R E P O R T R E S U M E S

ED 015 294 VT 003 856

THE CURRENT EMPLOYMENT MARKET FOR ENGINEERS, SCIENTISTS, AND TECHNICIANS, DECEMBER 1966.

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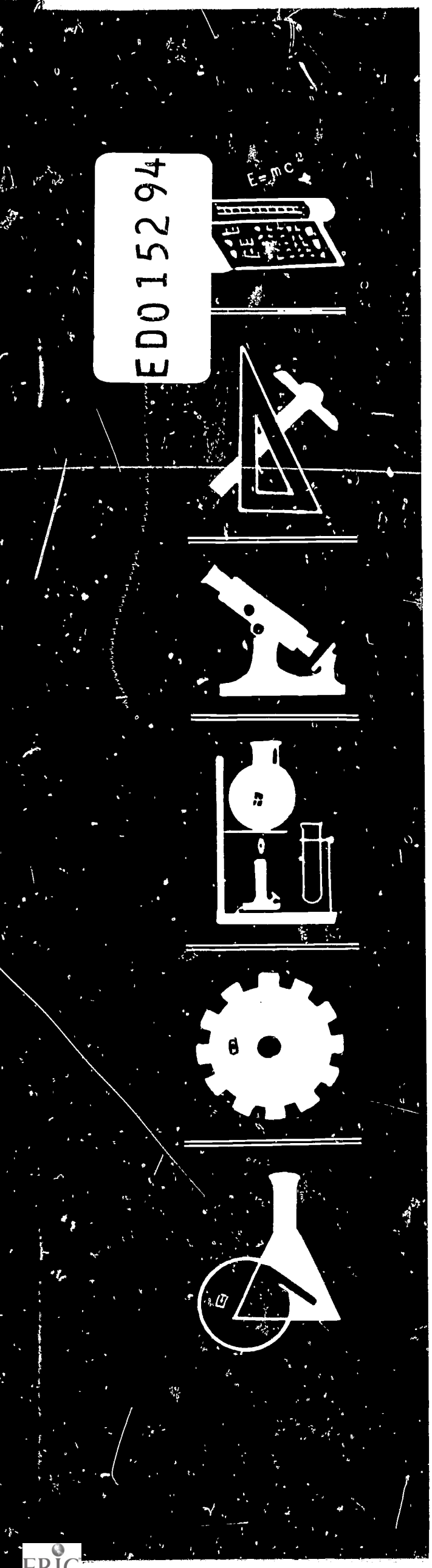
BUREAU OF EMPLOYMENT SECURITY (DEPT. OF LABOR)

PUB DATE DEC 66

EDRS PRICE MF-$0.25 HC-$1.92 46P.

DESCRIPTORS- *LABOR MARKET, EMPLOYMENT OPPORTUNITIES, EMPLOYMENT TRENDS, *SCIENTISTS, *DRAFTSMEN, *SUBPROFESSIONALS, *ENGINEERS, OCCUPATIONAL SURVEYS, EMPLOYMENT SERVICES, JOB SEEKERS, GEOGRAPHIC DISTRIBUTION,

FIELD REPORTS ON JUNE 1966 CONDITIONS IN 30 MAJOR LABOR AREAS FOR ENGINEERING, SCIENTIFIC, AND TECHNICAL OCCUPATIONS, PROVIDED BY AFFILIATES OF THE BUREAU OF EMPLOYMENT SECURITY, WERE THE BASIS FOR THIS SEMIANNUAL REPORT. THE NUMBER OF APPLICANTS HAD DECLINED 48 PERCENT TO A NEW 8-YEAR LOW, WHILE OPENINGS HAD RISEN TO 9,600, 58 PERCENT OVER THE PREVIOUS YEAR. DEMANDS ACCELERATED BY EXPANSIONS IN CIVILIAN-ORIENTED INDUSTRIAL AND GOVERNMENT CONTRACT ACTIVITIES AND GOVERNMENT SPONSORED RESEARCH AND DEVELOPMENT PROGRAMS WERE PARTICULARLY STRONG IN DURABLE GOODS, DEFENSE, AEROSPACE, AIRCRAFT, SHIPBUILDING, ELECTRONICS, METAL WORKING, MACHINERY PRODUCTION, CONSTRUCTION WORK, AND RESEARCH. THE GREATEST VOLUME OF JOB OPENINGS WERE FOR ENGINEERS AND DRAFTSMEN IN MECHANICAL, ELECTRICAL, CIVIL, AND AERONAUTICAL SPECIALTIES, FOR ANALYTICAL AND PHYSICAL CHEMISTS, MATHEMATICAL SCIENTISTS, AND PHYSICISTS, AND FOR INDUSTRIAL AND MEDICAL LABORATORY TECHNICIANS. TO MEET STAFFING REQUIREMENTS, EMPLOYERS SOUGHT EMPLOYED PERSONNEL, RECENT GRADUATES, AND COLLEGE STUDENTS, LOWERED JOB REQUIREMENTS IN SOME CASES, AND MADE HIGHER SALARY OFFERS. STARTING SALARIES FOR ENGINEERING GRADUATES AVERAGED 7 TO 10 PERCENT ABOVE 1965'S LEVEL. TO HELP MEET THE NEED, INSTITUTIONAL TRAINING COURSES UNDER THE MANPOWER DEVELOPMENT AND TRAINING ACT WERE APPROVED FOR SOME 2,300 DRAFTSMEN AND 700 LABORATORY TECHNICIANS. THE LONG LEAD-TIME REQUIRED TO TRAIN ENGINEERS AND SCIENTISTS, THE EXPANDING ECONOMY, AND THE NEED FOR ENGINEERS AND SCIENTISTS TO HELP SOLVE PROBLEMS SUCH AS AIR POLLUTION WHICH AFFECT THE NATIONAL WELFARE CONTRIBUTED TO THE CURRENT MANPOWER SHORTAGES. (JM)



THE CURRENT EMPLOYMENT MARKET

for

ENGINEERS, SCIENTISTS, AND TECHNICIANS

December 1966

U.S. DEPARTMENT OF LABOR
W. Willard Wirtz, Secretary
MANPOWER ADMINISTRATION
BUREAU OF EMPLOYMENT SECURITY
Washington, D.C. 20210

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BUREAU OF EMPLOYMENT SECURITY
ROBERT C. GOODWIN, ADMINISTRATOR
U.S. EMPLOYMENT SERVICE
Frank H. Cassell, Director

This survey is issued semiannually. It is based on field reports on current conditions in 30 major labor areas prepared by State employment security agencies affiliated with the Bureau of Employment Security, statistics on job openings for selected engineering, scientific, and technical occupations placed in interarea recruitment by public employment offices throughout the country, and information obtained from various government agencies, professional societies, and other sources. This study was prepared by Norma F. Ausmus, Alvin W. Saile, and Renee L. Gallop in the Division of Research and Publications, Office of Manpower Analysis and Utilization of the United States Employment Service.

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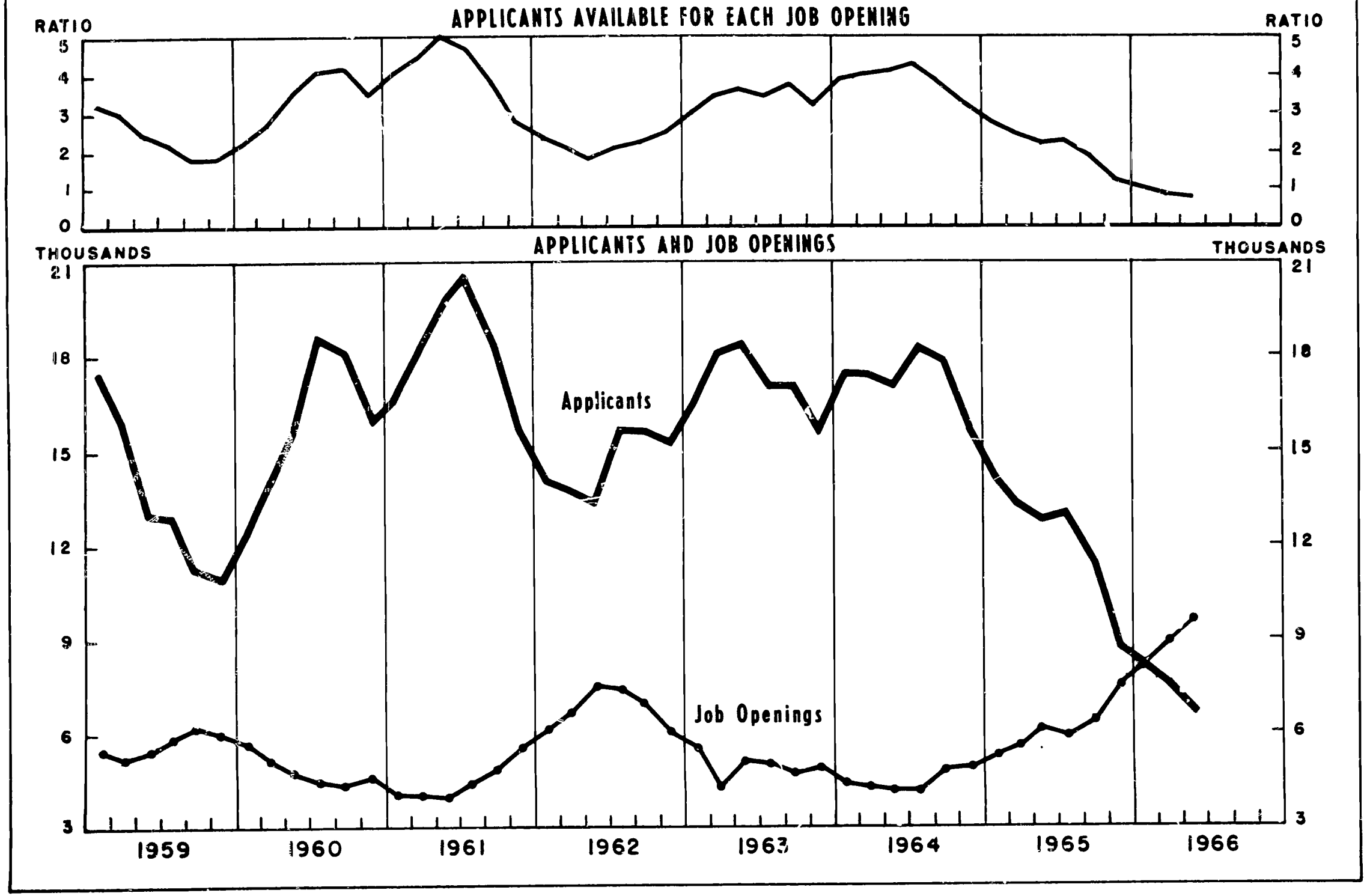
Comparison of Applicants and Job Openings in Public Employment Offices in 30 Major Metropolitan Areas - Bimonthly, 1959-1966



THE CURRENT DEMAND-SUPPLY SITUATION FOR ENGINEERS, SCIENTISTS, AND TECHNICIANS

SUMMARY

Despite some phase-out of aerospace contracts in late spring of 1966, demand continued to climb for engineers, scientists, draftsmen and other supporting technicians during the first half of 1966. According to the mid-1966 employment service survey of job market conditions for these occupations in 30 of the Nation's major employment centers, increased demand had absorbed a large portion of the available applicant supply.

In June 1966, the number of active jobseekers registered in each of these occupations in local public employment offices in the 30 reporting areas (see page 34 for listing) had dropped to a record low for the 8 years these data have been available. The number of applicants had drifted downward over the year to 6,700--a decline of 48 percent. At the same time, job openings in each of these categories rose, nearing or, in the case of aeronautical and civil engineers, draftsmen, and laboratory technicians, surpassing previous peak demand levels. Openings in the surveyed occupations totaled 9,600 and were 58 percent above a year earlier (see chart on opposite page).

Reflecting the growing tightness in the job market for technical manpower, the excess of job openings over jobseekers in many of these occupations this June was in sharp contrast to a year earlier when two persons were registered for each such employment service opening. Local office job listings for engineers and draftsmen in the 30 areas have exceeded the number of registered applicants throughout the first 6 months of this year. While there were more applicants than openings for scientists and laboratory technicians, there was a shortage of jobseekers capable of meeting still-high employer specifications.

Further highlighting the scarcity of qualified applicants in the engineering and technical job market was the sharp rise in locally hard-to-fill openings placed in interarea recruitment--a nationwide system utilized by State employment services for matching openings in one area with applicants in other areas. Openings in interarea recruitment in the surveyed occupations increased by 71 percent over the year to 7,000 in June 1966. Sharpest rises in demand were for support technicians, with openings for draftsmen and for laboratory technicians increasing by 125 percent and 83 percent, respectively.

