

TRAINING OPPORTUNITIES FOR THE SANITARIAN¹

THE GRADUATE APPROACH

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Qualified sanitarians now have more opportunities and more support for graduate education than at any time since the development of this professional category.

When considering the graduate approach to training opportunities the use of the terms "qualified" and "sanitarian" must be clearly understood. Many forms of the term "sanitarian" are now widely used by employing agencies as job titles. Educational requirements for these positions vary from high school graduation to a masters degree. As such, the term "sanitarian" is not an indication of academic achievement as are physician, engineer, nurse, veterinarian, dentist and similar designations which are clearly defined in terms of completion of a specific academic curriculum. The term "qualified", as used here, then will refer to qualifications for admittance to a graduate school, not to the title sanitarian. In a few cases these may be the same, but generally, today, they are not and because of this many persons, using the title and working as sanitarians, find themselves without the educational preparation required for admission to a graduate school.

The possession of a baccalaureate degree, even with a good grade average, does not necessarily mean that a person is "qualified" to undertake a specialized program of graduate study. Readiness for graduate work must be demonstrated by academic achievement in the proposed area of study. A sanitarian has been defined as a professional person qualified by education and experience to control environmental factors for the optimum health and comfort of mankind (1). Today, and increasingly so in the future, the control of the environment requires the application of scientific knowledge to the problems encountered. Therefore, to be "qualified" for graduate study in the environmental sciences, a sanitarian should have sound educational preparation in the basic sciences. Forty semester hours with reasonable distribution among physics, chemistry, mathematics,

and biology and with performance at the "B" level or better is generally a minimum. What then are the opportunities and support for graduate education available to such qualified sanitarians?

OPPORTUNITIES

Most Schools of Public Health admit qualified sanitarians to graduate study in the environmental sciences. Schools with specialized graduate programs in dairy science, food-technology, entomology, air hygiene, industrial hygiene, radiological health, institutional environment and related areas also will admit qualified sanitarians.

The fourteen Schools of Public Health in North America are approved by the American Public Health Association to award the degree Master of Public Health (M.P.H.). Some of these schools also award the degree Master of Science in Public Health (M.S.P.H.). The principal difference between the two degrees is one of professional experience. Admission to study for the M.P.H. degree requires that, in addition to meeting the academic standards, applicants have a graduate professional degree or three years of acceptable professional experience. Only the academic requirements must be met for the M.S.P.H. degree. Generally, a qualified student can complete the work for either of these degrees during one academic year although some take longer. Study toward higher degrees such as the Ph.D. or Dr.P.H. also is open to persons holding masters degrees or other advanced degrees and who possess the ability to undertake a doctorate program. At the present time two sanitarians are enrolled in such a program at the University of North Carolina, School of Public Health. Study in a doctoral program generally requires a higher degree of specialization than that for the masters degree. A sanitarian reaching this level generally will lose his identity as such, and become identified with a specialty.

The acceptance rate for sanitarians in Schools of Public Health is approximately at the median for 13 categories as shown by the data in Table 1. At one School of Public Health over a recent 5-yr period more masters degrees were awarded to sanitarians

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TABLE 1. APPLICATIONS AND ACCEPTANCES OF VARIOUS CATEGORIES OF STUDENTS BY SCHOOLS OF PUBLIC HEALTH FOR THE ACADEMIC YEAR 1961-62^a

Category	Number applying	Number accepted	Rate of acceptance
Statisticians	114	88	77.2%
Physicians	550	423	76.9
Nutritionists	88	65	73.9
Nurses	186	130	69.9
Health Educators	341	235	68.9
Engineers	47	32	68.1
Dentists	79	49	62.0
Sanitarians	199	123	61.8
Biologists, Medical technologists, Microbiologists, etc.	123	74	60.2
Veterinarians	49	27	55.1
Chemists	35	19	54.3
Hospital Administration	307	93	30.3
Other	156	107	68.6
TOTAL	2274	1465	64.4

^aTaken from: James L. Troupin. Report on Schools of Public Health in the United States and Canada 1961-1962. A Committee Report. American Public Health Association.

than any other category of students registered in the Department of Sanitary Engineering. Table 2 shows the distribution of these graduates by professional categories over the 5-yr period, 1958-1962. At the School of Public Health at the University of North Carolina a qualified sanitarian applicant for study toward a masters degree has never been refused admittance. The records show, then, that qualified sanitarians have opportunities for graduate academic training equal to those of the other professional disciplines.

