabeths Hospital has been unnecessarily delayed, and a serious overcrowding has developed in the psychopathic department of Gallinger Hospital. As a result of the public criticism of this provision and its attendant ill results, remedial legislation has been introduced which it is hoped will be enacted and secure a more efficient and humane functioning of the process of commitment of the mentally ill.

NEEDS OF THE HOSPITAL

An estimate of $1,281,150 for the support, clothing, and treatment of patients in St. Elizabeths Hospital for the fiscal year ending June 30, 1941, is recommended. This is $53,870 more than was appropriated for 1940, and is based on an average of 1,950 patients at the same per capita rate of $1.80 per day, or $657 per annum. On June 30, 1939, there were 2,013 patients on the rolls. The average number during the year was 1,932. The number estimated in view of these facts seems very conservative. There was an increase of 306 patients in the hospital on June 30, 1939, as on the same date of the previous year, and it is conservatively estimated that the number to be provided for during 1941 will be 6,450 patients.

In addition to the 1,950 chargeable to the Federal Government and authorized under the Interior Appropriation Act, the number that will be cared for in the hospital during the year 1941 are: 4,150 beneficiaries of the District of Columbia; 90 beneficiaries of the United States Veterans' Administration; 138 beneficiaries of the United States Public Health Service; 15 beneficiaries of the United States Soldiers' Home; and 107 beneficiaries of the Indian Bureau.

The rate estimated for the care of the patients during 1941 is $1.80 per capita per day, the same as for the past 5 years, notwithstanding the increase in the cost of some of the supplies and the change in legislation increasing vacation, sick leave, and holidays, which has a tendency to increase the cost.

Included in the estimate is $185,000 for repairs and improvements to buildings and grounds, the same amount that was included in the past several years. Out of this sum must come funds for keeping the various buildings in repair, including plumbing, heating, steamfitting, plastering, painting, flooring, and for the repair and widening of roads and walks.

The hospital continues to grow. The admissions are increasing, and there is still a shortage of beds. At least 1,000 beds should be provided to cover immediate needs and to include the replacement of the semipermanent group of buildings which were erected in 1918, with an estimated life of from 15 to 20 years. This semipermanent group which has 530 beds is in a rather dilapidated condition and far from fireproof. The cost of repair is increasing, and the hazard from fire is considerable. I consider this recommendation a pressingly urgent one.

The increase in population of 306 during the past year more than offsets additional beds previously authorized. At the present time the hospital has practically no available beds and it will be necessary to put additional beds in various wards to take care of new patients as received.

In a report of the National Resources Committee for May 1938, on The Problems of a Changing Population, is found the following statement:

> More than half the occupied hospital beds in this country are assigned to patients suffering from mental diseases. The social, economic, and medical aspects of these diseases, whereof the causes are still largely unknown, are very serious. They deserve the most intensive study.

The report well states the future of mental institutions and shows that provision must be made for additional beds, as well as for active research.

Two of the continuous-treatment buildings are to be located adjacent to the continuous-treatment kitchen where provision has been made for the preparation and service of food; dining rooms will have to be provided and a tunnel connection to the kitchen so that the food may be brought to the building. It is planned to have cafeteria service in the dining rooms attached to these buildings. The same condition applies to the three buildings that are suggested to replace the semipermanent group. Ground room is available for these buildings.

Based on bids received on the last buildings, it is believed that $350,000 will be required for each of these buildings, which will have a slightly increased number of beds. The first buildings of this class contained 162 beds; the new buildings, it is estimated, will have 200 beds.

There is an estimate of $150,000 for one additional 750-horsepower boiler with the necessary utilities. The hospital recently installed three 750-horsepower boilers, which were sufficient for its needs at that time. Space was left for one additional boiler which would be required when the new buildings were erected. The growth of the hospital requires the additional boiler as soon as arrangements can be made for its erection. Out of this amount also to be provided

is one ammonia air compressor for use in the refrigeration and ice plant. Two small compressors have been in use many years and have reached the maximum of their capacity. In order to supply the needs of a largely growing institution this additional compressor is urgently required.

Expenditure of $750,000 has been estimated for a building for storeroom, warehouse, laundry, and industrial shops, including preparation of plans and specifications, advertising, supervision of construction, and equipment.

The present storeroom was built more than 30 years ago. Since that time the population has very nearly tripled, but no change has been made in the storeroom and warehouse. The present storeroom, with cold-storage equipment, is practically out of date and the storage facilities are insufficient to care for adequate quantities of current supplies. In order properly to house supplies that must be cared for and regularly issued to the various buildings and industries, all sorts of out-of-the-way places have been utilized. The basements of many buildings housing patients have been used for storing furniture. The District Fire Department properly objects to this procedure. It is difficult to give proper protection to articles in all classes of buildings, and there is possibility of shrinkage.

When the present laundry building was erected, the total amount of material washed and laundered each year was about 3,000,000 pieces. This has increased until during the past year over 14,000,000 pieces were washed and laundered. It has outgrown the original building; small additions have been put on each side, but it is necessary to furnish more room. Over 150 patients and 41 employees work in this building. It is contemplated, if a new building is authorized, to make space at one end of the first floor of this building for the laundry. Such authorization is urgently recommended, and the Board of Visitors desires to add its most emphatic endorsement.

There is an estimate of $950,000 to purchase farm land, to construct buildings to house patients who would work on the farm, to construct buildings to house employees, for the farm animals, including dairy, piggery, poultry plant, a building for pasteurizing milk, making ice cream, and other necessary farm buildings, including expenditures for the purchase of land, preparation of plans and specifications, advertising, and supervision of construction.

The hospital consists of four plots of land, in all about 800 acres. The last land purchased for hospital use was in 1891. At that time the hospital had about 1,500 patients, and over 600 acres were used for farm and garden purposes. The hospital, while originally iso-

lated some miles from the center of the city, at the present time on account of the growth of the city and the use of various forms of traffic, is now adjacent to the city and is surrounded by a growing population. The dairy and piggery are in proximity to buildings occupied by patients, and the dairy barn is adjacent to Nichols Avenue, a thoroughfare running through this section of the city, both the dairy and piggery being the subject of a good deal of complaint on the part of the inhabitants of this section.

One part of the farm is located about a half mile from the main site, in what is known as Congress Heights. Certain groups have recommended that a portion of this ground be turned over to the National Capital Park and Planning Commission for playgrounds for children, and that another part be turned over to the District of Columbia for streets and roads. Parts of this same site have been taken by the city for widening streets. We have application on file at the present time requesting permission to run open drains through this land from three points of entrance, to take care of the District drainage water. It will readily be seen that the hospital must oppose all taking of land until additional land is obtained.

Another plot of the hospital is about 4½ miles from Washington; a portion of it is on low land, sometimes under water.

It is believed desirable to obtain approximately 5,000 acres of land, to concentrate all farm projects in one place, increase the size of the dairy herd, the piggery, and the poultry farm, and build about 6 cottages, housing 40 patients each, on this site. This arrangement would permit an increased number of patients to derive the therapeutic benefits of healthful outdoor occupation. This would also prove an economic arrangement, in that the hospital would be able to secure sufficient milk for all purposes, to increase the quantity of pork products and probably to cure pork products, thus reducing the quantity of ham, bacon, and shoulder to be purchased, and also increase the quantity of poultry products, such as fowl and eggs. Furthermore, the removal of the farming activities from the Nichols Avenue site would make available a considerable area of valuable land which could be used for further buildings and for other activities closely related to the immediate problem of the care of patients.

The hospital has no particular site in view, but preliminary studies indicate that such a site could be secured within from 10 to 20 miles from the main plant.

There is an item of $300,000 for a new nurses' home. The original Nurses' Home was built in 1903, and opened for occupancy in 1905. At that time the hospital had about 2,200 patients. It had a 2-year course in the Training School for Nurses, and practically no regis-

tered nurses. At the present time it has 6,300 patients, has just reopened a 3-year course in the Training School, accepts affiliates from the other nurses' training schools in the District and vicinity and postgraduates from similar schools to give them a course in mental training. The original Nurses' Home is filled with female nurses and another building, formerly used by patients, has been remodeled for male students. In addition to these, rooms in out-of-the-way places are used for nurses who are required to live on the grounds to meet emergencies. We have now reached the limit of our capacity, and recommend that an appropriation of $300,000 be authorized for a new home to be erected on the grounds east of Nichols Avenue, where the new construction is in progress.

There is an item of $150,000 to provide a chapel for holding religious services. The chapel at present in use is on the third floor of what is known as the old Center Building, erected partly in 1855 and partly in 1872. The chapel being on the third floor makes it inconvenient, if not impractical, for many of the patients to attend as there is no elevator in this building. The growth of the institution has been away from the old Center Building, and it is proposed to erect a chapel on ground on the east of Nichols Avenue to provide an adequate place for religious services.

STAFF CHANGES JULY 1, 1938, TO JUNE 30, 1939

The following appointments were made during the year:

First assistant physician: Riley H. Guthrie.

Psychiatric residents: Louis A. Cohen, Laura E. Ehrlich, Samuel P. Hunt, L. G. Johnson, Sydney B. Maughs, and Angelo M. May.

Internes: Ewin S. Chappell, Robert C. Hecker, James R. Hurley, Samuel W. Joel, Milton H. Layden, Vincent Marchese, Charles Silverberg, and Oswald V. Todd.

Visiting ophthalmologist: Robert F. Costello.

The following resignations took effect during the year:

Psychiatric residents: L. G. Johnson, Marion S. Love, Angelo M. May, and Burnell V. Reaney.

Internes: John H. Austin, David Brezin, and Robert E. Kennedy.

PUBLICATIONS

Overholser, Winfred, Superintendent:

Saint Elizabeths Hospital (with Capt. E. H. Parsons, Medical Corps, United States Army). The Military Surgeon, vol. 83, No. 3, Sept. 1938, pp. 227–234.

The Early Treatment of Mental Disorders. The Journal of the Michigan State Medical Society, vol. 37, No. 10, Oct. 1938, pp. 883–893.

The Psychiatrist in Court. (Presented before the Academy of Medicine of Washington, May 14, 1938). The George Washington Law Review, vol. 7, No. 1, Nov. 1938, pp. 31–51.

Contribution to: The "Lie Detector," Opinions as to Use and Value of the Polygraph. American Journal of Medical Jurisprudence, vol. 1, No. 4, Dec. 1938, p. 258.

Understanding the Child as a Person. National Parent-Teacher, vol. 33, No. 5, Jan. 1939, pp. 30–33.

The Troubled Mind, by C. S. Bluemel. (Book review.) Scientific Monthly, vol. 48, No. 1, Jan. 1939, p. 85.