The recent growth in technical manpower requirements for durables manufacturing as evidenced by employment service data began in the fall of 1964 and has continued unabated. Added defense commitments and some expansion in space exploration late in 1965 contributed to stepped-up recruitment for already hard-to-find engineers and draftsmen as well as to a tightening of the job market for scientists and technicians.

Demand during the first half of 1966 has been particularly strong in aircraft manufacturing, shipbuilding, electronics, metal working, light and heavy machinery and equipment production, and from consultants and contractors engaged in industrial construction work. Job prospects with Federal, State and local governments remained plentiful, with some improvements noted in salaries offered. Public utilities added to the recent job market competition with these firms seeking experts trained in power generation or transmission.

Specializations Sought

The greatest volume of employment service job openings in the surveyed occupations was for engineers and draftsmen--especially in the mechanical, electrical, civil, and aeronautical specialties. The emphasis was on engineers and draftsmen qualified to perform various design tasks for product development or plant facility expansion or modification.

Among natural scientists, those most widely sought through the employment service in the 30 major employment centers were analytical and physical chemists and mathematical scientists. Also listed were a few hard-to-fill openings for physicists with a doctorate degree and research specialization.

Openings for laboratory technicians rose sharply over the year, both for industrial and medical laboratory technicians. Needs rose noticeably during the first half of 1966 for chemist assistants and testers and other industrially trained technicians. The long-standing chronic shortage of qualified medical service laboratory technicians also increased during this period.

Dearth of Applicants

As applicant supply dwindled, many employers periodically canvassed local employment service offices, and finding few, or no, qualified applicants available, did not list their needs. Others resorted to open-end job listings, that is, they did not specify an exact number of openings and indicated they were willing to interview any reasonably qualified and interested candidate until further notice. Because of such employer practices, job opportunities were sometimes understated, and demand, as evidenced by employment service openings was perhaps less representative of the job market situation than in past periods.

The decline in applicant supply in the 30 areas was mirrored by a similar fall-off in national estimates of claimants for unemployment insurance in the selected occupations. In May 1966 such claimants totaled only 4,600, down 52 percent over the year.

Applicant supply in the selected occupations among the 30 reporting areas not only contracted but shifted in composition. Current applicants included many persons aged 45 or above, including retirees looking for part-time assignments. Some applicants had failed to update their skills while others lacked qualifying citizenship, security clearance, faced draft calls, or refused referral because of personal preferences concerning job location, working conditions, or salary.

Meeting Staffing Needs

In order to meet staffing requirements, employers attempted to recruit personnel already employed elsewhere and sought inexperienced recent college graduates. June college graduates were in great demand and generally found plentiful job prospects. Recruiters had been active on college campuses throughout the academic year attempting to attract prospective candidates by playing up job locations, emphasizing such factors as proximity to educational facilities, cultural advantages, or pleasant climatic conditions. Reports were received of job offers made to students in their junior year of college for which leaves of absence from work would be granted until graduation.

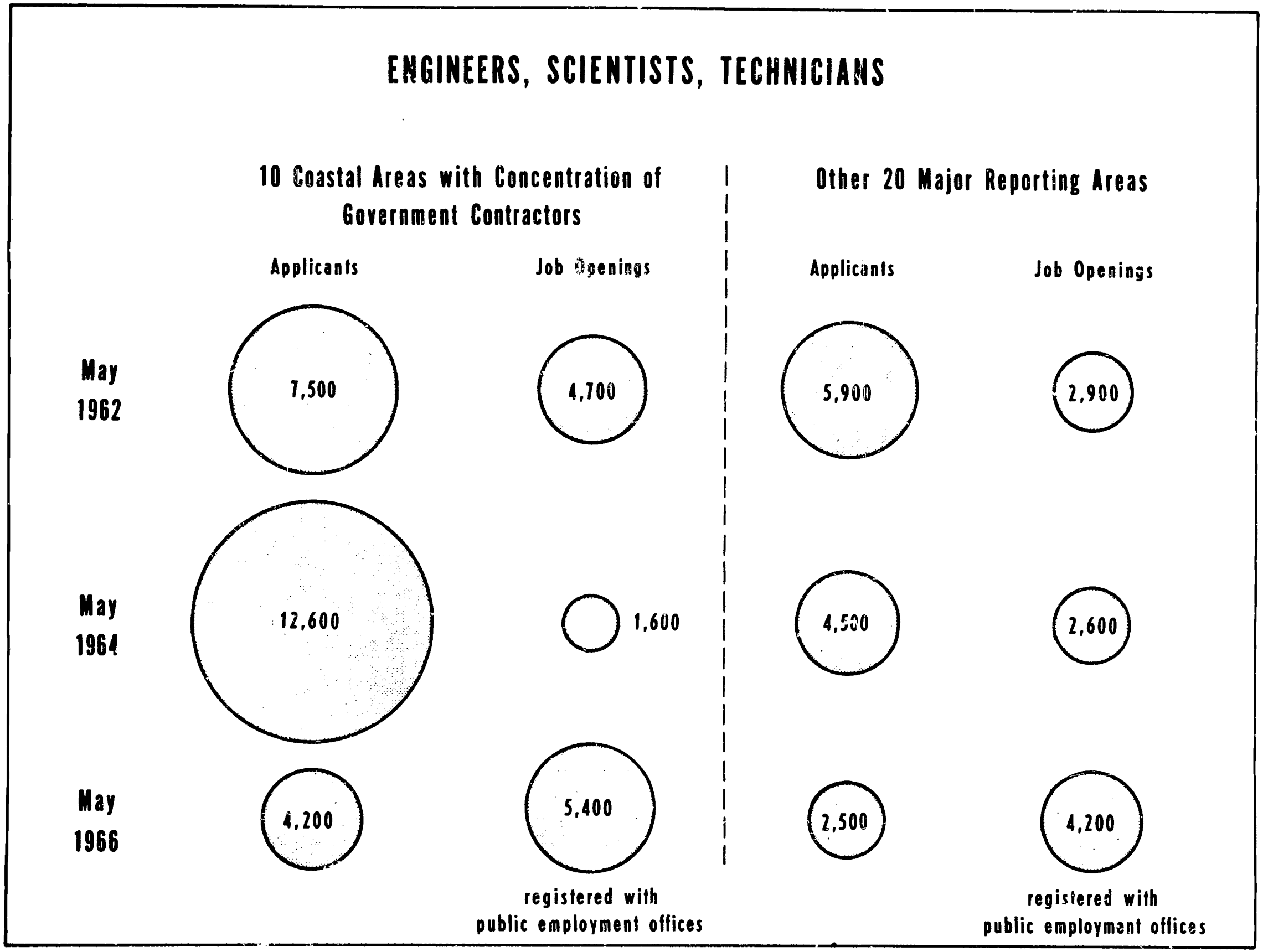
Starting salaries for engineering graduates averaged 7 to 10 percent above last year's level. More attractive salary offers made by larger establishments resulted in the loss of staff among some smaller firms, some of which, in turn, relaxed their hiring specifications with regard to age. In some cases, retirees were acceptable.

Among the technicians working in support of engineers and scientists, some college training was preferred. However, high school graduates with courses in mathematics or with mechanical aptitudes were also sought. For medical technologists, however, there was no lowering of requirements for State licensing or certification. In an effort to help meet the need for draftsmen and technicians, during the fiscal year 1966, institutional training courses under the Manpower Development and Training Act were approved for some 2,300 draftsmen and 700 laboratory technicians.

Future Needs

Contributing to the current manpower shortages is the long lead-time required to train engineers and scientists. Intensification of prevailing shortages is anticipated in many areas as the Nation's economic expansion continues. In addition to providing qualified technical manpower to meet expanding industry, space, and defense programs, engineers and scientists are needed to help solve problems affecting the national welfare such as water purification and conservation, air pollution, and mass transportation.

ENGINEERS, SCIENTISTS, TECHNICIANS



SOME PAST TRENDS

Impact of Changing Defense and Aerospace Manpower Needs on 10 Coastal Areas

Data on employment service openings and applicants in 10 coastal areas (see page 34 for a listing) have been particularly sensitive to changing manpower requirements for aerospace and defense projects. Much of the government contracting in these fields has involved research and development efforts, theoretical aspects of technological advancements, and production of the necessary hardware.

A review of trends in these 10 areas over the past 5 years indicates that such contracting activities were accelerating in the spring of 1962, creating a strong demand for engineers and scientists. Government sponsored research and development contracts at that time included the formulative efforts in missiles, application of solid state electronic circuitry, and the establishment of the DEW-line and other defense systems. In the spring of 1962, the 10 coastal areas accounted for 62 percent of the total openings and 56 percent of all engineers, scientists, and technicians seeking jobs at the local employment service offices in all 30 reporting areas. In the 10 coastal areas, the ratio of applicants to openings was 1.6:1 while for the other 20 areas, the ratio was 2:1 (see chart on page 4). Openings in the 10 coastal areas required recent education in new concepts, and many applicants available at the public employment offices found that they could not meet job specifications.

In the 2 years following the peak demand period of mid-1962, the search for engineers, scientists, and technicians for government contracting eased. There were cancellations of some projects such as Skybolt and Dyna-Soar, and completion of still others such as the Titan II and the Ranger. While highly qualified personnel were being released from such projects and increasing numbers were completing graduate school training, there was a drop in jobs listed by major government contracting firms at local public employment offices. At the end of May 1964, employment service openings in the selected occupations in the 10 coastal areas dropped to only 38 percent, while available applicant supply swelled to 74 percent, of the 30-area totals.

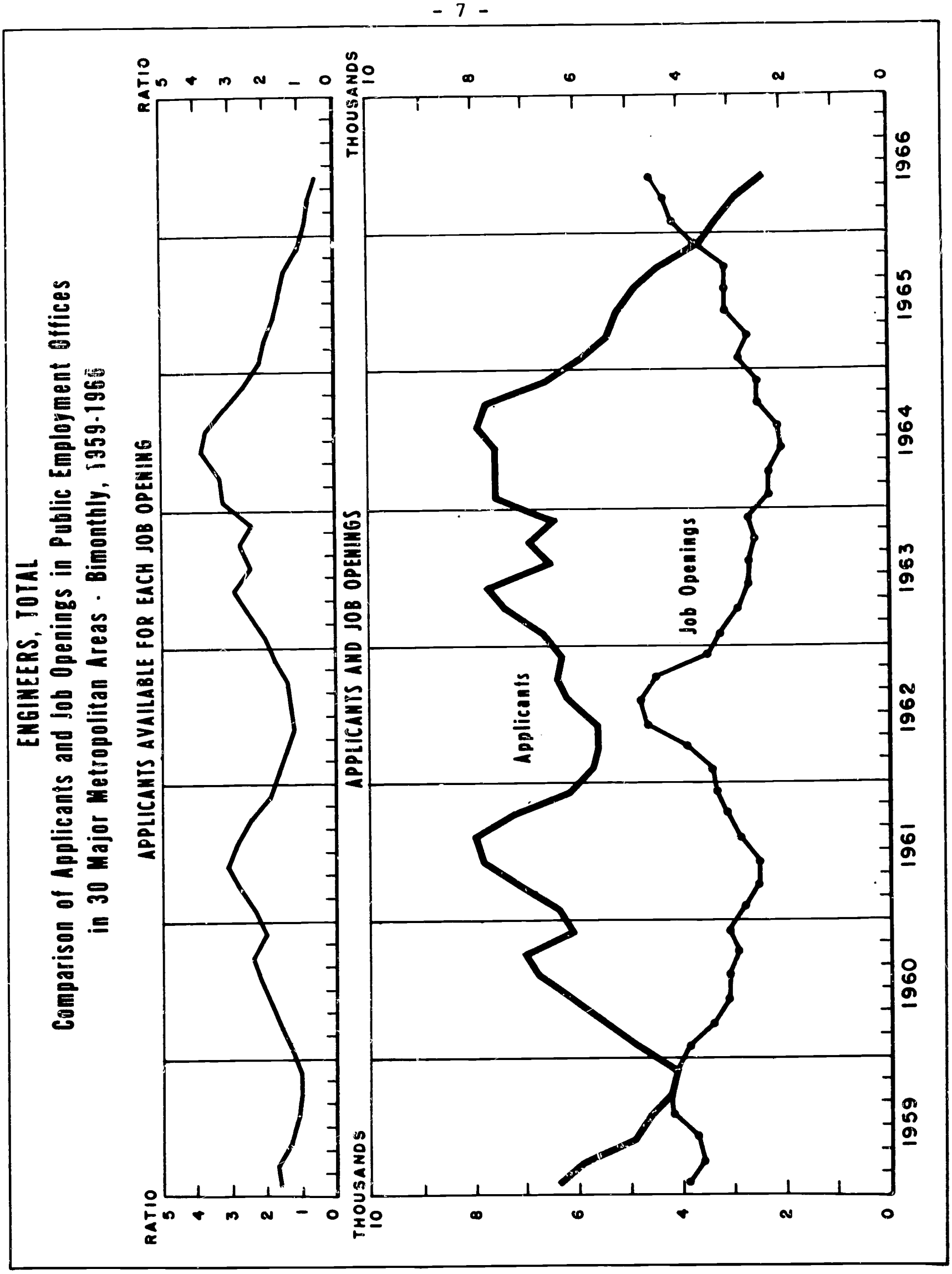
In the 10 coastal areas, the ratio of applicants to openings in the engineering, scientific, and technician occupations rose sharply to almost 8:1 in May 1964. By way of contrast, in the other 20 reporting areas, this ratio dropped somewhat to 1.7:1.

