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The environmental technician, a new but necessary subordinate of a professional environmentalist, might be employed by a health department, natural resources commission, state agriculture department, municipal water plant, or by business or industry in self-inspection and corrective activities. The Program of Teacher Education for Environmental Technology, by developing teacher training in the field of Environmental Health, hopes eventually to promote the environmental technician and free the professional for managerial responsibilities. The project proposes (1) to evaluate the trainee's areas of competence, and (2) to come to mutual agreement with the selected community college about the kinds of experience in the classroom and on the job that would best prepare the trainee for his new experiences. The training would consist mainly of university study with related teaching experiences in the community college. The individual would spend at least some time at the training center operated in cooperation with the University of Michigan School of Public Health, studying the development and application of standards in environmental health. Potential environmental technology teachers might be practitioners in the field or teachers in related fields. Other functions of the project will be curriculum development and student recruitment. (JK)

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Project POTEET

Under joint grants from the Kellogg Foundation and the Statler Foundation we are embarked on a five-year project to train teachers. One aim of our Program of Teacher Education for Environmental Technology (POTEET) is to prepare community college faculty. The plan involves selecting each year five or six demonstration junior colleges interested in establishing or developing a curriculum in Environmental Quality Control. Project POTEET will assist these colleges by providing scholarship help for the prospective teacher of the Environmental Health courses.

The amount of training underwritten will vary with a given trainee's background and needs, but will ordinarily not exceed one year. Some of the training will take place in a suitable college or university close to the trainee's home and community college. The trainee will spend some time in Ann Arbor at NSF's expense studying the development and application of standards in environmental health.

Each year the Project will select additional demonstration colleges and repeat the course work in standards for a new group of trainees.

Through this effort, Project POTEET hopes to draw attention to some patterns that teacher education may follow in the years ahead, years during which the need for college teachers will continually rise. Regular degree-granting institutions may find reason to adopt some of these patterns as all of us work together to provide the teachers required.

With respect to the practice of Environmental Health the project aspires to promote a better use of manpower. Technicians in the health agency can free the professional to achieve a more professional focus; technicians in business and industry are a logical manpower source as industry assumes increasing responsibility for maintaining environmental quality.

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Program of Teacher Education for Environmental Technology (POTEET).

INTRODUCTION

Today's professions witness to a multiplication of hands. The solitary doctor on the frontier belongs only to the world of television. Mr. Modern Citizen, when he gets sick, is used to seeing his physician assisted by the nurse, the medical technologist, the lab technician, the X-ray technician, an ambulance driver specially trained - the list extends.

Similarly, up-to-date dental care means the trained team. Dental assistant and dental hygienist enable the dentist to provide the quality of care we have learned to expect, and permit him best use of his most precious possession - time. Other professional fields have in recent years welcomed assistance from the technician; thus one notes the engineering technician, the chemical technician, the teacher aide. Again, the list extends.

In view of this widespread trend it comes as no surprise that those who devote their professional lives to guaranteeing environmental quality will now be assisted by the environmental technician. Involved here is a shift in both need and attitude. Time was, we took our environment for granted. If a stream got spoiled, others remained. If sulfur fumes poisoned the air, we put up with them or moved to the country out

of their reach - and in an agrarian society, country was everywhere. If a woods burned out or was cut down we paid little heed; in an economy of scarcity, few had time to play - and camping out is not likely to be a farmer's idea of fun. Roughing it outdoors is his daily bit.

But as we have urbanized we have become increasingly aware of our need to manage the environment. As we have come to recognize the physiological and psychological value of optimum environment we have in some cases even raised our standards. In the process we have buried the professional environmentalist beneath an avalanche of routine duties. The simple fact today is that professionals in this field cannot possibly do all the work expected of them. To cite just one professional as an example: the sanitarian cannot hope to insure, by means of evaluations once or twice a year, the levels of cleanliness we demand in our restaurants, in our hotels and motels, in our public swimming pools. If the sanitarian is to solve his work problem, he must be freed for the professional duties his training has prepared him for. And one spot in which the environmental technician belongs, performing tasks of sampling, measuring, and evaluating, is as a subordinate of the professional sanitarian.