Crime and the Community, by Frank Tannenbaum. (Book review.) Mental Hygiene, vol. 23, No. 1, Jan. 1939, pp. 143–145.

Discussion of "Misconceptions of Legal Insanity" by Dr. Gregory Zilboorg. Proceedings New York Neurological Society, Regular Meeting, Oct. 4, 1938. Journal of Nervous and Mental Disease, vol. 89, No. 2, Feb. 1939, pp. 217–220. Also published in Archives of Neurology and Psychiatry, vol. 41, No. 2, Feb. 1939, pp. 429–430.

Some Problems in Psychiatric Expert Testimony. American Journal of Medical Jurisprudence, vol. 2, Feb. 1939, pp. 76–83.

Mental Disease—A Challenge. The Scientific Monthly, vol. 48, No. 3, Mar. 1939, pp. 203–209.

Out of my Life and Work, by August Forel. (Book review). American Journal of Psychiatry, vol. 95, No. 5, Mar. 1939, pp. 1254–1255.

Manual of Psychiatry and Mental Hygiene, 7th edition, by Aaron J. Rosanoff. (Book review.) Journal of Criminal Law and Criminology, vol. 29, No. 6, Mar.-Apr. 1939, p. 925.

Alcohol and the Individual. (Book review: Alcohol: One Man's Meat, by Edward A. Strecker and Francis T. Chambers, Jr.) Scientific Monthly, vol. 48, No. 5, May 1939, pp. 468–469.

Ueber Gewalttatigkeitsverbrecher und Ihre Nachkommen (Violent Criminals and Their Offspring), von Dr. Med. Habil. Konrad Ernst. (Book review.) American Journal of Psychiatry, vol. 95, No. 6, May 1939, pp. 1469–1470.

White, William A., late Superintendent:

Mental Hygiene. (Condensed from Scientific Monthly.) Psychology Digest, vol. 2, No. 9, Nov. 1938, pp. 65–68.

In Defense of Psychoanalysis. (Reprinted by permission N. Y. Herald Tribune Magazine.) Psychology Digest, vol. 2, No. 11, Feb. 1939, pp. 2–4 and 91.

Eldridge, Watson W., Principal Medical Officer: Luetic Osteitis Simulating Malignant Disease. (With A. H. Ungerman and W. H. Vicary.) American Journal of Roentgenology, vol. 40, No. 2, Aug. 1938, pp. 224–229.

Katzenelbogen, Solomon, Director of Laboratories:

Discussion of: "Percental Relationship Between Blood Sugar and Spinal Fluid Sugar in Mental Disease," by E. P. Johns and G. H. Stevenson. American Journal of Psychiatry, vol. 95, No. 1, July 1938, pp. 129–130.

Insulin Treatment in Schizophrenic Patients, Clinical and Biochemical Studies. (With H. E. Harms and others.) American Journal of Psychiatry, vol. 95, No. 4, Jan. 1939, pp. 793–797.

Metrazol convulsions in Man, Clinical and Biochemical Studies. (With M. W. Brody, M. Hayman, and E. Margolin.) American Journal of Psychiatry, vol. 95, No. 6, May 1939, pp. 1343–1348.

Hypochondriasis. Medical Annals of the District of Columbia, vol. 8, No. 5, May 1939, p. 147.

Lind, John E., Senior Medical Officer: Mental Disorder as Seen in General Practice. Medical Annals of the District of Columbia, vol. 7, No. 8, Aug. 1938, pp. 257–260.

Murphy, John P. H., Senior Medical Officer: Progress, Science and the Mind; a History of St. Elizabeths Hospital. Medical Annals of the District of Columbia, vol. 7, No. 10, Oct. 1938, pp. 313–323.

Hoffman, Jay L., Assistant Medical Officer: Hydrotherapy in the Treatment of Mental Disease. Medical Record, vol. 149, No. 11, June 7, 1939, pp. 382–385.

Parsons, Capt. E. H., Medical Corps, United States Army: Saint Elizabeths Hospital (with Dr. Winfred Overholser). The Military Surgeon, vol. 83, No. 3, Sept. 1938, pp. 227–234.

Haydon, Edith M., Superintendent of Nurses: The Status of Psychiatric Nursing in the United States and the Present Facilities for Training both Student and Graduate Nurses for this Branch of Work. "Bits of News" from Headquarters, Graduate Nurses' Association of Virginia, vol. 7, No. 2, July 1939, pp. 32–36.

VISITORS

As has been the case for many years in the past, the hospital has been honored during the year by the visits of many physicians and other professional workers who have known of the activities of the hospital and who have desired to obtain first-hand knowledge of the methods employed there in caring for the mentally ill. In addition to many who have travelled from other parts of the United States (including Puerto Rico), the following foreign countries have been represented: Canada, Mexico, China, Denmark, England, Greece, Netherlands, Scotland, Sweden, Switzerland, and Union of South Africa.

ACKNOWLEDGMENTS

The American Red Cross has rendered invaluable aid to the hospital and to its patients. The closest cooperation between the Red Cross and the hospital has continued, and it is a pleasure to acknowledge this indebtedness. It would be difficult to imagine the successful functioning of the hospital without the assistance and encouragement of this fine organization.

The various veterans' organizations, particularly the American Legion and its Auxiliary, have been most helpful in providing entertainment and personal attentions to the patients.

To those various friends and former associates of the late Dr. William A. White, who made possible the gift of the fine portrait of Dr. White, deepest thanks are expressed. The portrait is a splendid memorial to a great man who did much not only for St. Elizabeths Hospital but for the intelligent and humane care of the mentally ill the country over.

Deepest gratitude is also expressed to Mrs. William A. White for the gift of Dr. White's valuable personal library to the hospital,

and for the specially designed bookplate which she has presented for the purpose of suitably marking the books. The library is valuable, not only for its intrinsic worth, but as a constant reminder of the outstanding psychiatrist who owned and used the books to such telling advantage as working tools.

It would be pleasant to record by name the many officers and employees who have rendered conspicuous service to the hospital during the year just past, but space does not permit. Notwithstanding the officers and employees of the hospital have done their part and deserve full credit, their continued cooperation is needed and will, I am sure, be forthcoming.

The Board of Visitors have been most generous with their time and advice, and I assure them of my deepest appreciation of their assistance. It has been a constant inspiration to work with them.

To the Honorable the Secretary of the Interior and his immediate assistants it is a pleasure to express sincerest thanks for their never-failing support, assistance, and advice, and to assure them of the continued loyalty of St. Elizabeths Hospital to the high ideals of the Department of the Interior.

COLUMBIA INSTITUTION FOR THE DEAF

Percival Hall, *President*

HEALTH

THERE was little illness among the students and pupils during the year. Surgical attention in a few cases was the principal need on the medical side.

An ample milk supply, practically equal to the highest grade certified milk, was provided from the institution dairy during the year.

COURSES OF INSTRUCTION

The course of instruction remained very much the same as in the year previous. Further opportunity for practice teaching and the study of psychology was afforded.

NEEDS OF THE INSTITUTION

The dormitories of the institution are taxed to the limit, and practically all extra space in the residences of instructors also has been utilized. A building containing a library, printing office, and class rooms should be provided. Two more residences for instructors, an addition to the gymnasium building, the extention of the laboratory building, and new units for the Kendall School dormitories and class rooms also are needed.

RESEARCH WORK

Provision has been made for research work by a very capable and experienced educator of the deaf. Equipment for testing of sight and hearing has been provided, and the regular work of testing the ability and achievement of the students of the institution has been enlarged and extended. Other institutions have asked assistance of this department in adjusting their curricula.

SPECIAL GIFTS

A gift of $4,000 from a group of women alumni, the income of which shall be used for scholarships, has been received during the year; also a gift from Mrs. Charles R. Ely, of $2,000, for the establishment of scholarships in memory of her husband, Dr. Charles Rus-

sell Ely, who was vice president of the institution and who died recently after many years of splendid service.

SEVENTY-FIFTH ANNIVERSARY

During the year the seventy-fifth anniversary of the higher department of the institution—Gallaudet College—was celebrated by special services conducted by the students, by a radio broadcast, and by special commencement exercises, at which nearly one hundred colleges and learned societies were represented.

PRESENTATION DAY

On Presentation Day, 8 students received the degree of master of arts in course; 10 students, bachelor of arts; and 8 students, bachelor of science. Honorary degrees were conferred as follows: Master of arts—Selwyn Oxley, London, England, and Josephine Timberlake, Washington, D. C.; master of science—Kreigh B. Ayers, Akron, Ohio; doctor of divinity—Arthur D. Bryant, Washington, D. C., and John W. Michaels, Mountainburg, Ark.: doctor of pedagogy—Tom L. Anderson, Council Bluffs, Iowa, and Joao Brazil Silvado, Rio de Janeiro, Brazil; doctor of humane letters—Frank Milton Driggs, Ogden, Utah, Giulio Ferreri, Milan, Italy, and Stacy Rufus Guild, Baltimore, Md. The address to the graduating class and friends of the college was delivered by Dr. Earl James McGrath, Specialist in Higher Education, American Council on Education.

RECEIPTS AND EXPENDITURES

The total receipts, including balance on hand July 1, 1938, were $201,404.59. Expenses were $198,423.45. A reserve of $201.77 was returned to the treasury, leaving a balance of $2,779.37.

FREEDMEN'S HOSPITAL

Dr. T. Edward Jones, *Surgeon in Chief*

WE BELIEVE that the greatest achievement during this fiscal period is that in the tuberculosis unit. By an allotment of $700,000 from the Public Works Administration, there is to be erected a tuberculosis unit of 150 beds. This amount permits not only the construction of the building, but also of its adequate equipment. This is a great step forward because it is the consensus of opinion that the number of beds in the District of Columbia devoted to tuberculosis are all too few. The addition of 150 beds will go a long way towards supplying adequate beds for the treatment of this disease. It will result in a definite benefit to the Negro inhabitants of the District of Columbia, in which group the incidence of tuberculosis is high. The construction of this building is scheduled to proceed on or about September 15, and its completion and occupancy will be on or about July 1940.

Another achievement during the year has been the construction of a new ice plant which not only will give the hospital a sufficient supply of ice, but will, we believe, also supply ice for the tuberculosis unit soon to be completed. Our refrigeration system for the kitchen had long outlived its usefulness, offering a distinct hazard to the health of our patients; to say nothing of the loss of foodstuffs because of inadequate preservation. Installation of the modern refrigerating system removes the health hazard and affords proper food care.

The antiquated plumbing throughout the institution, more than thirty years old, has been replaced.