After the start of 1965, increased demand was again reported for engineering and scientific manpower for space and defense programs. These included the Apollo and Saturn programs and the Nimbus meteorological satellites.

Early in 1966, accelerated military commitments for Vietnam produced a new wave of manpower needs in the engineering, drafting, and support technician categories in most of the 10 coastal areas. By the end of May 1966, despite the start of phase-outs of some portions of the Apollo and Saturn projects, job listings in the 10 coastal areas had risen to account for 50 percent, and applicant supply was reduced to 63 percent, of the 30-area totals in these occupations. Openings in the 10 coastal areas exceeded applicants by 1.3:1. In the other 20 areas, however, demand-supply relationships for technical personnel were even tighter, with the local employment service offices reporting a ratio of 1.7 job listings to each applicant.

ENGINEERS, TOTAL

Comparison of Applicants and Job Openings in Public Employment Offices in 30 Major Metropolitan Areas - Bimonthly, 1959-1965



ENGINEERS

Employers were finding it increasingly difficult to recruit engineers throughout the first half of 1966. There were scarcities of both well qualified, experienced applicants and of inexperienced, recent college graduates.

The upsurge in demand which began in the fall of 1964 accelerated sharply during 1965. Major impetus was provided during 1965 by expansions in civilian-oriented industrial activities, including the manufacture of aircraft and industrial construction. Many job opportunities became available particularly for designers in product development and in the modification or expansion of plant facilities. Late in 1965, and through most of the first half of 1966, additional demand for engineers was provided by government aerospace and defense contractors.

In mid-1966, however, the completion of some research and development contracts involving the Apollo moon venture led to the release of some engineers. In most instances, these engineers found their talents much in demand by other employers within the same area.

Shortages Intensified in Most Major Engineering Categories

Engineering applicants at the local employment service offices in the 30 major reporting areas in June 1966 reached the lowest level since 1958 when these data first became available. The drop in applicant supply occurred in every major engineering category except for mining. Only 2,400 engineers were registered on June 1, a decline of 54 percent from the 5,200 available a year earlier. The number of engineers claiming unemployment insurance benefits nationwide dropped at a similar rate. The nationwide estimate of 2,200 engineering claimants for May 1966 was 57 percent fewer than for the same month in 1965.

Job openings in the 30 major reporting areas reached 4,600 on June 1, 1966, a rise of 51 percent from the previous June. This represented a level just 200 below the high level reached in mid-1962 when the federally financed aerospace and missiles build-up reached its peak.

As the level of openings for engineers rose and the number of applicants for these jobs dwindled in the local employment service offices of the reporting areas, demand exceeded supply available in every major engineering category except mining. Prior to the close of 1965, only the electrical engineering category had recorded more job listings than applicants. Near mid-1966, there were two jobs available for each engineering applicant. Six months earlier, there was a near numerical

balance in demand and supply as evidenced by openings and applicants in these areas. In mid-1965, by way of contrast, applicants exceeded job listings by a ratio of 1.7:1 (see chart on page 7).

Shortages of Applicants in Most Reporting Areas

Evidencing the fact that the scarcity of jobseeking engineers was geographically widespread, 24 of the 30 reporting areas had more job openings than applicants in recent months. The six areas which, despite a local tightening in the demand-supply situation for engineers, had more applicants than openings on June 1, 1966, were New York City; Paterson-Clifton-Passaic, N. J.; Atlanta, Ga.; Detroit, Mich.; Louisville, Ky.; and San Francisco-Oakland, Calif. Descriptions of the job markets in these and in each of the other reporting areas appear on pages 24-32.

Some Employers Waive Normally High Hiring Standards

Several of the reporting areas indicated that some employers were reacting to difficulty in recruiting engineers by lowering hiring specifications. A number of developments pointed to increased willingness on the part of the employers to provide on-the-job training to newly hired engineers. There was some limited acceptance of applicants with experience in drafting and detailing work for engineering assignments. Applicants with college degrees in business administration or the liberal arts were recruited for certain industrial and engineering functions. A college degree without qualifying experience was often acceptable. In lieu of a college degree, employers sometimes permitted the substitution of at least 1 or 2 years' experience directly applicable to the employers' requirements. Members of the existing engineering staff were sometimes relieved from their regular duties to instruct incoming recruits.

College Graduates Favored

The needs of our expanding and increasingly technologically-oriented economy, coupled with the requirements of the aerospace and defense-related industries, have made job prospects for inexperienced engineers with college degrees among the best of all opportunities for college graduates. Although demand was greater for new graduates who had specialized in chemical, electrical, or mechanical engineering, opportunities were also plentiful for those specialized in other engineering fields. Demand was especially strong for those obtaining graduate degrees, or those who had a strong background in mathematics and science, to do research and development work.

More recruiters were reported actively interviewing throughout the academic year, and offers were made to high ranking juniors with positions being held pending their graduation. Starting salaries offered were as much as 10 percent above the previous year. Offers to those

receiving the bachelor's degree were generally between $625 and $725 per month; a holder of a master's degree in engineering found offers in the $750 to $850 range; while recipients of a doctorate could command considerably higher offers.

According to information obtained from the Office of Education, U.S. Department of Health, Education and Welfare, there has been an increase in the percentage of engineering students seeking advanced degrees. Freshman enrollments in engineering increased by 8.4 percent between the fall of 1964 and 1965 (see table on page 11). However, the rate of increase was almost twice as great in first-time enrollments of male students in all fields of college study undertaken at 4-year institutions.

Mechanical Engineers Most Sought

Among all engineering categories, the highest level of both applicants and openings at the public employment service offices in the reporting areas were for mechanical engineers.

During 1966, numerous opportunities for mechanical engineers were geographically widespread in such industrially diverse activities as aircraft fabrication, shipbuilding, the manufacture of various kinds of machinery and equipment, metal working firms, refineries and chemical facilities, and construction. In addition to specialized needs in some of these industries, there were strong needs for engineers familiar with the design of air-conditioning, heating, ventilating, and plumbing systems.

Electrical Engineers

Strong demands developed in the first half of 1966 for electronics specialists in a few of the reporting areas. Much of this recent step-up was traced to research and development contracting for aerospace facilities in San Jose and Santa Ana, Calif., and in Winter Park, Fla. This demand, as well as requirements in aircraft manufacturing among the reporting areas, required considerable knowledge of circuitry design, transistorized systems, radar and telecommunications equipment development, and instrumentation systems for guidance control. There were also rather strong needs for electrical power engineers in 1966.

Industrial Engineers

There was a vastly improved market in recent months for industrial engineers. Many of these strong demands were in the field of measurements and cost analysis, methods and manufacturing engineering, sequence and assembly layout, manpower utilization studies, and in quality control. A knowledge of mathematics and computer equipment utilization was fundamental in industrial engineering assignments. Industrial engineers were sought by aerospace and aircraft facilities.

SELECTED DATA ON COLLEGE DEGREES AND ENROLLMENTS

Item	Number	Percent change from previous year	Number	Percent change from previous year	Number	Percent change from previous year
Engineering Degrees	1964-65		1963-64		1962-63	
Total	50,871	+ 6.6	47,726	+ 7.3	44,471	- 0.9
Doctor's	2,124	+25.5	1,692	+22.8	1,378	+14.2
Master's (and other pre-doctoral)	12,056	+11.4	10,822	+12.3	9,635	+ 8.1
Bachelor's	36,691	+ 4.2	35,212	+ 5.2	33,458	- 3.7
Engineering Enrollments	Fall 1965		Fall 1964		Fall 1963	
Total	311,567	+ 4.1	299,371	+ 6.4	281,452	+ 2.3
Doctor's	13,947	+10.5	12,622	+14.8	10,994	+19.0
Master's (and other pre-doctoral)	44,208	+ 4.9	42,143	+ 9.6	38,457	+ 8.8
Bachelor's	253,412	+ 3.6	244,606	+ 5.4	232,001	+ 0.6
Freshman	79,872	+ 8.4	73,683	+12.1	65,740	+ 1.6
Male First-Time Degree-Credit Enrollment In 4-Year Institutions, All Fields of College Study	Fall 1965		Fall 1964		Fall 1963	
Total, including engineers	592,487	+15.6	512,532	+15.2	444,738	- 0.1

Source: The National Center for Educational Statistics, Office of Education, Department of Health, Education, and Welfare.

Civil Engineers

Needs were particularly strong for civil and structural engineers with construction firms and consulting services. Scarcities of needed workers hampered some concerns or consultants in accepting additional work in a few instances. Opportunities were plentiful in highway design, sanitary and water systems, and in inspection for State and local governments.

Aeronautical Engineers

Opportunities rose sharply since the close of 1965 as new government contracting for military aircraft and aerospace was added to existing strong demand for the design and development of commercial jetliners. Assignments covered a wide range of design functions. Past experience in spacecraft systems, turbine engine analysis, fluid or hydraulic systems, landing gear design, air-conditioning, heating and ventilating systems, aerodynamics, flight simulation tests, stress analysis, and power plant design was preferred. The Los Angeles-Long Beach and Seattle areas accounted for much of the strong demand, and there was a significant volume of openings in other areas. Requirements in the St. Louis area remained restricted to those with advanced college degrees. Other needs were noted with aircraft engine plants in the Cincinnati area, for research in liquid rocket engine propulsion in the Newark, N. J., area, and for facilities in Winter Park and near Cape Kennedy, Fla., for preparation of launch studies of Saturn space vehicles. A Federal naval facility near San Francisco had openings as did aerospace manufacturers in San Jose and San Diego.

Chemical Engineers

Stepped-up demands for chemical engineers included specialized assignments related to research and development in rocket propellants and missiles programs. Other needs existed in the design and operation of chemical plant instrumentation systems. Opportunities were listed for recent college graduates in service and technical functions. Other needs were found in rubber and plastics formulation.

Number of Engineering Job Applicants Registered at Public Employment Offices in 30 Major Labor Areas
May 1966, November 1965, and May 1965