Another point. Maturity means self-discipline, in an individual or in society generally. As we see more clearly that each of us must help manage the quality of our environment, business and industry are recognizing they must housekeep so as not to pollute the streams, or air, or the natural recreation potential of our playgrounds.

The quick and orderly assumption of such responsibility by private industry can forestall the almost certain alternative: insistence by

the citizenry, acting through its power arm, government, that this be done. Industry can take the initiative in this matter, save itself money in the long run, and reap the profound satisfaction of realizing that it is leaving the environment, which sustains us all, as good as it found it - or better.

Precedent exists for the model that NSF proposes. The dairy industry, for example, applies quality control from the producing animal to the consumer. It does so within standards established jointly with public authority. It employs field personnel, operates a laboratory or contracts for lab services, performs research in the improvement of quality, maintains records for the reviewing authorities, and conducts specialized in-service training in environmental health. And many aspects of its quality control are being carried out by technician-level personnel.

Regulatory agency personnel in such a changed scene then have their regulatory function reduced. They serve as consultants to industry, and maintain a continuing surveillance of those aspects of the industrial activity which affect environmental quality. To some extent this surveillance amounts to a kind of professional supervision of the environmental technician who is in the employ of industry.

To get the needed environmental technicians society must set up formalized procedures for training them. Implementing these procedures calls for trained teachers. It is to the specific task of training teachers that NSF addresses itself in its Program of Teacher Education for Environmental Technology (POTEET). Teachers trained by the project will work in community colleges, health agencies, and industry. The project will run for five years and is being financed by joint grants

from the Kellogg and the Statler Foundations.

Project POTEET seeks to help alleviate the shortage of environmental professional staff (1) by providing technician help in the public sector itself so as to free the professional to concentrate on the managerial and planning responsibilities of his job, and (2) by encouraging business and industry to employ environmental technicians to help assure a high level of environmental quality.

The project aspires to promote a better use of manpower and the diminishing of an inspection-oriented relationship between the regulatory agency and business and industry, with simultaneous growth in the assumption of legitimate, mature responsibility by all.

THE TECHNICIAN

Most environmental technicians now on the job probably work in health departments, and more of them will tomorrow. This concept is just beginning to take hold. But elsewhere too there is expanding potential for this person. Natural resources commissions, state agriculture departments, municipal water plants, waste water plants, and other public agencies will be needing him. And business and industry, through self-inspection and corrective action, can avoid the state of annoyance sometimes reached in the past between them and a regulatory agency. Self-discipline is a next reasonable step, to be taken now, if business is to remain free of tighter controls by government in matters respecting environmental quality.

Private employment of the environmental technician will markedly expand job opportunities. In New York state, where law forbids industry to pollute a stream after 1971, industry needs him now. New York consulting engineers have indicated they will hire him. He would seem to fit into the motel industry. He belongs in activities as disparate as food processing and detergent manufacture. When the private employer realizes how environmental technicians can serve his business, junior colleges will be pressed to produce them fast enough.

What does the environmental technician do? In general, field sampling and some bacteriological and chemical laboratory work to help control and prevent disease from sources like water and food and the air. The technician might collect water or waste samples and identify them for laboratory analysis. He might assist a district sanitary engineer and work under his direct supervision.

If employed by a motel he might operate the swimming pool (its filters and its means of disinfection) and the sewage treatment plant. He would continuously evaluate the food-service procedures to assure cleanliness. He would work in collaboration with sanitarians in the local health agency, receiving necessary guidance from them. Similar relationships now exist between health agencies and the operators of water treatment plants, municipal sewage plants, and the larger public swimming pools.

Environmental Technicians: Now and in the Future

Ten years ago Ferris Institute at Big Rapids, Michigan began training the two-year Environmental Sanitarian Assistant. The first six years, fifty students received the Associate of Applied Science degree. Forty-two stayed in Environmental Health: 23 in Michigan local health departments; 5 with the Michigan Water Resources Commission; 4 in the Public Health Service; and 5 with the food industry. Five went on immediately to the Bachelor of Science (as did 5 or 6 of the others, after working awhile).