The old X-ray equipment, more than twenty years old, has been replaced by modern X-ray appliances which enable the hospital to give to its patients the latest and best treatment along Roentgenologic lines.

The hospital has been greatly improved by the restoration of fallen plaster and by the application of paint throughout a large part of the institution.

The increase in personnel and equipment has resulted not only in better nursing care, but has also contributed to more efficient professional care to the patients, and it is to be noted that there has

been a reduction in the death rate. Although the hospital is not completely equipped, the additional equipment secured has been of inestimable value.

GROWTH

The hospital is rapidly outgrowing its capacity to accommodate the increased activities it is called upon to perform. For example, there were 23,560 outdoor visits to our clinics in 1937, 55,304 in 1938, and 73,196 for the fiscal year ending June 30, 1939. The largest individual clinic increase in the out-patient department is the luetic clinic. For the fiscal year ending June 30, 1938, there were 719 new patients treated, and their visits, together with those of the old patients, totaled 11,151. For the fiscal year ending June 30, 1939, there were 924 new patients, with the entire number of visits showing a total of 21,439, or an increase of 10,284 visits over the previous year. The next two largest clinics, the genitourinary and the surgical (including surgical diagnostic clinic), have shown marked increases. The figures for the G-U clinic show 961 new visits for the fiscal year ending June 30, 1938, as against 904 for the fiscal year ending June 30, 1939, and total visits for 1939 of 8,581 as compared with 7,819 for the previous year. There were 7,819 surgical clinic visits recorded for 1939 as against 7,370 for 1938.

These increases in the work of our out-patient department not only have overtaxed the physical accommodations of the hospital, but have placed a tremendous burden upon our limited personnel. If these increases are to be met adequately it is absolutely imperative that our personnel be increased.

INDOOR ACTIVITIES

The increase in the work done by the hospital is reflected not only in our out-patient department, but also in our indoor activities. In substantiation of this statement the total number of indoor patients under care for the fiscal year ending June 30, 1938, was 6,225 as compared with 6,710 for the fiscal year ending June 30, 1939. This increase took place in spite of the fact that some of our beds were inactive because of an insufficient nursing personnel. This insufficiency has been somewhat relieved by an increased appropriation for personnel for the fiscal year 1940 and will permit of the reoccupancy of wards previously inactive. The increase in nurses and attendants, however, is not sufficient to meet the requirements specified by the National League of Nursing Education, not only so far as patient-nursing hours are concerned, but other requirements prescribed by this League, which we must meet if we are

to maintain our school of nursing and preserve its accreditation by all the States of the Union.

It is a common belief, and financial computation seems to support the fact, that our school of nursing represents a financial liability to the Federal Government. However, we believe that this increased expenditure will yield a wholesome dividend in the preservation of the health of the nation. Statistics show that only 272 colored student nurses graduate in the United States during any one year, and Freedmen's Hospital supplies 12% of that number. This number of graduates (272), plus those already engaged in the practice of their profession, gives to the nation one colored graduate nurse to every 5,120 colored citizens; whereas, on the other hand, there are graduated yearly in the United States 5,126 white student nurses, which gives to the nation one white graduate nurse to every 296 white inhabitants of the United States. Therefore, it can be seen that if Freedmen's Hospital were to abolish its training school for nurses, it would greatly reduce the already insufficient number of colored graduate nurses sorely needed for the protection, preservation, and restoration of health in the nation. If the school is to have the necessary accreditation, it must have a greater number of nurses than it now has. The increase will create a housing problem unless there can be an increase in the appropriations sufficient to eliminate the $360.00 per annum now deducted for quarters and subsistence from the salary of each graduate nurse. In the majority of instances, there is no absolute necessity for these nurses to be quartered on the hospital grounds. If this arrangement can be changed, our present housing facilities probably will be adequate to absorb an increase in the number of graduate nurses.

BLOOD BANK

Another highlight of this fiscal year was the establishment of a blood bank. The use of refrigerated blood has been a boon to transfusion. Formerly, precious hours were lost in securing suitable donors. Now, with the well equipped bank, it is possible to give blood to a patient within a half hour of his arrival. As a result, the number of transfusions performed in the hospital has increased. The percentage of reactions has been remarkably low. The laboratory staff is wholly responsible for the typing and matching of the blood. This staff is called upon for duty at all times, nights, holidays, and Sundays, and its personnel is insufficient.

DIRECTOR OF CLINICS

The authorization and appointment of a Director of Clinics at Freedmen's Hospital has improved the management of our outdoor

department. During the year, our professional staff has undergone reorganization and grading. This step has insured the physicians on the staff of ranks in line with their attainments and length of service.

NEW RECORD SYSTEM

No hospital is better than its records. The types of records, their preservation and availability for reference may serve as a useful measuring rod of the kind of work being performed. Efforts are wasted unless medical records are preserved in such a manner as to be readily available to serve the purposes for which they are intended, namely:

1. After the patient is discharged, the records should be accessible, should he become ill in the future.
2. They serve as a basis for study of the work of the hospital as a whole, as shown in various reports and analyses which enable the governing body to determine the character of the professional care being rendered the patients and the quality of the work being performed by individual members of the medical staff, thereby enabling the governing body to exercise proper care in making future appointments.
3. The disease and operation indexes are of value in medical research.

By authorization of the Secretary of the Interior, an expert made an extended study of our antiquated record forms and filing methods, following which we revised our forms in accordance with the specifications of the American College of Surgeons. Although the new system is not complete, due to the lack of personnel to man further additions, great benefit has resulted from such installations as have been made to date.

The new system is known as the unit history system, and brings together in one folder all hospital admissions regardless of the number of times a patient is admitted. The patient's history records for each admission are kept together. A master index file is maintained and contains a single card for each patient. These cards are filed alphabetically and control the unit history system.

The improvement in record keeping and new forms has served as a stimulus to the attending physician to perform his part in furnishing better histories, more complete work-up of the cases, and prompt progress notes.

In finality, we have the objective of keeping a model medical records department to be presided over by a records librarian. Our method has been selected from many possible ones, as the one most suitable for our present and future needs.

W. P. A. PROJECTS

Three W. P. A. projects—clerical, public health, and cleaning—have been maintained in the hospital. With such an adjunct, we

have been able to accomplish much in the direction of the proper care of noncurrent files and cleaning of the building. Our correspondence, mails, and files division came in for attention during the course of our survey and is due for reorganization. An alphabetical file was set up by Remington Rand, Inc., during this fiscal year, but cannot be maintained effectively until such time as an addition can be made to the clerical force. This file is much more simple in operation than our former one, and also more efficient. The clerical project has rendered invaluable aid and accomplished the following results:

1. The alphabetizing and filing of 200,000 patient cards into one master filing system; the integration of 75,000 out-patient cards into this system; the consolidation into one master patient-index card all information and codings relative to each patient having entered the hospital more than once.

2. The placing in labeled folders and vertical filing of all case history records dated prior to January 1, 1929; the transcription of several thousand of such records in order to insure their existence.

3. The arrangement, classification, codification, and filing of 10,000 old emergency and patient cards.

4. The rearrangement, in chronological sequence, of the hospital census sheets dated prior to January 1, 1936.

On April 24, 1939, the project was reassigned to the hospital to continue for one year from that date, and the following work items now are being executed:

1. Continuation of the work described in work Item 1 of the previously operated project, the completion of which requires the verification and correction of approximately 50,000 cards which, though typed, are of unknown accuracy.

2. The compilation, classification, and filing of pay-roll records dated prior to 1930; the carding and filing, by name, of all employees ever in service; the compilation and due disposition of all additional information pertaining to those employees. The execution of this item is necessary in the computation of retirement benefits, the amelioration of employee claims and in other contingencies.

3. The making of an interfile check in order to insure the presence of a patient index card for each patient case history.

4. The checking of all registers of patients dated prior to January 1, 1936, for their physical condition and against the discrete patient index cards. This work item is important in that it will amend, clarify, and complement our present system of triplicate files.

5. To type onto permanent forms and file the registration and Social Service cards (now written in long hand and affected by age) for approximately 3,000 cases handled by the Social Service Department in the period 1930 through 1935.

6. The sorting, identifying, and assembling of all records now in the old file room, for consideration by the director for their disposal. This and Item No. 2 (compilation of pay-roll data) are in all probability the two major items of this project, for each will require about 1 year to complete.

7. Building from the available material, an index-status file for former student nurses. The material at hand is contained in books compiled on an annual

basis and is dated for the years 1894 through 1936. Such material is important for the clearance of nurses services, and will be used for intrahospital exchange and clearance.

8. Building, according to diagnosis, an alphabetical file of the medical survey cards accumulated prior to January 1936. These data are of vital interest to the United States Public Health Service, are referred to in the hospital's annual report to the Secretary of the Interior, and constitute source material for studies of morbidity rate.

Also the assistance rendered in establishing the unit record system in the department of records and admissions, is noteworthy.

NATIONAL YOUTH ADMINISTRATION PROJECT

The National Youth Administration Project supplied patient attendants in our wards as well as in other divisions of the institution. The services performed have benefited the patients and, in addition, have educated the young patient attendants so they will be able to give efficient service to the community in which they live when their services here have been terminated.

DIVISION OF ACCOUNTS AND COLLECTIONS

The authorization for a survey by the General Accounting Office has resulted in the installation of a standard, uniform accounting system which already has demonstrated its efficiency. It simplifies the preparation of the monthly reports required in government procedure, and presents a daily picture of our financial operation. The stock ledger enables the hospital to keep a better inventory of stock, together with its attendant cost. A correspondence system is contemplated and will be inaugurated as soon as additional clerical service is allowed. We feel that we should extend thanks to the agents of the Accounting Office for their kind cooperation and meritorious service to Freedman's Hospital. We also extend thanks to the Purchasing Office of the Department of the Interior for the aid given in the reorganization of our purchasing department. The general reorganization carried out in the departments of purchasing, stores, and issues will result in a general increase of the efficiency of these units. It is evident that there is need for additional personnel in these departments if the program, as outlined, is to have a proper fruition. Following is a partial statement of the work performed by these departments during the fiscal year ending June 30, 1939:

Number of bids invited	498
Total number of bid openings	120
Total number of bidders	300
Number of formal contracts entered into	124
Number of orders placed	1,962
Number of vouchers cleared and scheduled	1,748
Number of warrants cleared	80

Attention is invited to the increase over 1938 in the number of contracts let and orders placed:

	1939	1938
Contracts	124	66
Orders	1,962	1,293

TELEPHONE SERVICE

The installation of an intercommunication dial system and an additional switchboard position has resulted in improvement in the telephone service.