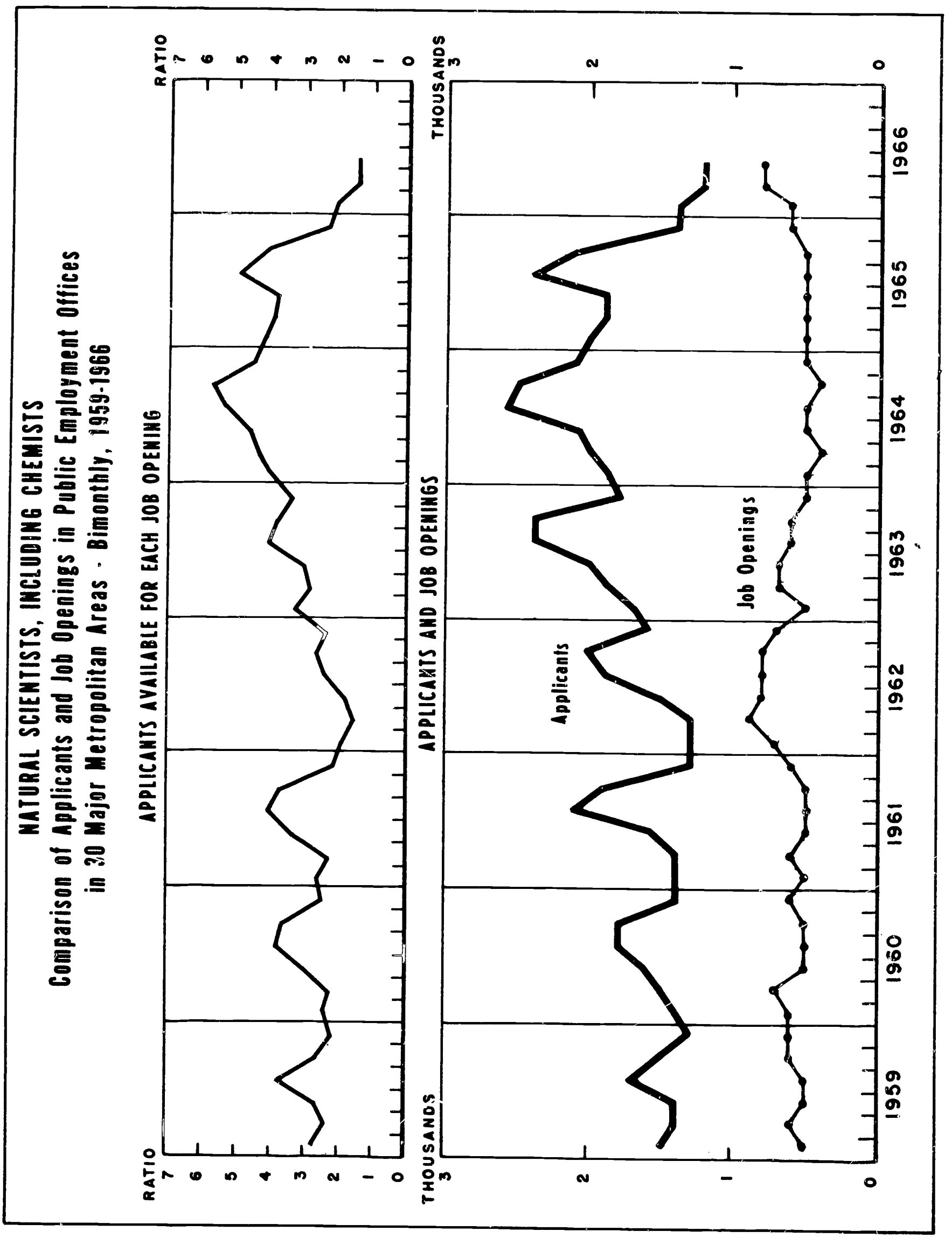
Engineering specialty	Active applicants: May 1966 Total	May 1966 With college degree	Nov. 1965	May 1965	Percent change to May 1966 from: Nov. 1965	May 1965
Engineers, total...	2,395	1,377	3,573	5,247	-33.0	-54.4
Metallurgical....	50	34	67	98	-34.2	-49.0
Chemical.....	142	120	214	268	-33.6	-47.0
Civil.....	356	234	457	529	-22.1	-32.7
Electrical.....	517	284	891	1,368	-42.0	-62.2
Industrial.....	462	197	694	1,089	-33.4	-57.8
Mechanical.....	784	442	1,152	1,708	-31.9	-54.1
Aeronautical.....	57	41	75	147	-24.0	-61.2

Source: State employment security agencies.

Number of Engineering Openings Unfilled at Public Employment Offices in 30 Major Labor Areas at End of
May 1966, November 1965, and May 1965

Engineering specialty	Unfilled openings at end of: May 1966	Nov. 1965	May 1965	Percent change to May 1966 from: Nov. 1965	May 1965
Engineers, total.	4,596	3,701	3,050	+24.2	+50.7
Metallurgical..	56	34	42	+64.7	+33.3
Chemical.....	262	188	159	+39.4	+64.8
Civil.....	781	539	415	+44.9	+88.2
Electrical.....	916	801	696	+14.4	+31.6
Industrial.....	511	437	328	+16.9	+55.8
Mechanical.....	1,323	1,275	986	+3.8	+34.2
Aeronautical...	738	416	409	+77.4	+80.4

Source: State employment security agencies.


NATURAL SCIENTISTS, INCLUDING CHEMISTS
Comparison of Applicants and Job Openings in Public Employment Offices
in 30 Major Metropolitan Areas - Bimonthly, 1959-1966
APPLICANTS AVAILABLE FOR EACH JOB OPENING
RATIO
7
6
5
4
3
2
1
0
APPLICANTS AND JOB OPENINGS
THOUSANDS
3
2
1
0
Applicants
Job Openings
1959
1960
1961
1962
1963
1964
1965
1966

NATURAL SCIENTISTS

Expansion in commercial and government sponsored research and development programs during the first half of 1966 was reflected in the marked improvement in job opportunities for natural scientists. Demand was particularly strong for analytical chemists with training in organic or physical chemistry and for mathematical scientists with knowledge of computer techniques.

Job listings rose to 800 for natural scientists at local public employment offices in 30 reporting areas in early June 1966, reflecting a 67 percent rise over a year ago. Although still exceeding the number of job openings, applicant supply dropped 35 percent over the year to 1,200 in June 1966, reaching the lowest applicant level for natural scientists in the 8-year history of this series. The tightening relationship between the availability of applicants to job listings was evidenced by the ratio of 1.5 applicants to each opening at the start of June, compared with a ratio of 2.3 to 1 near the end of 1965, and almost 4 to 1, a year earlier (see chart on page 14).

National estimates of unemployment insurance claimants in the natural scientist categories dropped by one-third in the past 12 months to fewer than 350 by May 1966. This decline, nearly identical to the percentage change in applicants registered in the 30 reporting areas, was an indication that the national job market for natural scientists has tightened.

As applicant supply declined in the reporting areas, there was an increased effort to seek qualified applicants through interarea recruitment. Over three-fifths of the total openings within the 30 areas were extended into the out-of-area search for manpower in June 1966 in contrast to just over two-fifths a year earlier. For the Nation as a whole, locally hard-to-fill openings for natural scientists in interarea recruitment rose by 41 percent over the year to over 500.

Demand for chemists accounted for approximately half of all natural scientist job openings in the 30 reporting areas. Accounting for almost half of all chemist openings were five of the 30 reporting areas--New York, Chicago, Minneapolis-St. Paul, Denver, and Los Angeles-Long Beach. While experience requirements were lowered for biochemists and other biological scientists needed in the medical service field in the New York area, advanced degree education was required of such specialists in the San Francisco-Oakland area. Needs in the Los Angeles-Long Beach area were for research and organic chemists. A Federal agency in the Denver area obtained some needed analytical chemists this spring but continued its search. Physical chemists were needed by an aircraft firm in Buffalo, a rubber producer in Akron (seeking Ph. D. applicants to train in research), an explosives

producing chemical plant and a Federal agency in the Joliet, Ill., area, and by Baltimore firms. Other hard-to-fill openings were listed for an insecticides chemical plant in Jackson, Ala., seeking organic chemists for research and development and for production.

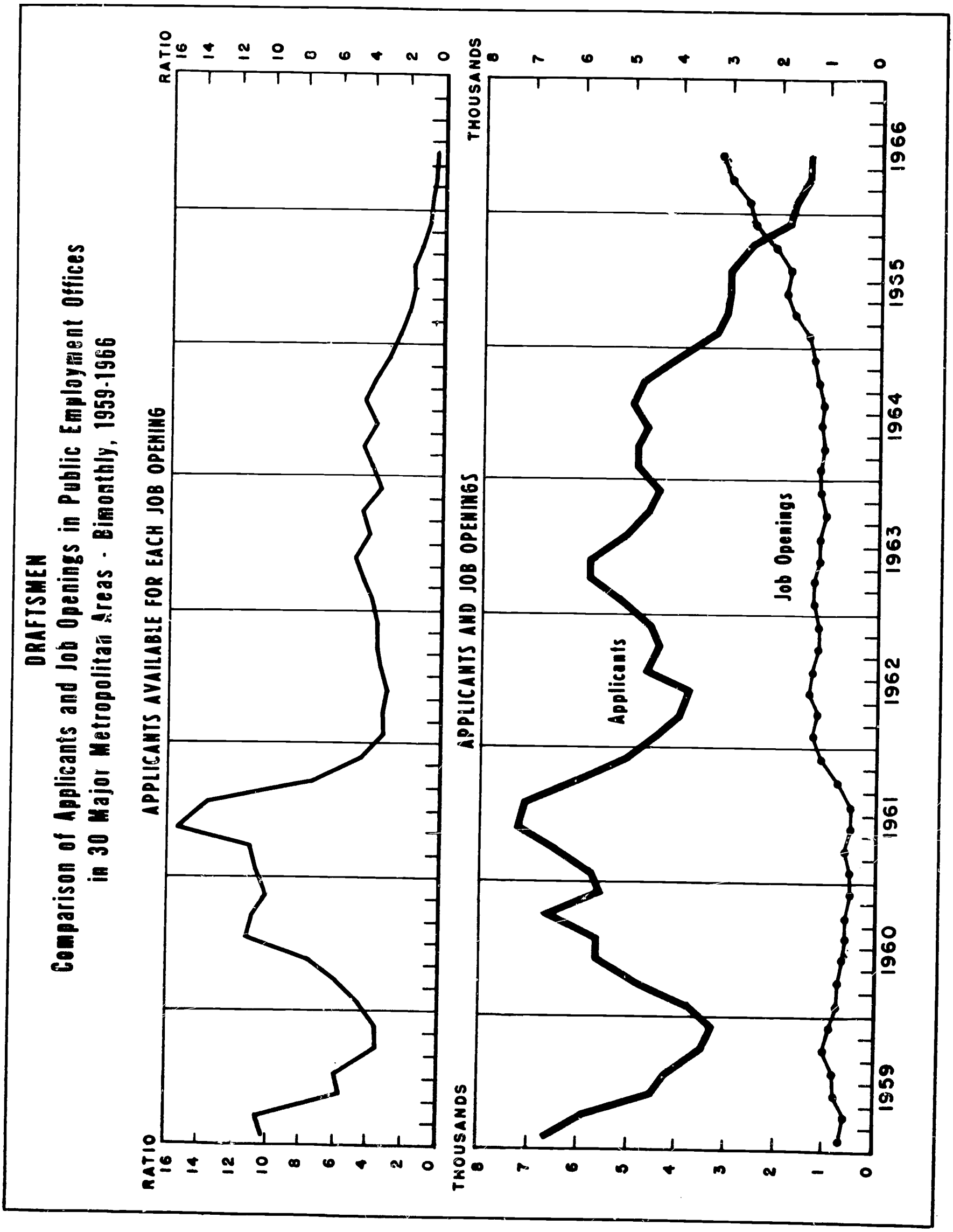
More than half of the chemists registered with the local public employment offices were concentrated in 4 of the 30 reporting areas--New York, Newark, San Francisco-Oakland, and Los Angeles-Long Beach. Those registered either lacked the advanced degrees, or did not have backgrounds in research or specific product lines specified. June college graduates were in great demand and found plentiful prospects with employer competition keen.

Job opportunities for mathematicians, statisticians, and computer analysts rose in the first half of 1966 as evidenced by the 200 job listings--double that of the previous year--from State agencies seeking applicants from other areas in early June. More than half of these listings were for the Seattle area where a large aircraft manufacturer sought college graduates with a major in mathematics or applicants with experience in large-scale digital and peripheral hardware system and language. Openings with a Federal agency in Washington, D. C., specified a college degree and 3 years in computer experience involving higher mathematics application to war games. Computing analysts with strong backgrounds in guidance control systems were sought for research and development work on advanced power plant systems of liquid propellant rocket engines at a Newark facility. Mathematicians were in demand in the mathematical calculation of atomic collision studies being carried out in San Jose, Calif.

A modest demand existed for physicists in mid-1966. Rigid employer specifications requiring a doctorate degree and prolonged periods of research specialization in highly technical fields resulted in some hard-to-fill openings. Backgrounds in highly technical fields such as space physics, optical systems, and film were reported in job openings available in the Los Angeles-Long Beach and San Jose areas. An electrical apparatus firm in Pittsburgh demanded applicants with experience in crystal growth, development of electronic or structural circuits, research in arc or plasma and computer technology, or high frequency measurements. Advanced degree requirements were not specified for a limited number of openings with an electronics firm in Binghamton, N. Y., for computer application to aerospace projects, and for a Buffalo aircraft producer. A Federal naval facility at Bremerton, Wash., sought recent degree-holders to conduct fundamental or developmental research and scientific investigations.

DRAFTSMEN

Comparison of Applicants and Job Openings in Public Employment Offices in 30 Major Metropolitan Areas - Bimonthly, 1959-1966



DRAFTSMEN

An acute shortage of draftsmen nationwide was evidenced by employment service operating data in June 1966. Difficulty in recruiting draftsmen was increasingly apparent throughout 1965 as industry expanded productive capacity and accelerated the output of goods to continue the Nation's vigorous economic expansion. During the first half of 1966, the expanding manpower requirements of defense contractors further stimulated the already hard-to-fill demand for draftsmen.

The rapid build-up in unfilled openings for draftsmen and the near depletion of applicant supply has not been rivalled at any other time in the 8-year employment service study of demand-supply relationships for draftsmen in the 30 major reporting areas. At mid-1966, these areas had a ratio of 2.3 job openings to each jobseeking draftsman registered at the local public employment offices. By way of contrast, near the close of 1965, there were 1.4 applicants to each opening, while at mid-1965, there were 1.6 applicants to each employment service opening for a draftsman (see chart on page 17). Prior to the close of 1965, openings had never exceeded applicants.