In 1963 when Ferris joined the state college system, a junior and senior year were piggy-backed onto the two-year technician program. This has in effect put Ferris out of the business of producing environmental technicians; 90% of the sophomores go on. But between 1958 and 1963 the technicians graduating were getting environmental health jobs in Michigan. It is reasonable to believe that a Michigan demand for the environmental technician continues, and there is no reason to look upon the Michigan demand as being somehow unique.

The Fayetteville Technical Institute in North Carolina has graduated three small classes in sanitary engineering technology. This curriculum produces specialists in water and sewage technology. The graduates are working for municipalities, local health departments, the state stream sanitation division, and the state board of health.

Various kinds of environmental technicians will likely develop. NSF does not wish to sponsor some kind of accelerated evolutionary process for meeting society's needs as now perceived. Project POTEET seeks rather to develop guidelines and assist efforts of various stripe that seem worth a try. Narrowness at the start can inhibit ultimate development, which right now shows promise of being various.

Assisting the Community Colleges

Project POTEET will serve as an information pool for colleges wishing to know more about curricula in environmental technology. It will also provide scholarships each year for five or six community college teacher-trainees. The project will consider various ways to help environmental technology succeed, but the main thrust aims at training a teacher who can serve on equal footing with the other faculty members in the community college. What is really being discussed at this point, of course, is excellence in the technician classroom.

Technicians Via the In-Service Training Route

What about efforts to develop environmental technicians on the job? As more and more community colleges spring up, business and industry and government agencies turn to them more and more often to solve their

in-service training requirement. The community college, established specifically to provide training and education, has proved responsive to just such local need. In answer to a request from a local employer, and working cooperatively with him, the college can offer a course or two that meets a specific need.

Such a beginning, serving, say, the local restaurateur, may grow into a cluster of courses in Environmental Quality Control, earning for the student a Certificate of Completion, within the context of an existing Food Service curriculum or Hospitality curriculum. In time, demand may warrant a one-year certificate program in Environmental Quality Management. A point worth emphasizing: development like this proceeds from expressed demand. The employer must will it if anything is to happen. Development of this sort makes sense, however; it leaves the employer free to accomplish his primary mission and reserves to the community college a training function which is part of its primary mission.

Technician Programs Now Operating

To speak of present reality and of patterns now established, it is the two-year degree program in environmental technology that shows greatest immediate promise. Ferris State College and Broome Technical Community College (Binghamton, New York) are now running successful programs in which primary emphasis is on biology (micro). Hudson Valley Community College (Troy, New York), the Fayetteville Technical Institute, and the Ag and Tech College in Morrisville, New York have programs oriented toward engineering.

All five schools concentrate on providing a curriculum specific

enough in content to produce a technician immediately employable upon graduation, and indeed this is a sine qua non of the good two-year technician program, whatever the field. NSF concedes the first-importance of this characteristic yet would wish such college training to give the environmental technician some blue sky - the chance to apply toward a baccalaureate some or many of the credits earned in junior college, should his ambition later take him in that direction.

Ferris, in the position of offering both the two-year technician program and a four-year curriculum in Environmental Health, solves the problem of articulation by accepting all the credits earned in its own lower division. To some extent it has turned the conventional four-year pattern upside down by giving most of the technical courses the first two years and enriching with the humanities and the social sciences the last two. Such total transferability may prove elusive in the usual instance in which community college and four-year college are separate; yet Ferris' example rebukes those who would say it can't be done.

Project POTEET as Catalyst

The fanciest of plans will come to nothing unless community college students actually enroll in environmental technology. Project POTEET will seek opportunities to help the community college recruit students. It may assist in getting out brochures, suggest placing articles in local newspapers, help stimulate the business community to pay for informative advertising, etc.

NSF will also, throughout the life of the project, seek to enlist the guidance and the help of trade associations (such as the National

Restaurant Association and the American Hotel and Motel Association) and professional organizations (such as the American Public Health Association, the National Association of Sanitarians, and the Conference of Local Environmental Health Administrators). The former can detail the training needed by employees in the industry they represent, the latter can provide suggestions from professionals respecting curriculum, may soon be in a position to accredit certain patterns of curricula, and may ultimately offer a home within their organizations to such environmental technicians as want identification of that sort.