Sanitarians sometimes undertake graduate study in an area of public health work other than the environmental sciences. This may be done because

TABLE 2. PROFESSIONAL CATEGORIES OF STUDENTS AWARDED MASTERS DEGREES IN THE DEPARTMENT OF SANITARY ENGINEERING, SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF NORTH CAROLINA FOR THE PERIOD 1958-1962.

Professional category	Year degree awarded					Total
	1958	1959	1960	1961	1962	
Sanitarian	7	6	7	7	9	36
Sanitary Engineer	7	6	6	6	7	32
Sanitary Chemist and Biologist	3	6	4	4	6	23
Other-Air Hygiene, Rad. Health, etc. ^a		2	1		1	4
TOTAL	17	20	18	17	23	95

^aCategory established 1959.

students expect their duties, after graduation, to be administrative or educational. Others may follow this route because their undergraduate academic education has not prepared them adequately to do graduate work in the environmental sciences. Still others may wish to follow a more highly specialized course of study. Apparently, however, only a small number of sanitarians undertake graduate programs outside the field of environmental health. Table 3 shows that this was the subject area of major study for 43 of 50 sanitarians graduating from Schools of Public Health last year.

TABLE 3. MAJOR SUBJECT AREA OF GRADUATE STUDY FOR 50 SANITARIANS GRADUATING FROM SCHOOLS OF PUBLIC HEALTH IN 1961-1962.

Major subject area	Number of sanitarians
Environmental health	43
Public health administration	4
Public health education	3
TOTAL	50

Data from: James L. Troupin. Report on Schools of Public Health in the United States and Canada. 1961-1962. A Committee Report. American Public Health Association.

SUPPORT

Support for graduate training of sanitarians refers principally to financial support. Today, by the time many persons are ready for graduate education they

TABLE 4. SOURCES OF SUPPORT FOR ALL CATEGORIES OF STUDENTS REGISTERED AT THE SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF NORTH CAROLINA. 1958-1962.

Source of support	Number of students	Per cent
Federal government traineeships and other grants.	524	62
State and local government traineeships, salaries, and other grants.	120	14
Other: personal, voluntary agencies, foundations, religious and professional organizations, etc.	199	24
TOTAL	843	100

have acquired dependents and incurred other continuing money obligations which make it impossible for them to leave a job and return to school unaided. The Federal Government, state and local government, colleges and universities, foundations, volunteer agencies and industry all have recognized this need and

are meeting it by offering traineeships, grants, assistantships, scholarships and similar forms of assistance to qualified students. Table 4 shows the sources of student support at one School of Public Health during a recent 5-yr period.

Support for sanitarians in the country as a whole compares favorably with that for all disciplines at North Carolina. Table 5 shows this information for sanitarian graduates from Schools of Public Health in 1961-1962.

TABLE 5. SOURCES OF SUPPORT FOR SANITARIAN GRADUATES FROM SCHOOLS OF PUBLIC HEALTH 1961-1962.

Sources of support	No. of sanitarians	Per cent
Federal government	31	62
Employing agency*	12	24
Personal	7	14
TOTAL	50	100

*Probably largely state and local government.

Data from: James L. Troupin. Report on Schools of Public Health in the United States and Canada. 1961-1962. A Committee Report. American Public Health Association.

The nature of support available to sanitarians for graduate academic training varies widely. State and local governments may make educational grants, continue an employee on full or partial salary while on educational leave, or pay tuition and fees. It can be seen from Tables 4 and 5 that apparently less than one-fourth of the support for education in public health comes from state and local governments.

Beginning in 1936, under Title VI of the Social Security Act, the Federal Government has provided support of one kind or another for graduate education in public health.

In 1956 the Public Health Traineeship Program was established as Section 306 of the Public Health Service Act. It is administered by the Division of General Health Services, Bureau of State Services, United States Public Health Service. Under it the Surgeon General is authorized to award traineeships for graduate or specialized public health training, either directly to individuals whose applications have been accepted by the public or non profit institution providing the training, or through grants to such training institutions. The primary aim of this program is to bring new people into the field of public health by providing post graduate training opportunities for men and women who have completed their basic professional education. It is designed to supplement and not to replace or reduce the training activities currently being sponsored by state and local governments. Since it is the intent of this

activity to bring new people into public health, preference has been given to qualified individuals under 35 years of age who have had not more than two years of public health experience and less than one year of graduate or specialized public health training. Exceptions to this policy are granted only under very special circumstances.