The drain on applicant supply available at the public employment offices in the 30 reporting areas has been underway since mid-1965. The 1,400 applicants available for jobs as draftsmen in June 1966 were fewer than one-half the number registered a year earlier. Over the same period of time, job openings for draftsmen in these major areas rose by two-thirds to 3,200.

All indications were that the growing shortage of draftsmen extended beyond the 30 major reporting areas. While the 30-area total of locally hard-to-fill openings for draftsmen placed in interarea recruitment rose by two-fifths over the year, such openings reported by all 50 State employment service agencies more than doubled and reached a total of 1,700 in June 1966. Concurrently, the proportionate share of these openings originating in the 30 reporting areas dropped from three-fourths to less than half of total openings.

The tightening trend in the national job market for draftsmen was also evidenced by the sharp drop in national estimates of draftsmen claiming unemployment insurance. The number of such claimants declined by 63 percent over the year to a total of 800 in May 1966.

Meeting Manpower Needs

Most often affected by the shortages of draftsmen in the reporting areas were the firms in the construction industry and consulting engineering and architectural services. They sought mechanical and structural designers and detailers for both industrial facility expansion

and for commercial building projects. As pressure to recruit qualified draftsmen built up, these were the firms most willing to relax hiring specifications in many of the reporting areas. Steps taken by construction and consulting firms to alleviate this manpower problem differed from area to area. In some instances, age barriers were lifted, or inexperienced high school graduates with appropriate mechanical aptitudes were accepted for on-the-job training. Still another solution adopted was the increased acceptance of women for training. In at least two major areas, New York City and Houston, construction firms admitted they were either hampered in maintaining work schedules, or were unable to accept additional work projects due to the lack of draftsmen.

In many of the reporting areas, some of the large manufacturers were also lowering hiring specifications by reducing experience requirements to 1 year or less, or offering beginning assignments to high school graduates who were willing to continue drafting studies in night school.

In addition to the sharp rise in openings for less experienced and entry-level draftsmen, many more highly specialized draftsmen capable of senior design work were being sought at the local employment service offices. Shortages developed for specialists in the mechanical, electrical, marine, detailing and layout, tool design, production illustrating, and cartography fields. Much of this specialized demand was for commercial aircraft facilities, Federal Government agencies, defense and space contractors, and heavy machinery and equipment manufacturing.

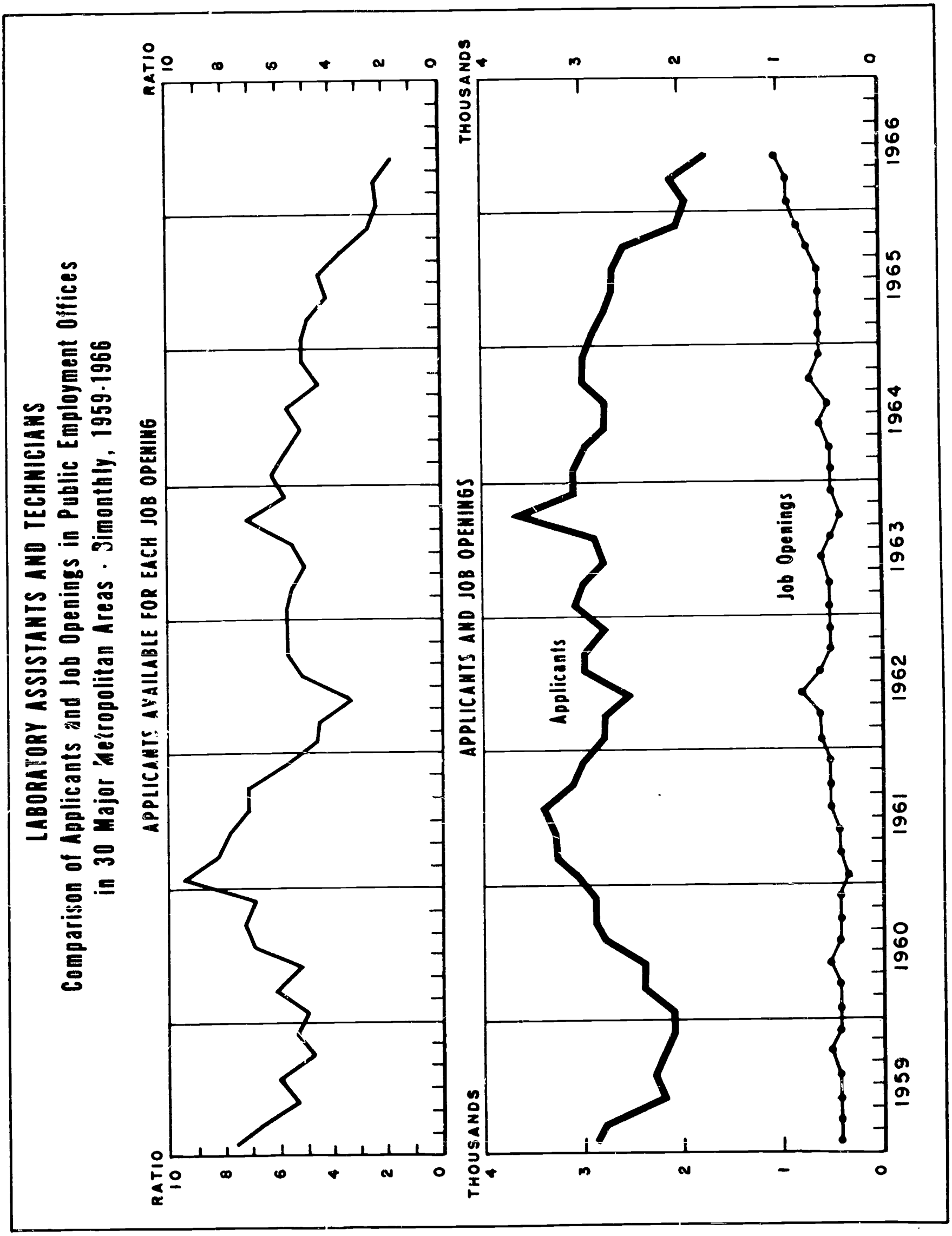
Plants producing commercial and military aircraft or jet engines sought various specialists in the Cincinnati, St. Louis, Seattle, and Los Angeles-Long Beach reporting areas. A jet engine facility at Cincinnati sought many detailers, requiring high school graduation or completion of appropriate courses. Openings listed by a St. Louis aircraft facility for tool designers and electrical draftsmen specified a preference for college degrees but technical school training with 2 years' electronics drafting experience could be substituted. By way of contrast, in Seattle, applicants could qualify for many of the 500 draftsman openings mainly in aircraft, upon completion of as little as one year of training or experience. However, high school graduates could not be recruited to enroll for draftsman training because they found many other kinds of jobs immediately available. Faced with this problem, employers in Seattle sought mechanical draftsmen familiar with the fundamentals of orthographic projection and aircraft blueprint systems, experienced aircraft tool designers, and production illustrators out of the area. As needs rose among Los Angeles area aircraft facilities, there was some willingness on the part of employers to set aside the usual 2-year college education requirement and to accept high school graduates with some experience in drafting. Employers in some areas were hiring draftsmen trainees who were still attending MDTA courses.

Federal agency needs included those for electrical and mechanical draftsmen to design electro-mechanical systems at an arsenal in the Newark area and for cartographers in the Washington, D. C., and St. Louis areas. High school graduates were acceptable as cartographer-trainees in the former area, while, in St. Louis, a college degree including specialized courses was required for assignments in compiling charts for use in air navigation.

Defense and aerospace firms with government contracts expanded listings sharply for specialists in electronics drafting, wiring, design, and circuitry systems. The manufacturers of various other durables sought mechanical and structural specialists in the detailing of pressure vessels, piping systems, machinery parts, and heating, ventilating, plumbing, and air-conditioning systems.

Only 4 of the 30 reporting areas had more applicants than openings for draftsmen listed at the local public employment service offices at the start of June 1966. These were Detroit, Denver, San Francisco-Oakland, and Los Angeles-Long Beach. However, in each of these areas, the supply-demand situation had tightened considerably over the year.

In Detroit, demand was rather limited and high employer specifications continued in effect. Denver reported a shortage of well qualified draftsmen applicants, except for those in geographic drafting. Some layoffs of map makers employed by land title companies added to the applicant supply in the San Francisco-Oakland area, while the electrical and mechanical draftsmen who were registered lacked the minimum of 2 years' experience that employers in that area sought. In Los Angeles, additional draftsmen registered in the local employment service offices in recent months. Some local applicants were not willing to accept the low salaries offered for specialized assignments in oil and gas drafting, nor were available applicants qualified to meet a strong demand for draftsmen experienced in piping and process layout.


LABORATORY ASSISTANTS AND TECHNICIANS
Comparison of Applicants and Job Openings in Public Employment Offices
in 30 Major Metropolitan Areas - Bimonthly, 1959-1966
APPLICANTS AVAILABLE FOR EACH JOB OPENING
RATIO
10
8
6
4
2
0
APPLICANTS AND JOB OPENINGS
THOUSANDS
4
3
2
1
0
Applicants
Job Openings
1959
1960
1961
1962
1963
1964
1965
1966

LABORATORY TECHNICIANS AND ASSISTANTS

Long-standing shortages of laboratory technicians and assistants in the medical service field were further heightened during the first half of 1966. Although most of the needs reflected by employment service operations in the 30 reporting areas were among government and private hospitals, there have also been additional opportunities with testing laboratories and in nursing homes. Needs were also on the rise for industrial laboratory technicians including chemist assistants and testers. Chemical, paper-making, food processing, and metal trades firms had openings in testing, inspection, and quality control.

Evidencing stepped-up needs for medical and industrial laboratory technicians and assistants, openings for these workers at the local employment service offices in the 30 reporting areas rose 30 percent from the start of the year and 60 percent from a year earlier to over 1,000 in June 1966. This was the highest level in the 8-year record, and was well above any other previous peak demand period. Applicant supply dropped below 2,000 late in 1965, and has continued downward to 1,700. Prior to June 1966 there were never fewer than 2 applicants registered to each job opening for a laboratory technician or assistant (see chart on page 21). On June 1, the ratio of applicants to openings was 1.7:1.

The improved job market for the laboratory technicians was evidenced by a sharp drop in national estimates of claimants in this occupation for unemployment insurance. These claimants numbered about 1,200 in May 1966, a decline of 600 from a year earlier. Generally, laboratory technicians that are eligible for unemployment insurance have industrially-oriented skills, as non-profit private hospitals and other health organizations have only voluntary coverage.

Openings and Applicants Concentrated in the Same Areas

Nearly two-thirds of the total applicants and job openings available for laboratory technicians and assistants among the 30 reporting areas were concentrated at mid-1966 in 8 of the reporting areas--Boston, New York, Washington, D. C., Chicago, Minneapolis-St. Paul, Denver, San Francisco-Oakland, and Los Angeles-Long Beach. The concentration of demand and supply in these areas had intensified slightly over a year earlier.

Most of the demand for laboratory technicians in the 30 major reporting areas was for qualified medical technicians for hospitals, medical centers, and laboratories. While applicants exceeded openings at the local employment service offices in many of these areas, they often lacked the required State licensing.

Employers in the 30 reporting areas directed little effort toward recruiting laboratory technicians and assistants from out of the area. In June 1966, the 30 areas total of locally hard-to-fill openings in these occupations in interarea recruitment changed little from a year earlier. However, for the Nation as a whole, these openings, many for smaller areas, rose by 80 percent over the year. By mid-1966, the volume of openings for laboratory workers in interarea recruitment neared 400, close to the previous peak at the start of 1963.

The search for technicians with industrially-oriented backgrounds became more intensive in 1966. Locally hard-to-fill openings for those laboratory technicians with industrial backgrounds comprised more than a fourth of the hard-to-fill job listings for laboratory technicians at mid-1966, compared with slightly more than a fifth of such listings at mid-1965. Smaller areas predominated in the search for industrial technicians. Youth were sought for MDTA training as chemist assistants in Rochester, Minn. Engineering aides were sought by a metal-making machinery firm in Sayre, Pa. Nonferrous rolling mills sought laboratory assistants in New Kensington, Pa. There were a few openings for scientific helpers with the State government at Lafayette, Ind. A Waukegan, Ill., machinery producing firm sought testers. Highly specialized technician jobs in Kansas City, Kan., were for inspectors of ammunitions components, propellants, and explosives. A Charles City, Iowa, chemical firm requested chemist assistants.

Among the openings for medical service laboratory workers listed in State interarea recruitment inventories were those for college-trained specialists for government assignments in Vietnam; for medical technologists and x-ray, electroencephalograph, and radiation specialists sought for Washington State hospitals; and for medical technicians with Federal hospitals in the Maryland suburbs of the Nation's Capital.