PERSONNEL

I do not feel that this abstract should be concluded without reference to our personnel, regarding its excellence of performance and cooperation, the existence of harmonious relationships, on their part as well as their willingness to give overtime duty and postpone vacations in the interest of the hospital. The necessity, however, for overtime should not be continued, because it is felt that it will impair the efficiency of the personnel concerned.

BUSINESS MANAGER

There is urgent need for a business manager. The business management now devolves upon the Surgeon in Chief of the hospital, who is assisted by the Chief Clerk. The professional and clerical administration of the hospital are of sufficient magnitude to require the full attention of the Surgeon in Chief and the Chief Clerk. Therefore, we believe that the appointment of a business manager would result in better business procedures and a distinct saving to the Government.

We cannot but be grateful to the Honorable, the Secretary of the Interior, to the Budget Bureau, and Members of Congress for their proper interpretation of our needs. We sincerely appreciate the increases granted both as to personnel and for maintenance and operation cost. Although the hospital is still undermanned and not fully equipped, we are hopeful that the appropriation for the fiscal year 1941 will permit us to attain the goal which we seek. The national scope of the hospital is indicated by the fact that 35 percent of the patients during this fiscal year were drawn from the States.

HOWARD UNIVERSITY

Mordecai W. Johnson, *President*

GENERAL TREND OF THE UNIVERSITY

THE year 1938–39 was the seventy-sixth year of the emancipation of the slaves, the seventy-second year of the operation of Howard University, the sixtieth year of the Government support of Howard University, the tenth year since the passage by Congress of the basic law authorizing annual appropriations in support, construction, and maintenance of the university, and the eighth year of the Government's 10-year program to establish Howard University on a sound basis of functioning as a first-class university service.

Student body and resources.—In the year 1938–39 Howard University had a student body of 2,393 persons from 40 States and 17 foreign countries, a faculty of 244 teachers (equivalent to 171 on full time), and awarded degrees to 271 graduates in 10 schools and colleges, including the graduate school, the college of liberal arts, the school of engineering and architecture, the school of music, the college of medicine, the college of dentistry, the college of pharmacy, the school of law, the school of religion, and the summer school. The institution had a physical plant valued at $7,315,830, total assets of $9,527,896, an income for current purposes of $1,147,860, and was receiving the support of the Congress of the United States, the Public Works Administration, the Works Progress Administration, the National Youth Administration, the General Education Board, the Rosenwald Fund, and other private foundations and individuals in a cooperative effort to establish its work on a basis of first-rate functioning.

Status of progress under the 10-year plan.—During the period since the passage of the substantive law in 1928, including 8 years of the 10-year program, the capital assets of the university had been more than trebled, its book collection more than doubled, its movable and flexible scientific and educational equipment modernized and trebled, the total number of teachers increased by 51 percent, the total number of full-time teachers increased by 88 percent, so as to place 90 percent of instruction in their charge; and the university as a whole had moved 72 percent of the way toward a first-class faculty and administrative staff, 67.5 percent of the way toward first-

Outstanding Educational Advantages Provided at Howard University in Washington, D. C.

Partial view of campus, showing, right to left, new Library Building, Chapel, Thirkield Hall, and the Chemistry Building.

class adequacy in flexible and educational scientific equipment and supplies, and more than 50 percent of the way toward a first-class educational plant.

Physical-plant improvements.—During the year two main buildings were under construction. The new library building, made possible by a Federal Emergency Public Works allotment of $1,105,000, was finished, dedicated as the Founders' Library, and turned over to the university by the Secretary of the Interior. The building received its first use during the year, and was widely acclaimed by librarians as one of the best buildings for the purpose in the Nation.

The new men's dormitory buildings, under Public Works Administration contract for $646,200, were nearing completion and expected to be ready for occupancy in December 1939.

Through funds of the Works Progress Administration the grounds of the university were being extensively planted with trees, shrubbery, and grass, permanent walks were being laid in the undergraduate and graduate quadrangle, and the exteriors of all but two of the buildings on the main campus were being painted.

Increased numbers and caliber of students and graduates.—Enrollment increased in 1938–39 by 153 students from 2,140 to 2,393, being a total gain of 767 students since the low point of the depression in 1933–34. The university was being fed at its base (the college) by 201 high schools and at its summit (the graduate school) by 72 colleges and universities. Seventy percent of all students in the professions of medicine, dentistry, pharmacy, law, and religion were holders of college degrees and 661 or 27.6 percent of all students in the university were persons holding one or more advanced degrees.

Graduates.—Graduates during the year increased by 21; that is, from 250 in 1937–38 to 271 in 1938–39. An outstanding index of the improved caliber of work being done in the institution as a result of the 10-year program is afforded by the increasing success of Howard University's medical graduates before State examining boards. Thirty-four Howard University medical graduates were examined by 12 State boards in the United States during the year. Thirty-three passed and one failed. The percentage of failures was 2.9 percent as compared with 8.5 percent for 1937.

Distinguished awards to student activities.—The Hilltop, a newspaper published by the students of Howard University, received the Brawley cup as being judged the best student newspaper printed in a Negro college, and it also received second-place honors in the Associated Collegiate Press Exhibition, being adjudged the next best college newspaper printed in the United States. The Howard Players' production of Rehearsal, by Albert Moltz, was adjudged the best

production in the Negro Collegiate Dramatic Association Festival, held at Virginia State College, at Petersburg, Va., on April 13, 1939.

Further advance in the graduate school.—The graduate school enrolled 407 students during the year, an increase of 81 over 1937–38. The rapid development of high schools in the South and the accrediting movement of high schools and colleges by the Southern Association of Secondary Schools and Colleges are making an increasing demand for teachers with graduate training of high caliber. Howard University is the oldest of the Negro institutions in point of the development of graduate work, the largest in point of enrollment, and apparently the most advanced in the matter of resources for further development. It clearly stands out as the most promising center for graduate instruction.

Medical school advances and renders important clinical services.—Through Government appropriation and the help of the General Education Board the university is moving toward decisive improvement in the full-time staff of clinical medicine. The increased appropriation of the Congress in 1939–40 made possible the appointment of a full-time associate professor in obstetrics-gynecology, and a full-time assistant professor in pediatrics. The General Education Board has granted fellowships to three able men who are preparing themselves on the graduate level for teaching and medical service in surgery, neuropsychiatry, and thoracic surgery.

These advancements in the clinical staff of Howard University serve at once to improve the professional care of patients in the Freedmen's Hospital and are enabling the university and the hospital to begin the development of professional services of major significance.

(1) Under the sponsorship of the National Tuberculosis Association the college of medicine held the first annual conference on Negro Tuberculosis Workers on June 5, 6, and 7.

The 150-bed tuberculosis annex to be erected at the Freedmen's Hospital under provision of a grant of $600,000 by the Public Works Administration through the Department of the Interior will serve as a valuable center for Howard University in the field of tuberculosis.

(2) The postgraduate course in venereal-disease control introduced last year was conducted again this year through a grant of $13,500 made by the United States Public Health Service.

(3) The university continued cooperation with the Freedmen's Hospital and the Health Department of the District of Columbia in the conduct of a prenatal and maternal welfare clinic.

(4) As a part of its training program, the faculty of dentistry continued to conduct a low-cost public clinic, available to school children

and persons of limited means. During the year 1938–39, this general clinic recorded 4,938 visits. In the surgical clinic, 1,498 others; and in the X-ray department, 948. Two thousand four hundred and thirty-one new patients came to the clinic.

School of law gives decisive help in important civil rights cases.—In the school of law, members of the faculty rendered constructive help in the preparation and argument of two major cases dealing with the protection of the constitutional rights of the Negro minority. In one of these cases the Supreme Court made a far-reaching decision bearing upon State-supported educational opportunities for Negroes. In the other case the Supreme Court judicially recognized and condemned registration devices designed to withhold from Negro citizens their constitutional right to vote.

Division of the social sciences.—The university has developed an able division of social sciences with a teaching and research staff of 29 members in economics, political sicence, sociology, history, philosophy, social work, and commerce and finance. This staff not only functions efficiently in the matter of teaching the social sciences on the undergraduate and graduate level, but it has shown research ability of high caliber and is being increasingly called upon by distinguished institutions of the public life for participation in cooperative research bearing upon public problems.

Faculty publications and research.—The members of the faculty of liberal arts during their tenure at the university have brought out 847 scholarly publications, including 62 books and monographs, 531 articles and papers, 161 book reviews and 93 other creative contributions such as poetry, plays, paintings, etc. The entire faculty of the university during the current year put forth 8 books, 104 scientific and scholarly articles, and 21 book reviews. Among these contributions was the continued publication of the Journal of Negro Education, now one of the most helpful publications in the United States, in the field of education. The annual number of this journal for July 1939 carried a comprehensive study by a large group of scholars on all major aspects of the relations of the Negro minority to American life.

Practical bearing of faculty research.—(1) The investigation of important problems in botany and agriculture has long been handicapped by the difficulty, almost the impossibility, of studying root growth and balance without disturbing the plants and interfering with their normal development. Such investigations have been greatly simplified and facilitated by the development in the botanical laboratory of Howard University of a new method of growing plants—Wick-culture method, which makes possible observation and study of the details of

root growth without disturbing them in any way and with a simplicity and ease in which this could never be done before.

Experiments by this method have already given more highly illuminating and significant results. The apparatus was exhibited at a meeting of the American Association for the Advancement of Science at Ottawa (1938). The work has been noticed in several releases by Science Service. The method has been included in the Manual of Methods in Plant Physiology, by Loomis (University of Iowa) and Shull (University of Chicago). The apparatus is patented and is being manufactured by the American Instrument Co., Silver Spring, Md., and is in use for instruction and research in quite a number of universities, including George Washington University.

This is but one of many possible examples of the practical bearing of research at Howard University on the life of the people.

(2) A member of the faculty of the school of engineering and architecture has patented "An optical apparatus for determining the position of a tool." This invention makes possible the creation of an object in metal directly from a drawing of the object.

(3) The university has believed that careful research on the more important phases of Negro life and relationships would tend to cast illumination on the entire area of human life. This faith has begun to bear fruit in the researches of the faculty. A member of the staff of sociology, for example, has just completed a study of "The Negro Family in the United States." An eminent sociologist of the University of Chicago has declared this study to be "* * * the most valuable contribution to the literature on the family since the publication 20 years ago of The Polish Peasant in Europe and America, by W. I. Thomas and Florian Znaniecki."

New library instruments facilitating the study of the Negro.—Through the cooperation of the Works Progress Administration, the university has completed two new instruments which will give invaluable assistance to scholars throughout the Nation in their study of the social questions affecting the Negro and race relations. They are: (1) The completion and publication of a complete 500-page catalog of the books by and about Negroes which may be found in the Moorland Foundation collection of the library of Howard University; and (2) the completion of the union catalog of items by and about Negroes to be found in 10 different libraries, containing about 30,000 cards and providing a clearing house of about 100,000 publications.