5/31/68

THE TEACHER

At the Community College

To speak of the teacher is to arrive at the center of NSF's Project POTEET. Where will the teacher come from? Community colleges in staffing new occupational curricula often seek out the successful practitioner in the field. The good inhalation therapist, or X-ray technician, or dental assistant, besides teaching the details of his craft, can say first-hand what it's like to be that kind of technician day after day. He communicates something of the quality of life in that field. His feel for the work gives to textbook and laboratory the ring of the true.

Maybe our teacher-trainee is today working in a health agency but wants to join the academic community. He'd like the chance to pass along to others what he has managed to learn. He likes young people, and even in his present work has often shown skill in teaching others.

But the teacher-trainee doesn't necessarily have to be a highly specialized public health practitioner. He should, however, be sensitive to public health needs, and especially sensitive to the occupational needs of the community. He may be a high school biology teacher who has, perhaps as a hobby, always taken an interest in environmental health. Or he may now be teaching in a community college but for valid reasons would like to shift fields.

Whatever his present situation the right help can make him a better

teacher, and it is to the specific task of preparing teachers that NSF primarily addresses itself in Project POTEET. To the community college, Project POTEET says, "Let's look together at what this potential teacher-trainee now has, and see what will make him better." The goal: a teacher who understands the junior-college student, who understands the community college itself, who knows something of the psychology of education, who can use audio-visual aids with some sophistication and perhaps even produce some of them. Etc. NSF proposes to evaluate, with the community college and the teacher-trainee himself, his areas of present competence, and to come to mutual agreement about the kinds of experience, both in the classroom and on the job, that will best ready him for his new duties. Together the three interested parties will then devise a program to handcraft a teacher.

The bulk of the training will likely take place close to the trainee's home and community college. But the trainee will spend some time in Ann Arbor, studying the development and application of standards in environmental health. At least part of the work in Ann Arbor will deal with the criteria and standards of the National Sanitation Foundation.

Locating most of the university study close to the home of the trainee will enable him to spend part of his time on the campus of the community college employing him. For the trainee who is coming to teaching from some other field the chance to learn first-hand his particular community college and, more important, to test on the job what he is getting from books at his university, is centrally important to our making this training the best it can be. If part of the training is to consist of education courses, it is probably true that courses in a

university close to home will focus more sharply on the distinctive characteristics of two-year education in that region. This makes for a slight advantage - not to be ignored, yet minor.

Project POTEET will expect to arrive at a specific agreement with the employing community college regarding the several aspects of the trainee's experience on his community college campus: observer, practice teacher, finally as teacher (under supervision) of a regularly scheduled course in a subject field in which he is already competent. Throughout, the trainee will work at shaping the curriculum in environmental technology and will share responsibility for recruiting students to the new field. The parties to this agreement will try to get the training university to grant some credit for the trainee's community-college activities.

In general, the first trainees will begin their training in the fall of 1968. If the trainee is to perform services for his community college, NSF and the college will agree on a fair price for such services. This price will be paid him in salary by the employing community college. Project POTEET will then provide a remainder that will hope to bring the trainee's gross to that earned by a first-year teacher in that college. The trainee is expected not to take on outside work during his training year, but to address himself totally to his training. The project will establish a routine to continuously evaluate its own methodology; it will disburse its scholarship funds monthly.

Support of a trainee by Project POTEET will ordinarily be limited to one year. How far this may advance the trainee toward a particular degree turns on what he had to begin with and what he is going for.

NSF seeks, in Project POTEET, to draw attention to some patterns that teacher education may follow in the years ahead, years during which the need for college teachers will continually rise. Regular degree-granting institutions may find reason to adopt some of these patterns as we all work together to alleviate the teacher shortage.

In Industry and the Health Agency

On the face of things the logical place for the in-service training of technicians these days would seem to be the local community college. The conducting of training, whether within health agency or business, may duplicate the primary mission of the college. But not every region has a community college, at least not yet. Or other reasons may dictate that in-service training will go better within the organization involved rather than in the college. If persons doing training for industry or health agency wish to enroll in a course in the development and application of standards in environmental health, NSF encourages them to do so. In fact, POTEET will implement this phase of the Project early, in response to express demand.

NSF intends to run a permanent training center, in cooperation with the University of Michigan School of Public Health. This center will offer training at NSF Headquarters in Ann Arbor or at such other locations around the country as will best satisfy demand.