Qualifications Continue to Specify Training Beyond High School

Most of the needs for workers in medical services were for licensed medical technologists. Licensing was contingent upon completion of post-high school training in accredited courses in medical technology. In some instances, the lack of applicants with such training has resulted in efforts to enroll trainees in in-hospital training under government sponsored training programs. An alternative was provided by State governments willing to accept training received in the Armed Services medical laboratory helper course along with further experience gained in laboratory work.

Hiring requirements for industrial technicians ranged from a minimum of high school with courses in chemistry, physics, and mathematics, to the more commonly specified requirements of at least 2 years of college chemistry with a course in organic chemistry. A few opportunities were restricted to college degree-holders in the field of science or engineering.

...the engineers' job market in 30 major areas

NEW ENGLAND REGION:

Boston, Massachusetts: Opportunities existed at mid-1966 in all levels of engineering, but the strong emphasis among area firms was for research-oriented experts. Buildup of a Federal space center and increasing research and development contracts for various aspects of space studies and equipment have further expanded research efforts in this area, which is a recognized pioneer in such activities. Companies were most eager to obtain applicants who were willing to continue their education at the graduate level in new and related research studies. More competition for this June's graduating engineers was encountered, but increased salary offers ranging from 4 to 10 percent above last year did not provide area firms with enough recruits to reduce the serious shortage for qualified engineers. Among the local office applicants in recent months were some retired because of compulsory age limits. Illustrative of the real shortage of workers was the lack of any response to advertisements encountered by a designer of highways and bridges.

Providence-Pawtucket, Rhode Island: As applicant supply continually dwindled over the past 12 months, area firms were unable to recruit for their requirements. In spite of shortages, no effort was directed by firms listing jobs with local offices to seek applicants out of the area. Demand in recent months was mainly centered in such industries as chemicals, construction, communications, machine-tools, wire and cable, and in government. Earlier in 1966, orders from primary metals firms and makers of scientific instruments had expanded openings. No single industrial segment or individual firm had any sizable number of the job listings.

MIDDLE ATLANTIC REGION:

Buffalo, New York: Increased needs for all types of engineers, except industrial, were for various functions ranging from research and development to cost estimating for an aircraft facility and for theoretical studies conducted by laboratories. These specialized needs and other openings that developed during the first half of 1966 were hard to fill. Local office openings were nearly double the number of applicants in June 1966. A year earlier, applicants outnumbered openings. Many jobseekers available during 1966 lacked the necessary college degree.

New York City, New York: The sharp drop-off in local office applicants noted in the spring months mirrored an intensified shortage of qualified persons in all engineering categories. Stepped-up demands for electronics specialists required extensive experience in transistorized and linear circuitry, as well as in digital and logic circuitry. Demand from employers was increased for structural, architectural, electrical, and mechanical engineers qualified to do designing and drafting. Manufacturing, construction, and consulting service firms continued to report many openings for all kinds of engineers, but were not admitting to any interference with operating schedules. Nevertheless, some large manufacturers and construction firms broke from the prevailing custom of hiring only well-experienced persons, and recruited beginners. These recent college graduates were provided extensive training by experienced staff engineers who had been relieved of their regular duties. Area firms were further hampered in finding qualified personnel due to competition from out-of-area firms that were extensively recruiting in New York.

Newark, New Jersey: Plentiful opportunities were open to both beginners and highly trained specialists in recent months. Needs were concentrated in a Federal arsenal and an aircraft facility, both of which were engaged in out-of-area recruitment efforts. Entry positions were offered to recent college graduates at the arsenal. Mechanical engineers were most needed although some positions were available to industrial engineers, and a few spots were open to chemical and electrical engineers. All positions required security clearance. Security clearance was also specified in all positions listed by an aircraft facility engaged in research and development and in the production of liquid fuel rocket engines and propulsion systems. At least 5 years' experience was demanded in highly specialized backgrounds. Knowledge of new materials and sophisticated metals was specified for metallurgists for liaison positions between projects and manufacturing. Chemical engineers were sought with backgrounds in plastics formulation and fabrication or in high temperature ceramics development. Electrical engineers were needed with knowledge of digital acquisition systems collection. Both mechanical and aeronautical engineers were required to have previous missiles or rocket engine experience. Assignments were as project leaders or, for those with a strong background in mathematics, assignments were in production methods, planning, test mode failure analysis, and design specifications review. More than half of the engineering applicants registered with local offices were age 45 or above (a fifth were age 65 or older). A stalemate has existed in openings and applicants with few applicants capable of meeting employers' requirements.

Paterson-Clifton-Passaic, New Jersey: The supply of applicants in most engineering categories has dropped since the start of 1966 while the level of job openings has remained fairly constant. Lack of qualifications and individual preferences created a stagnant volume of openings over the first half of 1966. Local offices were not

asked by employers to recruit out of the area in an effort to find the needed personnel. Employment expansion among area defense plants that was in progress early in 1966 appeared to taper off by May. Increased employment this spring in the machinery and equipment and instruments segments of durables manufacturing and in chemicals and contract construction contributed to near record employment levels. Some firms in these industries were adding to their plant facilities.

Philadelphia, Pennsylvania: New contracts for research, design, and development continued to enter the area and many existing contracts have been supplemented. Increases in prime government contracts for engineering development have been noted in shipbuilding and repair, aerospace, electronics, and the computer equipment industries. Competition between area firms has intensified for engineers, particularly in mechanical and structural engineering. A record low number of applicants was reported among local public employment offices, and consisted mainly of older age and retired engineers. Since there were few applicants, employers have restricted their contact with public employment offices to making inquiries concerning the availability of applicants. Therefore, the volume of job listings has become less representative of area demand than in other periods. Some of the older age mechanical engineers were successfully placed with consulting engineering firms willing to raise age restrictions. These firms were desperately trying to recruit engineers for assignments with both local and out-of-area firms.

Pittsburgh, Pennsylvania: Demands for engineers specialized in the design of rolling mills and steel plant machinery and equipment, in the fabrication of piping and instrumentation for chemical processes, and in various activities in connection with electrical systems were in evidence over the past several months. A large number of openings extended to out-of-area recruitment have been listed throughout the first half of 1966. Most prevalent demands were for college graduates with extensive design experience, while some opportunities were reported for chemical engineers holding advanced degrees. The number of applicants registered and employment service openings listed remained static over the past 12 months, with fewer jobseekers than openings available.

SOUTH ATLANTIC REGION:

Baltimore, Maryland: Reflecting a serious shortage, as demand continued an 18-month upswing, there were few applicants at local offices in mid-1966. Most needs were among defense and space-oriented industries. Opportunities were best for electrical engineers. By late spring, after exhausting every possible media for recruiting, employers relaxed job specifications and accepted those with marginal qualifications. Job opportunities listed at local offices were not representative of the magnitude of area requirements. Employers engage in open-end listings rather than list a specific number of openings, and there was an abundance of jobs for candidates with the appropriate experience and education.

Washington, D. C.: A large volume of job opportunities remained open for both college degree-holding beginners and consulting specialists in work assignments overseas or with Federal and local government. More than half of the more than 300 jobs listed at mid-1966 involved advisory positions overseas. Strongest demands were for civil engineers whose backgrounds included bridge and dam construction, refinery operation, railway systems, city and traffic planning, structural design and materials engineering. There were numerous spots listed for mechanical engineers. Technical experts versed in combustion engines, machine shop operations, automotive and production engineering, and design were sought. Electrical engineering specialists in power generation, distribution and transmission, and in electronics and telecommunications were also sought. Needs in Federal government facilities were for electrical engineers for entry positions in telecommunications; other openings were limited to engineers experienced in machine tools or processing industries for work on electrical control systems. For mechanical engineers, assignments were in the field of air-conditioning, heating, and design for related construction and building maintenance operations. Several highway and civil engineers were needed by local government. Limited applicant registration at local offices resulted in most of these openings being unfilled for a prolonged period of time.

Atlanta, Georgia: A shortage of engineers in all categories was reported for the area since early 1966, although local employment service office job listings and applicants were very limited. Both were below year earlier levels, and did not reflect any significant changes since the start of 1966. Following the transfer of the engineering design division of an aircraft facility out of the area in 1965, engineering opportunities have primarily been individual job openings in a smattering of industrial activities.

EAST NORTH CENTRAL REGION:

Detroit, Michigan: Recruitment activity was limited with applicant supply, although reduced over the year, continuing to exceed job openings available in the local public employment service offices. Applicants registered could not meet rather rigid employer hiring specifications or sought salaries higher than those offered. The State government sought civil engineers for the construction, design, maintenance, and planning of highways. Among the jobs requiring a mechanical engineering degree were openings for an automotive engineer experienced in automotive safety engineering to develop preliminary design concepts for vehicle components to reduce or eliminate injury potential in the event of an accident. Also sought was a mechanical engineer, experienced in production design, to design, construct, and test full-scale working models for a motor parts manufacturer. A higher percentage of acceptance of local office referrals against recently received job orders was reported. Less than one-half of the approximately 100 jobseekers available over the 1966 period ending in June were college degree-holders.

Cleveland, Ohio: Expansion of the economy, particularly in manufacturing, along with further impetus furnished to area firms engaged in military contracting, created more demand for metallurgical, electrical, and mechanical engineers. Projected expansion of production facilities to meet schedules increased demand for civil engineers. Faced with heightening shortages, employers virtually eliminated restrictive hiring specifications. Extensive recruitment was undertaken at colleges, universities, and out of the area.

Columbus, Ohio: The largest concentration of openings at mid-year were for civil engineers needed by the State government. College degrees in engineering or the physical sciences plus experience in highway design were required. Local offices had no applicants registered in this speciality. Other needs for engineers were widely scattered among area firms. Mechanical engineers were sought from out of the area for the design of heavy machinery and parts.

Cincinnati, Ohio: Efforts were undertaken to attract considerable numbers of engineers to fill production, management, and control assignments due to sharp step-up at a facility producing jet aircraft engines. Opportunities were available for inexperienced college degree-holders, or in industrial engineering, for those without degrees but having previous manufacturing experience. Needs for specialists in electronics were more restrictive in nature. Openings have been listed at local offices and in interarea recruitment for the past few months for research and development work in radio, antennae, and related electronics functions. Very few jobseeking engineers were available at local offices throughout the first half of 1966. Those who were had inappropriate fields of experience. Others were employed applicants seeking best pay offers.

Indianapolis, Indiana: Preference for recent college graduates was evident in recent job listings as employers encountered increasing shortages of engineers. Most of the requirements were related to production and design functions in a variety of manufacturing concerns, utilities,and State and local government. While most of the available assignments for civil engineers were with the State government for design and construction duties, there were some openings in public service firms and among private engineering concerns. At least 2 years' experience was required of electrical engineers in electronics products design and in tube or transistorized circuitry. Mechanical engineers were sought by firms in the electrical and non-electrical machinery, food, petroleum, rubber and plastics, fabricated metals, and aircraft industries. The limited number of applicants at mid-1966 consisted of a few seeking summer work before returning for further education or teaching positions, some self-employed or retired persons with sales or inspection backgrounds, or immigrants who had not obtained security clearance.

Chicago, Illinois: There has been a dearth of qualified applicants, particularly in mechanical, electrical, and electronic specialities and a rising volume of openings. Large area employers have been recruiting intensively in all major labor areas of the Nation. Recent graduates entered a favorable job market, while undergraduates were being recruited for part-time assignments. The few applicants at the public employment offices could not meet hiring specifications regarding age, citizenship, or college degree. In spite of the recent cancellation of some long-standing job orders that could not be filled, and the termination of contracts with engineering service firms, total openings rose sharply from the start of 1966; by May, openings exceeded applicants by over 4 to 1, in sharp contrast to a near numerical balance 6 months and a year earlier. Job opportunities included those in a Federal ordnance plant, in the manufacture of machine-tools, electrical equipment, plastics, and automotive parts, and in construction.

Milwaukee, Wisconsin: A sharply reduced local office applicant supply was incapable of satisfying a rising volume of demand from durable goods producers, construction firms, contract engineering services, utilities, and government. Demand continued strongest for mechanical engineers needed by both electrical and nonelectrical machinery producing firms. The background most sought included the design of tools, machinery, equipment, or systems. More extensive out-of-area search was undertaken as 1966 progressed. By the spring of 1966, there was increased acceptance of inexperienced recent college graduates in many firms.

WEST NORTH CENTRAL REGION:

Minneapolis-St. Paul, Minnesota: Expanding computer firms, continued high demand for capital goods, and requirements for Vietnam were major stimuli in the area's busy economy in 1966. Demands for engineers remained strong for the manufacture of durables--heavy machinery and equipment, electrical machinery, and instruments--and paper. Some hard-to-fill specialized assignments including those requiring some experience in the analysis and design of magnetic memory systems for airborne digital control systems, and in the design of new electromechanical products and electronic controllers listed in the spring were no longer listed at mid-year. Despite some decline in openings in the first half of 1966, openings at the public employment offices outnumbered applicants 2 to 1.