Outstanding needs of the university.—The outstanding needs of the university, made increasingly clear during the year, were: (1) Immediate increases in the number of teachers in the graduate school

and in the clinical branches of medicine; (2) an increase of 29 in the number of mature teachers of professorial rank; (3) a sum of $92,000 to make important supplements to the gravely deficient book collection in our library; (4) the doubling of funds for scholarship and student aid, especially for teachers in the South, who receive low salaries and may not otherwise find it possible to pursue the graduate work which they need to increase their efficiency; (5) proper organized relationships with the Freedmen's Hospital so as to enable the school of medicine to operate on a sound basis; (6) increased funds for at least that minimum of research which is necessary to maintain a living mind in the members of the teaching staff; and (7) the following buildings: (*a*) an auditorium accommodating at least 3,500 persons; (*b*) a modern building and equipment for the work in dentistry; (*c*) an administration building for the centralization and proper interrelation of the administrative services of the university; and (*d*) a biology building and greenhouse.

STUDENTS

University enrollment.—The total enrollment for the year 1938–39 was 2,393 (see table following), of whom 1,173 were men and 1,220 were women, as compared with an enrollment of 2,240 for 1937–38, of whom 1,119 were men and 1,121 were women. This enrollment represents a net gain of 153 students, or 6.8 percent. It represents also a total gain of 767 students since the low point of the depression in 1933–34.

Geographical distribution.—Of the regular students enrolled for the school year 1938–39, 95.9 percent came from the continental United States and 4.1 percent from without the borders of the United States. These percentages are the same as those for the school year 1937–38. The percentage of students coming from the District of Columbia was 26 percent as compared with 25.6 percent for the school year 1937–38.

Forty States sent 2,179 candidates for degrees in 1938–39 as compared with 42 States sending 2,048 candidates for degrees in 1937–38. The regional distribution of candidates for degrees is as follows: From the North, 528 students, as follows: New England, 53; the Middle Atlantic States. 325; the East North Central States, 103; the West North Central States, 47. From the South, 1,640 students, as follows: The South Atlantic States, 1,342; the East South Central States, 169; and the West South Central States, 129. From the West, 11 students, as follows: Mountain States, 4; Pacific States, 7.

Summary of Students Enrolled in Howard University for the years 1938–39 and 1937–38

Division of the university	Net enrollments						Total gain	Total loss
	1938–39			1937–38				
	Total	Men	Women	Total	Men	Women		
THE COLLEGES								
College of liberal arts	1,383	583	800	1,332	586	746	51	-------
School of engineering and architecture	59	59	0	50	50	0	9	-------
School of music	92	33	59	98	31	67	-------	6
Graduate school	407	164	243	326	121	205	81	-------
Total	1,941	839	1,102	1,806	788	1,018	135	-------
PROFESSIONAL SCHOOLS								
School of religion	25	25	-------	23	20	3	2	-------
School of law	70	69	1	74	72	2	-------	4
School of medicine:								
College of medicine	154	142	12	154	142	12	-------	-------
College of dentistry	51	45	6	48	41	7	3	-------
College of pharmacy	31	29	2	29	29	0	2	-------
Total	331	271	60	328	304	24	3	-------
Total in regular courses	2,272	1,149	1,123	2,134	1,092	1,042	138	-------
Special students in music, religion, law, and dentistry	132	32	100	130	38	92	2	-------
Total	2,404	1,181	1,223	2,264	1,130	1,134	140	-------
Less duplications	11	8	3	24	11	13	-------	13
Grand total (net)	2,393	1,173	1,220	2,240	1,119	1,121	153	-------

Seventeen foreign countries sent 93 candidates for degrees during the school year 1938–39, as compared with 15 foreign countries with a total of 87 candidates for degrees in 1937–38. As usual, the largest group of foreign students (47) came from the British West Indies. Nine came from the Virgin Islands, 8 from British Guiana, 6 from Panama, 5 from Canada, 4 from Africa, and 4 from Puerto Rico.

Students of graduate caliber.—Two of the professional divisions, namely, pharmacy and dental hygiene, receive students on the basis of regular college entrance requirements. Medicine, dentistry, law, and religion require definite amounts of college work. Of the 89 students entering the regular freshman classes of medicine, dentistry, law, and religion in 1938–39, 72 or 80 percent entered with college degrees. Two hundred and thirty-three or 75 percent of the 308 students in these 4 professional schools are degree-holding students. Of the 2,393 students in the entire university, 661 or 27 percent are persons holding one or more advanced degrees as compared with 564 or 25 percent in 1937–38.

Scholarships and student aid.—Scholarships within the university continued to be administered on the basis of an allotment of 7½ percent of all students' fees, as provided by the trustees of the university.

During the past year the committee on scholarships and student aid received about 1,200 applications for student aid. Only two criteria governed the award of student aid: (1) Need and (2) scholarship average.

The committee on scholarships and student aid awarded tuition or work scholarships to 564 students, which constituted 23.5 percent of the student body. Of these 213 received aid from the National Youth Administration at an average of $124.58 per student. The total amount available for scholarships from all sources was $62,604.81.

Limited funds required the university to turn away without assistance many deserving students. There is urgent need for more funds for scholarships and student aid.

GRADUATES

Number and distribution.—The following table exhibits the number of graduates from each division of the university during 1938-39. There were 271 graduates coming from 30 States, the District of Columbia and 6 foreign countries. The total of 271 students graduating in 1938–39 represents an increase of 21 graduates as compared with 250 for 1937–38. There were 147 male graduates and 124 female graduates as compared with 134 and 116, respectively, for the year 1937–38.

Honorary degrees.—Three honorary degrees were conferred at commencement on June 9, 1939. The degree of master of science was conferred on Matthew Alexander Henson, explorer; and the degree of doctor of laws, upon William J. Hale, president of Tennessee Agricultural and Industrial College, Nashville, Tenn., and Walter White, executive secretary of the National Association for the Advancement of Colored People.

Total number of Howard University graduates.—The total number of graduates of Howard University is now 10,537. Of this number the registrar has over 6,000 correct addresses in 41 States, the District of Columbia, and 16 foreign countries, classified alphabetically by States, cities, sex, schools, and classes.

Summary of Students Graduated by Howard University for the Years 1938–39 and 1937–38

Division of the university	Graduates					
	1938–39			1937–38		
	Men	Women	Total	Men	Women	Total
THE COLLEGES						
College of liberal arts	59	92	151	54	82	136
School and engineering and architecture	3		3	4		4
School of music	3	1	4	3	3	6
Graduate school	20	22	42	21	24	45
Total	85	115	200	82	109	191
PROFESSIONAL SCHOOLS						
School of religion	5		5	6		6
School of law	22		22	14	1	15
School of medicine:						
College of medicine	28	2	30	22		22
College of dentistry:						
4-year course	7		7	7		7
Dental hygiene		6	6		6	6
College of pharmacy		1	1	3		3
Total	62	9	71	52	7	59
Grand total	147	124	271	134	116	250

THE TEACHING STAFF

Number and full-time status of teachers.—There were 244 members of the teaching staff for 1938–39, of whom 153 were full-time teachers and 91 were rendering part-time service, representing together a full-time equivalent of 171.27 teachers.

In 1928 when the trustees began to put the 10-year program into operation, there were 161 teachers in the university, 81 of them being on full-time service and 80 on part-time service. During the intervening period the total number of full-time teachers has been increased by 88 percent. This means, in brief, a major improvement in the life of the university that has greatly strengthened the quality of all divisions of instruction in all schools and colleges. The teaching load in the college of liberal arts, for example, has been reduced by one-half. Ninety percent of the work of instruction in the university is now being done by teachers who are devoting their full time to education.

There are three major divisions in the university in which the inadequacy of teaching personnel is more pronounced. These are (1) the graduate school, including related work in the college; (2) the clinical branches of medicine; and (3) the school of religion. Improvement in the latter must be provided for wholly out of private resources.

Salary scale and advancements in rank and salary.—A definite salary scale has been adopted in each rank of instruction. The minimum has been reached and passed in each rank, but the university is short of agreed upon averages in each rank by the following sums: Instructors, $209; assistant professors, $142; associate professors, $83; professors, $865.

Definite and objective criteria have been established for advancements in rank and salary, but limited funds have made the pace of advance very slow, and the rank of professor has suffered.

The maturity of the staff.—On the basis of the 10-year program the present staff of Howard University should have the following distribution: Professors (40 percent) 66, associate professors (10 percent) 16, assistant professors (20 percent) 33, instructors (30 percent) 49. In 1938–39 the actual staff, on full-time and full-time equivalent basis was: Professors (21.6) 37, associate professors (13.5) 23, assistant professors (26.3) 45, instructors and assistants (38.6) 66. This situation represents substantial progress; but, as will be seen, approximately 65 percent of the staff is in the two lower ranks, as compared with the 10-year objective of 50 percent, and only 21.6 percent are in the professorial rank, as compared with the 10-year objective of 40 percent. The university is but slightly beyond the halfway mark in the number of mature professors. Twenty-nine such men and women are now needed.

Tenure regulations and retirement system.—Regulations governing tenure have been adopted and revised by the trustees after consultation with faculty representatives. Further revision designed to increase security, is experimentally under way. A retirement system has been adopted, providing an annuity of from one-third to one-half average annual income on payment of premium of 5 percent of the salary by teacher matched by similar payment of 5 percent by the university.

Educational assistants, educational and scientific supplies and equipment.—Teaching resources in these items have been trebled during the progress of the 10-year program, but the university is still operating 34.2 percent below the objectives in these fields.

Faculty publications.—One of our professors in the college of liberal arts has made a careful study of the scholarly productions of that faculty over a period of years (through 1937–38), showing in brief that they have published 56 books and monographs, 469 articles and papers, 141 book reviews, and 86 other creative contributions such as poetry, plays, paintings, etc. This is a highly favorable picture. In the discussion of this result, however, the writer makes the following significant comment: "It should be kept in mind

that it has only been within the last 10 years that the teaching load in the college has been sufficiently reasonable to allow time and energy for scholarly productivity."

Publications of the university faculty during the year 1938–39 were as follows: eight books, 104 scientific and scholarly articles, and 21 book reviews. In addition there were nine other creative contributions which included seven creations from the art department, publication of a musical composition by a member of the faculty of the school of music and an invention patented by a member of the faculty of the school of engineering and architecture. All schools and colleges of the university were represented in these publications and contributions.