The financial level of the awards under the Public Health Service Traineeship Program is adequate to enable a sanitarian with dependents to return to

TABLE 6. DISTRIBUTION BY PROFESSIONAL CATEGORY OF INDIVIDUALS RECEIVING PUBLIC HEALTH TRAINEESHIPS DURING THE ACADEMIC YEAR 1961-1962 (3)

Professional category	No. of traineeships awarded
Nurses	192
Sanitary engineers	77
Physicians	53
Health educators	38
Sanitarians	33
Miscellaneous	30
Dentists	18
Laboratory personnel	14
Sanitation field (Other)	12
Nutritionists	11
Veterinarian	7
Statisticians	5
Dental hygienists	4
Medical social workers	2
TOTAL	496

school for graduate study. The usual stipend for graduate study at the masters level is \$250 per month with an additional \$30 per month allowed for each

TABLE 7. SCHOOLS SELECTED FOR GRADUATE STUDY BY SANITARIANS AWARDED FEDERAL TRAINEESHIPS IN 1961-1962 UNDER SECTION 306 OF THE PUBLIC HEALTH SERVICE ACT (3).

School	No. of sanitarians selecting school indicated
University of California, Berkeley	9
University of North Carolina, Chapel Hill	7
University of Minnesota, Minneapolis	4
University of Oklahoma,* Norman (Dept. of Sanitary Sci.)	3
University of Puerto Rico, San Juan	3
Tulane University, New Orleans	3
University of Michigan, Ann Arbor	2
Georgia Institute of Technology,* Atlanta (Public Health Department)	1
University of California, Los Angeles	1
TOTAL	33

*Departmental administrative unit rather than a School of Public Health.

dependent. In addition the actual cost of tuition and fees is paid and some assistance is given toward personal travel costs of the trainee. Traineeship awards generally are for a period of one academic year, although special exceptions may be made.

During the academic year 1961-1962, 33 sanitarians and 12 other workers in the field of sanitation received Public Health Service Traineeships. Table 6 shows this information for other professional categories. All but two of the 33 sanitarians receiving traineeships attended Schools of Public Health. Table 7 shows the distribution of trainees among schools. Sanitarian recipients of the fellowship awards were from 16 states and 2 territories.

SUMMARY AND CONCLUSION

There are many opportunities for graduate professional education open to sanitarians. During the academic year 1961-1962, 61.8% of the sanitarians applying to Schools of Public Health were accepted. For the same period sanitarians received 6.6% of the Public Health Traineeships awarded. At one School of Public Health, 36% of the students receiving masters degrees with majors in the environmental sciences were sanitarians. Any sanitarian qualified to undertake graduate work in his professional category can find support.

Professional status for the sanitarian, as for any

other group, must be built upon a foundation of education. Most professional education today is at the graduate level, and the current trend in that direction is growing stronger all the time. Yesterday, we worked in parts per million, today we cope with micromicrocuries; what will it be tomorrow? Training tomorrow's sanitarians to meet today's problems is not enough. Graduate education prepares the sanitarian to meet tomorrow's problems as well as today's.

REFERENCES

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ENUMERATION OF PSYCHROPHILIC MICROORGANISMS¹

A REVIEW

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The importance of psychrophilic microorganisms in quality control, sanitation and processing of milk products has fostered a growing interest in methods of their enumeration.

The literature on psychrophilic microorganisms was reviewed briefly by Doetsch and Scott (20) and comprehensively by Davis (19), Thomas (43), Ingraham and Stokes (25), and Witter (52). The purpose of this paper is to summarize the more pertinent information about the enumeration of psychrophilic microorganisms.

One of the first problems which arises is that of finding a precise, yet sufficiently comprehensive, definition for these organisms. Many definitions have

been proposed, but as yet no single definition is universally accepted. These definitions are discussed by Witter (52) and Ingraham and Stokes (25). Methods of enumerating psychrophilic microorganisms are as numerous as their definitions, since definitions are used as a basis for establishing counting procedures. Consequently, the problem of the one "best" method of enumerating psychrophilic microorganisms is still unsolved.

PLATE COUNT INCUBATION TEMPERATURE AND TIME

Temperature and time of incubation for determination of psychrophiles by the agar plate method seem to be the subjects of greatest debate. The eleventh edition of Standard Methods for the Examination of Dairy Products (9) recommends holding plates at 41-44.6 F (5-7 C) for 7-10 days. The

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