St. Louis, Missouri-Illinois: Accelerated hiring at an aircraft facility and new defense contracts among electronics and other firms in the spring of 1966 heightened the demand for engineers in an already tight situation. Rigid hiring specifications requiring specialized experience in stress analysis, aerodynamics, and research engineering were in effect. Other openings were available to graduate engineers with experience in structural design, heating, and air conditioning, and in time and motion studies. Nearly 200 openings

were listed at local employment service offices for aeronautical, electrical, and mechanical engineers in June 1966; these offices had only 36 applicants in these categories on file.

Kansas City, Missouri-Kansas: Openings for mechanical, civil, and industrial engineers exceeded applicants. Experienced applicants were sought out of the area by manufacturers of ordance, fabricated metals, machinery, and rail equipment. Requirements were for specialized design functions. Included were the design of heating and air-conditioning systems for the climate control of machinery in the production of ammunition, the design of piping systems for petrochemical plants and for water and gas processing firms, and the design of commercial and pre-fabricated buildings and feed mills. These firms also sought engineers experienced in methods and time and motion studies in standards and quality control and in sales. There were few applicants at local offices by June, indicating the urgency of demand for engineers in other areas as well, since it has been the custom for applicants and graduating college seniors to out-migrate.

EAST SOUTH CENTRAL REGION:

Louisville, Kentucky: Although local offices had slightly more applicants than openings, many jobseekers were employed and some were seeking positions in the $10,000 to $15,000 salary range. While area firms have recently increased entrance salaries, they were still below those offered in other regions. Employers sought applicants under age 40, and in some cases, under age 30. Most employers felt that degrees received many years ago were outdated unless recent courses were taken. In addition to recent degrees, some experience was also demanded. Most sought were mechanical engineers, with openings also for chemical and industrial specialities.

WEST SOUTH CENTRAL REGION:

New Orleans, Louisiana: Many openings for qualified engineers have been listed throughout the past year by space contractors. College degrees and a minimum of 1 to 5 years' experience were specified. In greatest demand were mechanical engineers, but needs also existed among all other specialities. Local office job listings have declined recently due largely to an awareness of the shortage of qualified applicants in this area rather than to a decrease in demand. More than half of the limited numbers of applicants at local offices during 1966 were age 45 or above.

Dallas, Texas: Faced with rising demand and declining applicant supply, some employers were willing to relax their previous rigid adherence to high hiring standards for engineers. In June 1966 there were more openings than applicants at the local public employment offices. By way of contrast, a year earlier, there were more than 3 applicants registered to each job listing. Major needs were for civil, industrial, and mechanical engineers.

Houston, Texas: Shortages of chemical, electrical, industrial, and civil engineers have grown more acute since the start of 1966. Needs were in manufacturing and construction. One large construction firm felt the lack of qualified engineers was hampering work schedules, but this was not a general condition in the area. However, employers indicated growing concern over the need for action to resolve intensifying shortages. Recently, some employers, not in the major industry segments, have been willing to accept experience in lieu of a college degree.

MOUNTAIN REGION:

Denver, Colorado: A tightened job market for engineers was reflected by steadily rising demand and declining applicant supply during the first half of 1966. The near numerical balance between job openings and jobseekers was in sharp contrast to the loose demand-supply situation of a year earlier. Aircraft and engineering research firms in and near the area were extending their search for engineers to other localities. At the same time, local engineering personnel were being attracted by the salary offers of out-of-state aircraft and missiles firms. Highly specialized research and development engineers were in shortest supply.

PACIFIC REGION:

Seattle, Washington: Needs for engineers have risen sharply in the aircraft industry. The manufacture of large capacity commercial jetliners required the construction of additional plant facilities. Over 500 engineering openings were listed at the local public employment offices exceeding the depleted supply of applicants by a ratio of 20 to 1. Greatest demand was for aeronautical engineers with college degrees for assignments in design and research. Aircraft designers were needed for structural design, fuel systems, hydraulics, air-conditioning and pneumatic systems, aircraft control and power plant engineering. Because of the lack of suitable candidates within the area, a local aircraft facility has established recruitment centers in other major metropolitan areas including Chicago.

Portland, Oregon-Washington: Rising demand and declining supply reflected growing tightness in the engineering job market. The limited number of jobseekers registered at the local employment service offices did not meet the highly specialized job specifications. In shortest supply were civil and mechanical engineers. Applicants versed in structural engineering, air-conditioning, materials handling, conveyor systems, or electro-mechanical devices were sought out of the area for design and development positions.

San Francisco-Oakland, California: Despite increasing tightness in the engineering job market in June 1966, employers have retained rigid job specifications. Defense contractors in electronics, limited a

year earlier by the austerity program, were agai.. actively seeking electronics engineers through stepped-up nationwide recruitment efforts. High-rise building construction contributed to demands for electrical engineers versed in lighting and power distribution and for mechanical engineers experienced in heating, ventilating, and air-conditioning design. A Federal installation required electrical engineers to direct repair work of missiles and aircraft. A minimum of 2 to 5 years' experience was demanded by area concerns seeking a large number of mechanical engineers. Backgrounds in small mechanism design or photo-optics and in machine and tool design were sought. Among civil engineers, opportunities were available to those with subdivision or structural design experience. Recently graduated chemical engineers were being recruited for positions throughout the West. Although local offices still had more applicants than job listings this spring, the great percentage were not qualified because of inappropriate experience, lack of citizenship or State registration, or were over retirement age.

Los Angeles-Long Beach, California: There was a marked tightening in the engineering job market over the year. Openings at the local employment service offices more than doubled, while applicant supply dropped by nearly two-thirds. There were 1.4 openings to each of nearly 600 applicants in June 1966. This was in sharp contrast to the situation of a year earlier, when the ratio of applicants to openings was 3.8 to 1. Much of the upsurge in demand stemmed from expanded aerospace--aircraft and missiles--and Vietnam requirements. Greatest demand in June 1966 was for aeronautical, mechanical, and electrical engineers. Openings rose also for civil and chemical engineers. Specializations most sought for aeronautical and mechanical engineers included experience in spacecraft systems, turbine engine analysis, supersonic and hypersonic configurations analysis, fluid and hydraulic systems, landing gear design, and flight control analysis. Electrical engineers for power design were in short supply. Specialized assignments for electronics experts required knowledge of the latest technological developments such as design and development of computers, circuits, quality control in telemetry design, micro-electronic hybrid integrated circuits, and advanced helicopter avionics systems. Local public employment offices had very few applicants that could match hiring standards. About half of those registered lacked a qualifying degree; more than half were age 45 or above, and 10 percent were age 65 or older.

appendix

Technical Notes

Information in this report is based chiefly on two kinds of data, both prepared in the United States Employment Service of the Bureau of Employment Security. Since January 1957, the Bureau has been publishing reports on the number of job openings in a group of selected occupations placed in interarea recruitment by public employment offices.[1] The source of information on openings in interarea recruitment is the Inventory of Job Openings, published every 2 weeks by each State employment security agency. These inventories list all openings currently in interarea recruitment (a process of matching workers in one area with jobs in other areas) by affiliated State agencies.

Supplementary data on the same occupations have been collected from the employment offices in 30 of the largest labor areas (identified on the following page) since 1958. These labor area reports provide information on the local demand-supply relationships for engineering, scientific, and technical personnel in the area.

The demand-supply relationship in the selected categories is not always fully indicated by the numerical data. Active applications or registrations show the number of individuals in the selected occupations who apply for work at public employment offices. In a like manner, openings received and unfilled at the end of the month are not complete measures of demand since they cover only job orders placed with public employment offices. Despite these limitations, the data provide a useful indication of the demand-supply trend and its nature.

1/ The occupations covered and the appropriate code number from the Dictionary of Occupational Titles include: Engineers, metallurgical, and metallurgists (0-14), engineers, chemical (0-15), engineers, civil (0-16), engineers, electrical (0-17), engineers, industrial (0-18), engineers, mechanical (0-19), engineers, aeronautical (0-19.03), engineers, mining (0-20), chemists (0-07), natural scientist, n.e.c. (0-35), draftsmen (0-48), and laboratory technicians and assistants (0-50).

List of Thirty Major Labor Areas by Regions

New England:

*Boston, Massachusetts
Providence-Pawtucket, Rhode Island

Middle Atlantic:

Buffalo, New York
*New York, New York
*Newark, New Jersey
*Paterson-Clifton-Passaic, New Jersey
*Philadelphia, Pennsylvania
Pittsburgh, Pennsylvania

East North Central:

Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Indianapolis, Indiana
Chicago, Illinois
Detroit, Michigan
Milwaukee, Wisconsin

West North Central:

Minneapolis-St. Paul, Minnesota
Kansas City, Missouri-Kansas
St. Louis, Missouri-Illinois

South Atlantic:

*Baltimore, Maryland
*Washington, D. C.
Atlanta, Georgia

East South Central:

Louisville, Kentucky

West South Central:

New Orleans, Louisiana
Dallas, Texas
Houston, Texas

Mountain:

Denver, Colorado

Pacific:

*Seattle, Washington
Portland, Oregon-Washington
*Los Angeles-Long Beach, California
*San Francisco-Oakland, California

* Ten Coastal Areas that had significant changes in manpower requirements among government contracting establishments are marked with an asterisk.

tables

Table I, Part A. Trend in Job Openings Placed in Interarea Recruitment by Public Employment Offices, January 1956-1959, and Bimonthly, January 1960-May 1966

Month and year	All occupations	Professional & managerial	Selected occupations 1/				
			Total	Engineers	Scientific	Draftsmen	Technicians
Jan. 1956.....	27,887	12,845	6,803	4,792	435	1,361	215
Jan. 1957.....	35,629	14,498	8,993	6,349	389	1,988	267
Jan. 1958.....	14,665	7,726	2,582	1,817	245	315	205
Jan. 1959.....	16,042	10,530	5,426	4,386	489	377	174
Jan. 1960.....	19,735	11,834	5,817	4,389	648	605	175
March.....	21,286	12,611	5,167	3,927	587	442	211
May.....	19,839	11,217	4,710	3,589	550	364	207
July.....	17,480	9,589	4,401	3,489	483	272	157
Sept.....	15,380	8,137	4,453	3,591	492	201	169
Nov.....	15,445	8,310	4,605	3,697	471	248	189
Jan. 1961.....	17,954	12,033	4,799	3,835	516	296	152
March.....	17,489	11,515	4,253	3,395	454	236	168
May.....	16,121	9,828	4,097	3,255	432	244	166
July.....	16,991	9,830	4,078	3,301	393	192	192
Sept.....	16,712	8,740	4,262	3,337	433	230	262
Nov.....	18,579	9,198	4,975	3,859	503	358	255
Jan. 1962.....	21,880	13,966	5,719	4,487	584	446	202
March.....	24,212	14,295	5,473	3,985	602	539	347
May.....	28,856	17,823	6,909	5,342	821	497	249
July.....	27,387	15,592	8,069	6,463	805	461	340
Sept.....	24,286	13,069	6,594	5,008	807	560	219
Nov.....	23,739	13,446	6,363	4,517	633	960	253
Jan. 1963.....	23,749	14,497	6,115	4,236	638	861	380
March.....	25,006	16,266	6,005	4,042	694	930	339
May.....	24,860	14,718	5,278	3,481	643	816	338
July.....	21,013	11,475	4,481	3,133	471	636	241
Sept.....	19,621	9,276	3,839	2,638	424	532	245
Nov.....	20,931	10,811	3,872	2,574	476	638	184
Jan. 1964.....	18,978	11,082	3,486	2,324	469	497	196
March.....	17,741	9,730	3,385	2,267	434	500	184
May.....	20,247	10,932	3,060	1,985	356	507	212
July.....	18,995	9,854	2,904	1,944	298	503	159
Sept.....	18,145	7,715	2,815	1,842	316	463	194
Nov.....	20,536	8,188	3,496	2,276	349	667	204
Jan. 1965.....	22,118	10,609	3,695	2,364	421	691	219
March.....	25,352	12,889	3,909	2,560	392	755	202
May.....	29,923	14,671	4,176	2,828	388	744	216
July.....	28,530	13,418	4,345	3,127	330	675	213
Sept.....	28,602	10,991	4,519	3,264	353	692	210
Nov.....	35,386	11,137	5,298	3,724	375	933	266
Jan. 1966.....	40,476	13,344	6,054	4,322	371	1,090	271
March.....	46,838	16,663	7,068	4,639	431	1,662	336
May.....	55,003	19,107	6,954	4,429	517	1,639	369

1/ Data since September 1959 will differ from those previously published because of the exclusion of technical writers from the selected occupations.

Source: State employment security agencies.