As indicated under "General trends," many of these publications have had and continue to have highly constructive bearing upon the practical life of the people.

THE GRADUATE SCHOOL

General trends.—The graduate school continued the unbroken trend of increased enrollment which it has maintained since 1929–30, throughout all the years of the depression. The steady increase in graduate enrollment has been of a national character. This year the students came from nearly three-fourths of the States of the Union. While students have come predominantly from colleges and universities established for Negro youth they have increasingly come also from many of the long-established colleges and universities in the North and West.

Two major developments designed to have a very helpful effect upon graduate work appeared during the year. The new library building has been dedicated and placed in service. Its provisions for graduate reading rooms, seminar rooms, and cubicles for individual study in the stacks have greatly facilitated graduate study. The new men's dormitory, now under construction and to be available during 1939–40, is so arranged as to permit an entire section to be set apart for graduate students.

Enrollment.—The total enrollment of graduate students for the year 1938–39 was 407. This represents an increase of 81 students over the enrollment of 326 students in 1937–38. Two hundred sixty-four of these students were registered in the first semester, 242 in the second semester, and 120 in the summer school. One hundred and sixty-four of the total were men and 243 were women.

There were 118 full-time students in the first semester and 115 full-time students in the second semester of 1937–38. (The full-time student load is rated at 5 subjects or 15 semester hours.) In

1938–39 there were 154 full-time students in the first semester and 135 in the second semester. This shows an average increase of 28 in the number of full-time students.

Sources of students.—The 407 graduate students came from 33 States, including the District of Columbia, and three foreign countries. The largest number of students from a single place came from the District of Columbia, which furnished 122 students. Forty-two came from Virginia, 28 from North Carolina, 27 from South Carolina, 19 from Maryland, 15 each from Alabama and Georgia, 13 from Pennsylvania, 12 from Texas, and 11 from Tennessee. Sixteen Southern States and the District of Columbia, in which separate schools are mandatory, furnished 340 graduate students or 83 percent of the total enrollment. These students received their first degrees from 72 colleges and universities before coming to Howard University. Thirty-one students held degrees from colleges of the North and West attended by students of both races. Among the total of 407 there were 35 who held master's degrees prior to registration at Howard.

Departments of instruction and faculty.—The 407 students for the year 1938–39 did their work in 19 departments of instruction. One hundred and eighty-seven or 46 percent of the students in the graduate school did their work in education, psychology, and philosophy. Ninety-five or 23 percent did their work in the social sciences of economics, sociology, social work, history, and political science. Forty-eight or 12 percent did their work in the natural sciences, in mathematics, botany, zoology, chemistry, and physics. Fifty-five or 14 percent did their work in English, German, and romance languages.

The general trend of specialization indicated above has been followed by the students over a period of 4 years, the comparable figures for the 4-year period 1934–35 to 1938–39 being as follows: Total graduate students, 1,485; specializing in education, psychology, and philosophy, 654 or 45 percent; specializing in the social sciences, 356 or 24 percent; specializing in mathematics and the natural sciences, 202 or 14 percent; specializing in languages and literature, 240 or 16 percent.

Eighty-one teachers offered graduate courses of instruction during 1938–39 as compared with 72 teachers in 1937–38.

Social work.—Graduate instruction in social work was undertaken for the first time in the academic year 1935–36, under the direction of the Department of Sociology. Steps are now being taken to improve the work so as to qualify for national accreditation. Specific projects for 1939–40 include a field-work supervisor, field-work super-

vision in the Family Service Association, instruction in medical social work, and additional instruction in public assistance and psychiatric work.

Degrees conferred.—At commencement 42 graduate degrees were conferred on 19 men and 23 women. Thirty-three received the degree of master of arts and 9 the degree of master of science.

The future of graduate work.—The rapid development and accreditment of public schools and colleges for Negroes in the States of their majority residence within the last 10 years have created an acute and growing need for mature teachers with thoroughly competent training on the graduate level. The soundness of the educational structure throughout these States depends primarily upon the caliber of graduate instruction which is made available to meet this situation.

There is yet nowhere among these States a single tax-supported college of liberal arts with a sufficient number of departments of instruction and a sufficient amount of resources for personnel, educational supplies, and equipment to undergird and maintain the establishment of a first-rate graduate school.

Howard University is still the most promising center for graduate work for Negroes. The steady increase in the enrollment in the graduate school from 43 in 1926–27 to 407 in 1938–39 is an index both of the rapidity with which the need has developed and of the remarkable opportunity which now confronts Howard University in this field. It is of the utmost importance to the States of the Negroes' majority residence and to the Nation that all possible steps now be taken to place the graduate work at Howard University on a sound and thoroughly competent basis.

In such a program certain immediate steps are necessary: (1) the book collection of the university should be doubled within a period of 5 years; (2) special scholarships and fellowships for graduate students should be provided; (3) funds should be available for at least that minimum of research which is necessary to maintain a living mind in the members of the staff who teach graduate students; (4) salaries of mature teachers on the staff of the university should be so increased as to enable them to give their entire time to their work without worry; (5) the number of such mature, well-paid teachers should be increased as rapidly as possible.

THE COLLEGE OF LIBERAL ARTS

General trends.—The caliber of entering students was the best in the history of the college of liberal arts for more than a decade. The enrollment and the graduating class of 1939 were the largest

since the college was reorganized in 1933–34. An evaluation of the new plan of study indicates that the college is well on its way toward providing a greatly improved type of general education for its students. The faculty continued to show improvement in competence and in scholarly activity.

Enrollment.—The college of liberal arts enrolled 1,383 students in 1938–39. This is the largest enrollment in the history of the college. It represents an increase of 51 over the enrollment of 1937–38, and an increase of 227 over the enrollment of 1934–35, which was the first year of the merger of the college of education with the college of liberal arts. Twelve hundred sixty-nine of these students were registered in the two semesters of the regular school year and 144 in the summer school.

Graduates.—There were 151 graduates of the college of liberal arts for 1938–39 as compared with 136 in the previous year. This is the largest graduating class since the college was reorganized in 1934–35.

The faculty.—There were 86 members of the faculty of the college officially in service during the academic year 1938–39. Of these, 80 were full-time teachers and 6 were part-time teachers. Twenty-three of these were full professors, 13 were associate professors, 22 were assistant professors, 26 were instructors, and 2 were assistants.

The following significant factors about the faculty of liberal arts are taken from a study made during 1937–38 and brought up to date by Dr. Charles H. Thompson, dean of the college of liberal arts:

1. Of the 23 full professors, 17, or 73.91 percent, have the doctorate degrees, and no full professor possesses less than 2 years of graduate training.

2. Of the 13 associate professors, 8, or 61.5 percent, have the doctorate degree; 4, or 30.77 percent, have 2 or more years of graduate training, and only 1 (an art teacher) has less than 2 years of graduate training.

3. Of the 23 assistant professors, 10, or 43.48 percent, have doctorate degrees; 9, or 39.13 percent, have 2 or more years of graduate training. Only 1 of the 23 has less than 1 year of graduate training, and this person is a personnel officer (dean of men), who gives part-time instruction in the college.

4. Of the 24 instructors, 23, or 95.82 percent, have 1 or more years of graduate training. The 1 exception is an instructor in art who possesses a special art diploma from the School of the Museum of Fine Arts, Boston, and 1 from the Designers' Art School, Boston. This instructor was on leave of absence for study in Paris in the year 1937–38.

5. Taking the faculty as a whole, 45.78 percent have doctorate degrees or more; 75.9 percent have 2 or more years of graduate training; and the only persons (3) who do not have some formal graduate training are the special cases already noted.

Faculty publications during the year 1938–39 included 6 books, 62 articles published in scholarly periodicals, 20 book reviews, and 7 creative contributions in art.

The curriculum.—The curriculum of the college of liberal arts has been developed under a new plan of study, including a program of general education for the first two years and of special education for the last two years. The new plan of study became operative for all entering freshmen after September 1937. The primary design of the new plan of study has been to improve the general education of the students and to prevent too early and too narrow specialization. The sophomores of the year just ended were the first class to enter under the new plan requirements. On the basis of general education tests which were given to these sophomores and to the seniors who entered under the old program where too early and too narrow specialization was possible and practiced, it was found that, after making an allowance for the knowledge gained through specialization by the seniors, the sophomores did consistently better on all tests. The new plan of study, however, is still undergoing critical evaluation and revision. Three new general divisional courses will be required of all students during the first year—"Introduction to the Social Sciences," "Introduction to the Humanities," and "Introduction to Physical and Biological Sciences." The course in freshman orientation and guidance has been eliminated.

MILITARY SCIENCE AND TACTICS

Enrollment.—The enrollment in the department of military science and tactics for the year 1938–39 was 328 for the first semester and 301 for the second semester as compared with 329 for the first semester and 323 for the second semester of last year.

Unit rated as "Excellent."—Maj. Harry M. Gwynn inspected the R. O. T. C. unit from May 22 to May 25, and attended R. O. T. C. day on June 2, 1939. A summary of his report is as follows:

"General rating of the unit—'Excellent.' "

Credits allowed.—Last year the faculty of the college of liberal arts voted to give academic credit for the advanced courses in military science and tactics to the extent of 1½ semester hours per semester; and this year the faculty voted that the basic courses shall yield 1 semester hour's credit for each of the four semesters in which the work is given.

Commissions awarded.—Nine students were awarded commissions as Second Lieutenants, Officers' Reserve Corps, United States Army, contingent upon their completion of a period of training in camp this summer.

SCHOOL OF ENGINEERING AND ARCHITECTURE

General trends.—Howard University is the only institution for Negro youth in the United States which now has accredited work in engineering. Although properly qualified students may enter the freshman class of the school of engineering and architecture upon graduation from high school, there is a pronounced growth in the number of students registering for degrees in this school who have studied previously in other institutions of higher learning. Ten percent of the students registered in 1938–39 had already earned a bachelor's degree. Seventy percent of the student body came from States in which dual systems of education prevail.

Enrollment.—The year 1938–39 witnessed the largest enrollment in the 28 years which have passed since the establishment of this school. Sixty students from 16 States and 1 foreign country registered for degrees in civil, electrical, and mechanical engineering, and architecture. This is an increase of 10 students, or 20 percent over the total enrollment of the preceding year.

Graduates and their employment.—Three students were graduated at the June commencement, 1939, one each in architecture, civil engineering and electrical engineering. All received employment within the week following graduation. Howard now has 72 graduates in the engineering and architectural fields distributed as follows: Architecture, 13; civil engineering, 7; electrical engineering, 27; and mechanical engineering, 25. All these graduates are employed and working in 18 States, the District of Columbia, and 4 foreign countries. During the current year a graduate of our school was appointed one of three associate architects of the low-rent Federal housing project at Charleston, W. Va.; one was appointed junior engineer, Public Works Administration, Fort Wayne, Ind.; and another was appointed to the National Park Service, Schnecksville, Pa.