Table I, Part B. Number of Nonagricultural Job Openings in Selected Occupations In Interarea Recruitment at Public Employment Offices, U.S. Total June 1966, January 1966, and June 1965

Selected Occupations	Job openings			Changes to June 1966 from:			
	June 1966	Jan. 1966	June 1965	Jan. 1966		June 1965	
				Number	Percent	Number	Percent
All selected occupations.....	6,992	6,054	4,101	+938	+15.5	+2,891	+70.5
Engineers, total.....	4,438	4,322	2,792	+116	+2.7	+1,646	+59.0
Chemical.....	199	205	153	-6	-2.9	+46	+30.1
Civil.....	530	465	392	+65	+14.0	+138	+35.2
Electrical.....	1,083	1,080	799	+3	+0.3	+284	+35.5
Industrial.....	530	492	269	+38	+7.7	+261	+97.0
Mechanical.....	1,428	1,396	746	+32	+2.3	+682	+91.4
Aeronautical.....	597	627	377	-30	-4.8	+220	+58.4
Natural science Occupations.....	533	371	379	+162	+43.7	+154	+40.6
Chemists.....	195	135	159	+60	+44.4	+36	+22.6
Physicists.....	54	45	44	+9	+20.0	+10	+22.7
Mathematicians.....	42	53	51	-11	-20.8	-9	-17.6
Other.....	242	138	125	+104	+75.4	+117	+93.6
Draftsmen.....	1,657	1,090	731	+567	+52.0	+926	+126.7
Laboratory technicians	364	271	199	+93	+34.3	+165	+82.9

Source: State employment security agencies.

Table II, Part A. Number of Active Applicants Registered in Selected Engineering Occupations by Public Employment Offices in 30 Major Labor Areas
May 1966, November 1965, and May 1965

Labor Area	Engineers total			Electrical			Industrial			Mechanical a/		
	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965
Total.....	2,395	3,573	5,247	517	891	1,368	462	694	1,089	841	1,227	1,855
Atlanta.....	18	18	44	4	7	9	6	6	11	7	5	21
Baltimore.....	15	26	47	3	5	15	4	7	7	7	10	5
Boston.....	107	228	345	19	52	102	24	69	108	39	63	85
Buffalo.....	108	134	136	14	14	18	27	40	23	47	62	69
Chicago.....	79	149	169	25	57	62	21	26	35	17	42	37
Cincinnati.....	23	19	32	2	2	8	11	7	8	5	6	6
Cleveland.....	18	61	54	2	12	10	2	15	13	10	25	20
Columbus, Ohio.....	11	7	16	3	0	5	4	2	4	3	1	5
Dallas.....	41	67	115	3	13	28	10	9	28	14	25	33
Denver.....	43	47	114	8	7	25	6	11	18	10	13	39
Detroit.....	94	96	215	11	17	43	13	20	49	38	38	74
Houston.....	38	61	61	2	9	4	7	8	13	13	10	22
Indianapolis.....	29	16	40	2	3	8	8	1	6	12	8	15
Kansas City.....	11	19	42	4	5	10	2	4	12	1	6	17
Los Angeles-Long Beach...	585	922	1,586	133	274	432	95	141	291	244	365	669
Louisville.....	50	73	60	8	15	13	7	21	14	19	25	23
Milwaukee.....	35	98	121	6	4	18	12	27	24	14	27	55
Minneapolis-St. Paul.....	75	79	82	18	12	20	15	12	13	22	38	32
Newark, N.J.....	203	167	257	53	54	75	53	31	68	65	51	73
New Orleans.....	22	22	24	3	2	6	1	5	3	7	7	8
New York.....	264	460	564	77	155	188	38	73	91	77	125	176
Paterson-Clifton-Passaic.	69	120	118	15	33	40	14	19	20	27	46	43
Philadelphia.....	59	113	218	16	26	61	18	32	68	20	36	62
Pittsburgh.....	57	62	66	9	8	4	17	20	18	14	16	22
Portland, Oreg.....	23	19	35	2	1	6	1	1	4	13	8	10
Providence-Pawtucket.....	14	25	43	2	2	3	5	12	13	5	9	21
St. Louis.....	60	48	90	15	10	31	5	9	12	21	17	32
San Francisco-Oakland....	160	282	403	36	55	85	26	43	84	50	109	140
Seattle.....	27	54	52	2	6	9	7	11	12	6	17	16
Washington, D.C.....	57	81	98	20	31	30	3	12	19	14	17	25

a/ Includes aeronautical.

Source: State employment security agencies.

Table II, Part B. Number of Active Applicants Registered in Selected Non-Engineering Occupations by Public Employment Offices in 30 Major Labor Areas
May 1966, November 1965, and May 1965

Labor area	Chemists			Other natural scientists			Draftsmen			Laboratory technicians		
	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965
Total.....	506	650	800	717	707	1,090	1,371	1,840	2,987	1,710	1,976	2,657
Atlanta.....	3	2	4	3	1	2	12	9	15	12	17	15
Baltimore.....	5	8	12	2	3	3	8	11	36	26	53	45
Boston.....	14	30	47	22	38	39	19	79	77	29	71	116
Buffalo.....	22	23	30	18	20	32	25	55	58	51	90	102
Chicago.....	22	38	40	12	14	25	45	47	79	86	107	166
Cincinnati.....	4	7	8	4	5	2	17	5	26	15	30	22
Cleveland.....	2	7	12	3	5	6	7	33	36	10	42	38
Columbus, Ohio.....	4	2	5	3	2	4	7	6	17	4	8	23
Dallas.....	11	16	11	17	26	28	25	24	40	6	36	45
Denver.....	17	8	9	21	21	30	39	34	65	73	34	116
Detroit.....	22	17	25	38	34	27	53	61	117	34	48	70
Houston.....	18	8	15	31	42	48	29	37	47	52	69	63
Indianapolis.....	1	2	8	4	2	9	8	8	17	15	10	22
Kansas City.....	1	4	5	5	4	12	9	13	13	18	18	15
Los Angeles-Long Beach...	78	124	156	139	123	226	481	491	1,136	392	400	496
Louisville.....	9	14	15	11	7	12	13	31	25	27	32	21
Milwaukee.....	6	22	27	10	18	40	7	21	28	8	8	18
Minneapolis-St. Paul.....	15	18	16	79	28	44	44	48	61	83	64	64
Newark, N.J.....	58	54	52	14	27	38	48	56	79	41	45	96
New Orleans.....	7	7	10	11	12	16	11	15	27	11	21	23
New York.....	87	94	125	110	52	199	135	328	406	221	211	309
Paterson-Clifton-Passaic.	16	20	22	3	14	8	11	30	34	16	37	47
Philadelphia.....	10	14	24	11	20	23	28	42	94	44	49	156
Pittsburgh.....	11	9	7	14	12	19	47	39	57	111	82	69
Portland, Oreg.....	2	6	6	0	7	10	24	32	37	18	33	20
Providence-Pawtucket.....	0	9	1	2	4	3	5	11	17	2	1	23
St. Louis.....	7	7	23	1	10	12	25	36	50	50	62	51
San Francisco-Oakland....	36	48	48	44	29	54	157	179	227	180	212	285
Seattle.....	1	7	11	13	15	18	16	24	25	21	20	39
Washington, D.C.....	17	25	25	72	112	101	16	35	41	54	66	82

Source: State employment security agencies.

Table III, Part A. Number of Unfilled Openings in Selected Engineering Occupations Listed by Public Employment Offices in 30 Major Labor Areas, End of Month, May 1966, November 1965, and May 1965

Labor area	Engineers total			Electrical			Industrial			Mechanical a/		
	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965
Total.....	4,596	3,701	3,050	916	801	696	511	437	328	2,061	1,691	1,395
Atlanta.....	7	11	15	1	3	0	0	2	2	4	5	9
Baltimore.....	53	44	49	36	25	27	2	0	0	12	17	17
Boston.....	142	125	3[illegible]	43	40	9	15	20	5	34	36	14
Buffalo.....	210	83	100	38	10	18	42	20	10	93	38	50
Chicago.....	305	198	204	56	22	33	66	35	45	116	95	82
Cincinnati.....	61	240	12	20	3	3	9	57	1	17	154	6
Cleveland.....	62	47	33	7	2	2	11	7	2	26	15	17
Columbus, Ohio.....	93	44	51	13	6	7	5	3	7	25	21	29
Dallas.....	51	26	32	8	1	14	12	8	4	18	14	7
Denver.....	47	6	6	8	1	1	0	0	1	32	2	1
Detroit.....	9	20	7	1	1	0	3	2	0	4	15	4
Houston.....	43	49	41	12	11	7	2	7	4	12	17	11
Indianapolis.....	97	71	72	14	7	11	19	15	14	33	23	28
Kansas City.....	36	17	7	4	1	1	6	2	4	14	7	0
Los Angeles-Long Beach...	839	599	411	181	149	128	71	28	18	387	347	213
Louisville.....	43	41	62	2	5	6	9	4	16	16	19	26
Milwaukee.....	181	122	197	30	15	43	25	15	23	96	67	95
Minneapolis-St. Paul.....	178	232	104	38	56	20	43	46	20	65	93	37
Newark, N.J.....	263	212	165	55	42	46	36	46	35	103	76	59
New Orleans.....	87	112	117	6	8	12	11	10	12	53	84	72
New York.....	183	234	226	56	73	75	22	26	13	48	73	85
Paterson-Clifton-Passaic.	50	58	33	17	24	12	12	10	4	14	16	14
Philadelphia.....	160	80	47	17	25	21	7	1	4	35	35	19
Pittsburgh.....	101	68	130	22	12	19	16	5	4	34	32	62
Portland, Oreg.....	40	29	15	3	5	1	2	2	3	18	11	7
Providence-Pawtucket.....	32	16	23	8	8	7	3	1	3	16	3	8
St. Louis.....	250	169	264	65	28	25	25	21	12	130	97	176
San Francisco-Oakland....	135	121	118	29	25	21	11	10	11	56	38	42
Seattle.....	535	231	242	58	52	62	4	13	33	452	131	138
Washington, D.C.....	303	396	234	68	141	65	22	21	18	98	110	67

a/ Includes aeronautical.

Source: State employment security agencies.

Table III, Part B. Number of Unfilled Openings in Selected Non-Engineering Occupations Listed by Public Employment Offices in 30 Major Labor Areas, End of Month, May 1966, November 1965, and May 1965

Labor area	Chemists			Other natural scientists			Draftsmen			Laboratory technicians		
	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965	May 1966	Nov. 1965	May 1965
Total	395	335	265	406	246	218	3,220	2,511	1,921	1,008	771	630
Atlanta	0	1	3	0	0	0	22	19	4	7	2	7
Baltimore	2	1	0	1	0	1	86	56	35	3	6	5
Boston	23	8	3	21	12	3	132	171	44	59	83	79
Buffalo	13	24	13	7	8	4	92	69	83	25	22	11
Chicago	32	26	22	0	3	4	383	281	199	159	81	56
Cincinnati	7	6	2	2	4	0	48	33	36	19	4	9
Cleveland	3	3	1	2	0	0	79	72	60	17	15	20
Columbus, Ohio	7	8	3	4	5	10	92	15	39	15	16	7
Dallas	4	1	2	5	2	4	58	34	17	13	16	5
Denver	27	0	1	2	0	0	21	5	11	55	57	29
Detroit	1	1	0	2	0	0	15	23	15	12	7	20
Houston	0	5	4	8	5	6	30	22	9	19	13	5
Indianapolis	5	2	0	1	2	2	49	40	26	26	16	15
Kansas City	1	1	7	2	0	2	27	11	4	5	8	9
Los Angeles-Long Beach	32	11	29	37	44	21	269	308	104	69	61	49
Louisville	4	13	10	5	0	1	20	32	22	8	20	15
Milwaukee	23	9	14	7	7	10	101	123	102	8	7	14
Minneapolis-St. Paul	27	52	15	11	9	5	101	111	58	64	67	29
Newark, N.J	18	16	29	20	4	4	125	70	80	37	22	37
New Orleans	7	3	3	9	1	7	45	39	30	4	10	9
New York	78	78	59	21	13	15	285	297	235	138	109	95
Paterson-Clifton-Passaic	15	12	8	0	1	2	32	45	16	20	13	1
Philadelphia	5	3	1	1	1	2	61	105	31	4	1	15
Pittsburgh	15	24	16	11	21	14	79	73	54	18	25	11
Portland, Oreg	5	3	0	2	1	1	29	22	13	14	5	10
Providence-Pawtucket	3	2	0	0	0	0	14	4	5	4	5	2
St. Louis	14	9	4	6	5	7	136	166	123	32	17	4
San Francisco-Oakland	22	8	6	8	3	4	83	64	74	75	38	38
Seattle	2	1	2	171	40	36	485	120	168	20	7	7
Washington, D.C	4	4	8	40	55	53	221	81	224	59	18	17

Source: State employment security agencies.

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