Faculty.—The regular faculty of 8 full-time members serving in the first semester included 1 professor, 2 associate professors, 3 assistant professors, and 2 instructors. During the second semester the active faculty consisted of 9 members distributed in rank as follows: 1 professor, 1 associate professor, 3 assistant professors, and 4 instructors. Two members of the faculty were on leave of absence.

Five members of the faculty are registered professional engineers by examination in the States of Alabama, Ohio, Pennsylvania, Virginia, and the District of Columbia.

There were two publications by faculty members during the year and one member of the faculty obtained a United States patent on his invention, "An Optical Apparatus for Determining the Position of a

Tool." This invention makes possible the creation of an object in metal, directly from a drawing of the object.

SCHOOL OF MUSIC

Number and distribution of students.—There were 216 students enrolled in the school of music for the year 1938–39 as compared with 222 students for the year 1937–38. Ninety-two of these students were registered in the regular courses leading to a degree; 124 students were classified as special students, the majority of whom were registered in the junior department.

Faculty.—The faculty comprised 15 members during the year. Eleven were full-time teachers and 4 were part-time. One member of the faculty was on leave of absence for 1938–39. He was star of the musical drama, "The Sun Never Sets." He appeared as guest artist with leading English orchestras and will appear as guest artist with the philharmonic orchestra at the Lewisohn Stadium in New York City this summer. A member of the faculty played a series of piano recitals in several Southern States. One member of the faculty has been granted sabbatical leave to continue research in the field of Creole music. A song recently published by a member of the faculty has been sung during the year by several distinguished artists. Original music by different students has been selected for public programs by recital artists.

Graduates.—Four students were graduates at the June commencement, 1939. Three received the degree of bachelor of music; 1 received the degree of bachelor of school music.

Outstanding events of the year.—The recital of Marian Anderson, world-renowned contralto, attracted both national and international attention. Seeing the inability of the university to secure an auditorium of sufficient size on account of racial barriers and discrimination, the Secretary of the Interior granted permission for an open-air recital on the steps of the Lincoln Memorial. The program was sponsored by eminent persons from all walks of the Nation's life and was broadcast on a national network with an estimated attendance of 75,000 persons. A complete recording of this event, which includes the description by the radio announcer, an introductory address by the Honorable Harold L. Ickes, Secretary of the Interior, and the recital of Miss Anderson, will be available at Howard University for all future generations of its students.

The concert series this year was very successful. The committee presented Egon Petri, pianist; Conrad Bernier, organist; Catherine Van Buren, soprano; the Russian Trio; Charlotte Wallace Murray, contralto; and Muriel Kerr, pianist.

On May 20, 1939, the school of music produced and presented Verdi's opera, Il Trovatore. This was the first attempt of the school of music to give its students an insight into the production of opera. Many departments of the university were called into action. Two hundred members of the student body and faculty were in the cast and on the staff. Opportunity was given to the students of voice to create the leading roles. Students of instruments were given first-hand opportunity to follow an operatic score. The stirring choruses were sung by members of the men's glee club and the women's glee club of the university and other Howard students, representing many departments of the university. A capacity audience attended both the matinee and evening performances of the opera and the press comment was highly favorable.

SCHOOL OF MEDICINE

The school of medicine is the functional organization which represents the cooperative interests of the entire medical unit of the university without superseding the direct line of relationship between the independent faculties and the board of trustees. The autonomous member units are the college of medicine, the college of dentistry, and the college of pharmacy. Freedmen's Hospital, an independent institution built upon grounds owned by the university, is functionally a part of the university medical unit.

COLLEGE OF MEDICINE

Outstanding events of the year.—(1) Under sponsorship of the National Tuberculosis Association and the District of Columbia Tuberculosis Association, the first Annual Conference of Negro Tuberculosis Workers was held at the College of Medicine on June 5, 6, and 7, 1939. Twenty-four Negro specialists on tuberculosis from various parts of the country registered for the conference. Speakers at the conference included some of the most eminent authorities and specialists on tuberculosis in the United States. (2) The Public Works Administration has granted $600,000 for the erection of a 150-bed tuberculosis annex at Freedmen's Hospital. This should make available to Howard students facilities for clinical training in tuberculosis. With this clinical asset, Howard University and Freedmen's Hospital should become an important national center of interest and activity with respect to the control of tuberculosis. (3) The postgraduate course in venereal-disease control, introduced last year, was continued through a grant of $13,500 made by the United States Public Health Service. Twenty-one Negro physicians, drawn

principally from the Southern States, registered for this course. (4) Continuance of the study of student health programs in Negro colleges was made possible by a grant of $600 from the National Tuberculosis Association and a grant of $600 from the American Social Hygiene Society. (5) A resurvey of the school was made by the Council on Medical Education of the American Medical Association on April 12 and 13, 1939. This survey placed special emphasis upon the relationship of the school to the hospital. A report on this survey has not yet been made. (6) Considerable improvement has been made in the general appearance in the wards of the Freedmen's Hospital and its physical facilities. New physical X-ray equipment has been installed and an additional X-ray technician has been employed. Other valuable equipment and facilities have been provided.

Students.—Of a total of 282 applicants, 240 presented minimum premedical requirements for admission. From this number 39 freshmen were admitted. The largest number of medical students registered at any time during the year was 137.

Graduates.—The degree of doctor of medicine was conferred upon 30 graduates at the June commencement all of whom have secured interneships in hospitals approved by the Council on Medical Education and Hospitals of the American Medical Association.

Thirty-four Howard University graduates were examined by 12 State boards in the United States during the year; 33 passed and 1 failed. The percentage of failures was 2.9 percent as compared with 8.5 percent for 1937. The failure rate of 2.9 percent is the lowest recorded in the history of the college of medicine.

Faculty.—Of a total of 96 faculty members who devoted time to teaching, 28 were full-time teachers and 68 were part-time teachers. The great majority of the part-time teachers were clinical instructors and clinical assistants.

One General Education Board fellow will continue the study of surgery at Columbia University College of Physicians and Surgeons for another year; another who spent the past year in the study of neuropsychiatry at the University of Iowa, will spend the year 1939–40 at Harvard University; one General Education Board fellow in internal medicine will report for study on July 1, 1939, at the University of Rochester, while another will report on July 1, 1939, at the University of Michigan for study of thoracic surgery.

The 16 publications of the faculty during the year 1938–39 consisted of 1 book, 1 book review, and 14 articles. In addition there were 2 abstracts and 8 articles were accepted by various journals for publication during the year 1939–40.

COLLEGE OF DENTISTRY

General trends.—There was an increase in the enrollment in 1938–39, continuing the regular increase in numbers for the past 5 years. Incoming students showed marked increase in educational background and professional promise.

Over 50 percent of the full-time teachers of the college of dentistry have engaged in formal research and graduate studies, and most of this group have received the degree of master of science for work in their special fields.

Further improvements were made on the present physical plant, which greatly increase its usefulness for temporary purposes. Its limitations, even under these improved circumstances, however, indicate the pressing need for a new dental building and equipment.

Students.—Fifty-one students enrolled in the college of dentistry in the year 1938–39. Eighteen of these were dental freshmen and six were young women registered in oral hygiene. The total enrollment showed a gain of three students over last year's enrollment, while the freshman class showed a gain of seven students over the preceding year.

Of the 18 freshmen, 13 held bachelor's degrees; 2 had completed 3 years of college work and only 3 had the minimum requirements for admission of 60 semester hours or 2 years of college work. The freshman students came from 9 States, the District of Columbia, and the British West Indies, and their predental instruction was pursued in 10 colleges and universities. The average amount of clinical work accomplished per student during 1938–39 excelled that of any previous year of clinical records. The average income per student in 1929–30 was $156.56; since that time there has been a gradual rise until the current year when the income reached the rate of $405.59 per student.

Graduates.—Seven graduates received the degree of doctor of dental surgery, and six received certificates in oral hygiene.

Of the graduates in dentistry two received postgraduate internships paying $1,500 for the year 1939–40 at the Murry and Leonie Guggenheim Dental Clinic in New York; another received a similar appointment at the Forsyth Dental Infirmary in Boston, Mass.; two others received interneships at the Freedmen's Hospital, Washington, D. C., and the Harlem Hospital, New York.

Faculty.—There were 15 members of the faculty during the year, distributed by rank as follows: One professor, 2 associate professors; 6 assistant professors; 4 instructors; 1 academic assistant; and 1 clinical assistant. Two of the instructors were part-time, and the

2 assistants were part-time teachers. Prior to 1935 only 1 faculty member had engaged in graduate study in dentistry. At the present time 6 members hold the degree of master of science. Two others have done graduate work leading to the degree. Fifty-eight percent of the full-time teachers have completed at least 1 year of graduate work. The faculty continued its program of public education and guidance during the year, visiting 27 colleges and universities in 14 States, and the District of Columbia, and conferring with students interested in dentistry.

COLLEGE OF PHARMACY

General trends.—During the last 10 years there has been a steady decline in the number of students entering pharmacy in all institutions. As a result, an acute shortage of pharmacists has been created in all sections of the country. During the year 1938–39, the college of pharmacy received requests from 30 drug stores to supply them with pharmacists. The prevailing tendency among pharmacists is toward the professional type of store rather than the general drug store. Pharmaceutical manufacturers are beginning to employ Negro pharmacists as detail and professional representatives.

Enrollment.—During the year 1938–39 the college had an enrollment of 31 students as compared with 28 students for the year 1937–38. These students came from 13 states, the District of Columbia and 2 foreign countries. Scholastic attainments of the entire group of students for the year 1938–39 were considerably above those of students in previous years.

Graduates and their employment.—The college had one graduate to receive the degree of bachelor of science in pharmacy at commencement in June 1939. Of the three graduates of the class of 1938, one has successfully passed the Ohio State board, the other two have passed the Pennsylvania State board. All of the graduates for the past 4 years are employed in pharmacies.

Faculty.—The faculty for the year consisted of one full-time professor of pharmacognosy, three full-time instructors in pharmacy, and one part-time instructor.

All members of the faculty are duly licensed and registered to practice pharmacy and are active members of the major pharmaceutical organizations. Two articles were published by a member of the faculty during the year.

Supplies to various departments.—The college supplied to the university health service 1,944 units of material in labeled containers ready for dispensing and clinical use. This was more than twice the amount supplied during the previous year. In addition, the college

filled 193 prescriptions for students of the university written by the staff of the health service as compared with 112 prescriptions for the year 1937–38, which represents an increase of 81 prescriptions or 72 percent. Pharmaceutical preparations and supplies were also furnished to the colleges of dentistry and medicine and the department of physical education.

SCHOOL OF LAW

General trends.—The school of law at Howard University is the only school freely admitting Negroes which maintains sufficiently high legal standards to be a member of the American Association of Law Schools and on the approved list of the American Bar Association.

In addition to its work of sound instruction in all elements of basic law, the school of law at Howard University continues to place emphasis on all phases of law which peculiarly affect Negroes and to train Negro students to cope with those socio-legal and economic-legal problems which specifically affect Negroes. As a matter of legal theory, the rights and duties of Negroes do not vary from those of other citizens. Actually, in the courts and in other places where legal problems are raised, a difference does exist. It is essential, therefore, that the education and training of Negro lawyers should qualify them to cope with the problems of this group.

Students.—There were 71 students enrolled in the school of law for the year 1938–39, which is 5 less than the number of students enrolled in the year 1937–38, but almost double the enrollment of 1933–34, when there were only 37 students.

Twenty-seven States and 34 colleges and universities are represented in this year's student body. Twenty-six of these colleges are Negro institutions and 24 of them are located in the South.

Of the total number of students, 49 possessed a bachelor's degree and 17 others completed more than the minimum admission requirement of 2 years of college work.

Graduates.—Twenty-two law-school students received the degree of bachelor of laws in 1938–39 as compared with 16 in 1937–38 and 17 in 1936–37. This was the largest graduating class since the school of law was established as a full-time day law school 11 years ago. During the year graduates of the law school were admitted to practice law in the District of Columbia, Florida, Illinois, Kentucky, and Virginia.

Faculty.—The faculty for the year 1938–39 consisted of eight members, distributed by rank as follows: One professor, one associate professor, five assistant professors, and one lecturer. Of these, five were full-time teachers and three were part-time, the part-time serv-

ices being equivalent to one-half the services of a full-time teacher.

Thirteen articles were published by members of the faculty during the year, and one paper was read before the section on public utilities at the annual meeting of the National Lawyers Guild. Two members of the faculty successfully argued two cases dealing with the civil rights of Negroes before the Supreme Court of the United States.

William H. Hastie, judge of the United States District Court of the Virgin Islands, was named dean of the school of law, effective July 1, 1939.

The library.—The law library contains 20,436 bound volumes, and ranks second in size among the law-school libraries of the District of Columbia. The additions for the year 1938–39 include 393 volumes received on purchase, 33 volumes received as gifts, 45 volumes as bound periodicals, 46 periodical titles received on purchase, and 24 periodical titles received as gifts. The total circulation of books for 1938–39 was 5,022 as compared with a circulation of 4,810 for 1937–38.

SCHOOL OF RELIGION

Financial support.—The school of religion receives no aid from Government funds. Its work is maintained entirely by endowment and private gifts.

General trends.—For 7 years the school of religion has permitted only college graduates to be enrolled. In 1932–33 there were only 5 graduate students in the school of religion while there were 39 in 1938–39.

The school of religion takes the lead in graduate seminary work for Negroes. Its enrollment of Negro college graduates exceeds that of any seminary in the United States.

Students.—There were 40 students enrolled in the school of religion in the first semester and 43 in the second semester of the year 1938–39. The total net enrollment of 43 is an increase of 11 students over the enrollment of 32 students in 1937–38. Thirty-one colleges supplied the undergraduate training of this year's student body.

The school has been interdominational from its very beginning. The 10 denominations represented by the students this year include the Colored Methodist Episcopal, the African Methodist Episcopal Zion, the Congregational, the Presbyterian, the Baptist, the Church of God, the Christian, the Syrian Christian, the Methodist Episcopal, and the African Methodist Episcopal churches.

Graduates.—Of the nine students graduated from the school of religion at the June commencement, 1939, five received the degree

of bachelor of divinity and four received the master's degree in religious education. Three of the four students who received the master's degree had already received the degree of bachelor of divinity. It should be noted that the master's degree in religious education is awarded by the graduate school under the supervision of which all graduate work in the university is consolidated under one head.

Faculty.—The faculty for 1938–39 consisted of four full-time teachers and six part-time teachers, representing a gain of one in the full-time staff, and a high-water mark of four in this important group. One member of the faculty was away on sabbatical leave. During the year members of the faculty published one book and seven articles.

New home.—The school of religion will move from its present quarters to the Carnegie Library Building, which is expected to be ready for occupancy some time during the year 1939–40. The Carnegie Building fully fits the requirements of the school of religion. It will provide library space for 40,000 volumes, 5 classrooms, ample reading and study space, 7 offices for the faculty, an ample chapel, a social room, and rest rooms.

Library.—There are approximately 3,000 volumes in the school of religion library. Thirty-three hundred volumes of religious books now housed in the general library will be moved to the Carnegie Building, making a total of 6,300 volumes.

THE LIBRARY

Outstanding events.—The general library of the university is now housed in its new home, the Founder's Library, which was opened for use on January 3, 1939. Certain important collections were acquired during the year. Of special note is the acquisition of the Richard Le Galliene Collection of 175 books, 23 letters, manuscripts, and magazine articles, assembled by the late Prof. Benjamin Brawley and made available to the university as a gift. To the collection on Negro life and history two special types of significant material were added. Important issues of The Liberator were purchased. A significant gift of other issues came from Dr. Oswald Garrison Villard, who also added other valuable antislavery material. A very promising beginning was made in collecting manuscripts, printed compositions, pictures, and letters of Negro musicians. The work on the catalog of books by and about Negroes in the Moorland Foundation was completed. This bound, mimeographed publication of more than 500 pages was made possible by funds for personnel received from the Works Progress Administration.

The Moorland Foundation supplied about 3,129 readers with approximately 4,905 cataloged books, pamphlets, and periodicals, more than 200 newspaper clippings, and over 40 pictures—an approximate increase of 82.5% in the items used by patrons. The collection now totals 11,300 items, comprising 6,626 books, 3,981 pamphlets, 416 bound periodical volumes and 277 Howard masters theses.

The Union Catalog of items by and about Negroes, found in and about 10 different libraries, made available through Works Progress Administration funds, contains about 30,000 cards, providing a clearing house for over 100,000 publications.

Statistics.—The total number of books now accessioned in the university libraries is 119,146. This is an increase of 7,345 over the 111,801 books accessioned in 1937–38. Seven thousand three hundred and forty-five books were accessioned in all university libraries during 1938–39 as compared with 5,441 in 1937–38. Eight hundred and twenty-three periodical titles were received by all libraries, 579 of which were received by the main library. The circulation recorded in all libraries for 1938–39 was 157,110. This is an increase of 20,629 over the total circulation for 1937–38. The circulation recorded in the main library was 94,319 as compared with 74,587 for the previous year.

BUILDINGS AND GROUNDS

Buildings under construction.—The following table shows the list of building projects in progress during the year ended June 30, 1939. These buildings were going forward under the funds and direction of the Federal Emergency Administration of Public Works.

Building Projects in Process, Year Ended June 30, 1939

No.	Description of project	Date authorized	Total appropriations
5	Construction and equipment of a library building	Feb. 14, 1931	$1,105,000
9	Construction and equipment of dormitories for men	Oct. 4, 1935	646,200

The status of the above-listed projects, as of June 30, 1939, was as follows:

Project No. 5.—Construction and equipment of a library building. The Founders Library was completed, and on May 25, 1939, it was dedicated and presented to the university by the Honorable the Secretary of the Interior, Harold L. Ickes.

Project No. 9.—Construction and equipment of dormitories for men. This building project was 76 percent complete on June 30, 1939. It is expected to be ready for occupancy on December 3, 1939.

Works Progress Administration projects.—Two Works Progress Administration projects were under way on the campus during the year—one in landscaping and the other in exterior painting. The first project included the extensive planting of trees, shrubbery, and grass, the resurfacing of tennis courts, and the construction of permanent bituminous walks in the area between Carnegie Hall and Miner Hall. In the second project was included the exterior painting of the women's dormitories and all of the buildings on the main campus with the exception of Carnegie and Thirkield Halls.

FINANCES

Assets.—The total assets of the university on June 30, 1939, were $9,527,896.44, exclusive of the unexpended balances of Government appropriations for the men's dormitories. Of the total assets, the sum of $1,106,873.93 represents assets in the physical plant extension fund, made possible through private gifts of the General Education Board and the Julius Rosenwald Fund, and through rentals of the property purchased by the gifts of these funds; $979,098.21 represents endowment (this shows a net decrease of $52,303.25 in the funds due to depreciation of securities—there was an actual increase of endowment gifts by $34,162.91); $7,315,830.01 represents plant fund assets (an increase of $507,992.19 since the report of June 30, 1938) exclusive of the unexpended balances of governmental appropriations for buildings, as indicated above; $1,341.46 represents a small-loan fund for students in the school of medicine. The remaining $124,752.83 represents assets of the current fund.

Income and expenditure.—The total income for the year 1938–39 was $1,609,487.60 including current and capital funds. This represents a decrease of $302,267.62 in the total income for 1937–38. Gross income for current purposes was $1,147,860.03, representing an increase of $23,577.03 over the income for current purposes for 1937–38. Of the total income for current purposes the Government contributed $723,364.77 or $23,540.01 more than the Government contributed for 1937–38. The income for current purposes from private sources in 1938–39 was practically the same as that for 1937–38, being $424,495.26 in 1938–39 and $424,458.24 in 1937–38.

The total expenditures for all purposes, current and capital, for the year 1938–39 was $1,616,518.59, representing a decrease of $294,999.07 in the expenditures for the year 1937–38. The total current expenditures for 1938–39 were $1,154,891.02, representing an increase of $30,845.58 over the expenditures for 1937–38.

Attention is respectfully directed to the fact that during the year 1938–39 there was an increase in the amount and percentage of money

spent for graduate instruction and research and for the general library; there was a reduction in the percentage of funds spent for physical plant operation and maintenance. These trends are soundly in the right direction.

The audit of funds.—The auditing of all the university's accounts has been done by certified public accountants. All moneys appropriated by the Congress and by the Federal Emergency Administration of Public Works were expended under the supervision of the Secretary of the Interior.

APPRECIATION

On behalf of the trustees, faculties, and students of Howard University, I wish to express to the Secretary of the Interior and through him to the Members of the Congress and to the President of the United States our appreciation for their thoughtful and constructive interest in Howard University, and to all the officers and employees of the Department of the Interior for their courtesy and helpfulness in handling the affairs of Howard University.

INDEX