not keep close to the laboratory is in danger of tending toward empiricism and mere technic. It would be a great gain if graduate work in medicine and the degrees which were granted in recognition of it could consciously emphasize the importance of keeping the laboratory and the clinical sides in constant and reciprocal relationship.

In conclusion, we may summarize the situation as follows: The university must assume its obligations toward all types of medical education; it must distinguish consciously and carefully between medical extension and genuine graduate work in medicine; it must develop graduate courses in an informal and flexible way so as to utilize accumulating experience wisely, take advantage of all facilities, and avoid a premature conventionalizing of advanced work in medicine. Finally, the university should adopt a cautious, conservative policy with respect to higher degrees; it should aim at coordinating graduate work in medicine with the graduate work of the institution as a whole, and should recognize this work in practically the same way that all types of advanced study are signalized.*

COURSES AND DEGREES IN PUBLIC HEALTH WORK*

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The educator interested in preparing students for service in public health work must take several factors into account. First of all, the education must be for service. Furthermore, the quality of that service is exacting and of great importance to the community. In order, then, to be satisfactory, the education must be special, yet comprehensive. The saying that the student should know something of everything and everything of something applies here with particular emphasis. The underlying sciences which form the basis of preventive medicine are various, and therefore a satisfactory knowledge of the medical as well as the related sciences is necessary for success in a public health career.

Pehaps the next most important consideration is that the education for public health service may take one of four directions. The public health servant may be teacher, research scholar, technical expert or administrator. A survey of the field of public health work as it exists in this and in other countries will disclose the fact that the successful workers are dedicating their lives to one of these four general subdivisions. Some peculiarly fitted by nature and temperament are teaching the subject; others are sacrificing much to the call of laboratory research; others again are devoting their energies to the technical art of one of the sanitary sciences, while many must be administrators. Occasionally we find a man with special endowments who combines several of these phases and is at once administrator and research student, technician and teacher; but as a rule it will be found desirable if not necessary to place emphasis on one line of activity in order to achieve success—at least to achieve distinction, which currently passes as success. There is much overlapping and interlocking, for often the research student becomes teacher; the technical expert becomes administrator.

With these points in view, the next matter requiring our attention is that since the education is to be for service, it must be practical, but a practical art based on sound science. The only satisfactory practical work done in public health lines is accomplished by those who have a secure scientific foundation. It is pitiful to watch the vain strivings and waste of energy, time and money by public health officers who have an imperfect or incomplete knowledge of the sciences on which their work is based.

This brings us to another important consideration, and that is, that the object of public health work is the prevention of disease. It is impossible successfully to prevent disease without a knowledge of disease. Therefore, the fundamental medical sciences must form the background of a good education for public health service. By this I do not mean the orthodox medical curriculum that has for its object training for the practice of medicine. The practitioner of the art of medicine must make a special study of diagnosis and treatment. When a patient consults a physician, he wants to know two things: First, "What is the matter with me?" and second, "What can be done to relieve me?" The successful doctor then becomes a specialist in the recognition of disease and the use of remedial measures. His object is to cure rather than to prevent. On the other hand, the public health officer is interested more in the mode of spread and methods of preventing disease. The two points of view are quite distinct.[1]

The medical curriculum, already overcrowded, has little time for sanitation and hygiene, much less for vital statistics, epidemiology, public health administration, quarantine, industrial hygiene, sanitary engineering, management of epidemics, rural and dairy hygiene, milk supplies, food adulteration, sewage disposal, water purification, heating, lighting and ventilation, housing, social service work, school hygiene, infant mortality, public health laboratory methods, and a number of other subjects on which an efficient health officer must be well informed.

Public health work is therefore becoming, in fact, has already become, a separate profession. It has split off from medicine just as medicine long ago split off from the priesthood. Public health service, as a career, must be made an end in itself. It is often difficult and sometimes impossible to bend the physician into a health officer. The ordinary medical training does not qualify a person to be a health officer any more than the training suitable for public health service would qualify a man to practice medicine. Sanitation, then, has become more than a specialty; it is a profession.

The time has long gone by when the physician can spend a few hours from his busy day to look after the duties of the health office. The situation demands the entire time and energy of those who consecrate their lives to the public welfare. In order to attract capable men to the new profession, it is important that the health officer should have an assured tenure of office with adequate pay and freedom from politics.

These facts are stated in order to throw force into my contention that special degrees should be provided

* Read at the Eleventh Annual Conference on Medical Education of the American Medical Association, Chicago, Feb. 16, 1915. The discussion of this paper appears under Society Proceedings, this issue.

1. The modern practitioner of medicine is fast adding prevention as one of the tools of his equipment. The future student of medicine will make a study of health and how to maintain it, as well as a study of disease and how to cure it. However, the point of view of the practitioner of medicine is personal and particular, while the point of view of the sanitarian is communal and general.

for those who qualify for public health service. In this way the fundamental distinction between the health officer and the physician will be borne into the consciousness of lay and professional minds.[2]

A school for health officers in a university organization should occupy a position as separate as that of the medical school, the dental school, the engineering school or the law school. A school for health officers needs a separate faculty, but also needs cooperation with other schools in the university. Thus it needs sanitary law from the law school, sanitary engineering from the engineering school, oral prophylaxis from the dental school, the medical sciences from the medical school. A school for health officers, in fact, must reach out more widely than the resources of any university. Thus, it needs the contagious disease hospital; it needs the city board of health, the state department of health and the federal Public Health Service, for instruction, for inspiration and for opportunities that lie without the bounds of any university. A school for health officers also interlocks with many private and semipublic philanthropic organizations.

All this is a far cry from the practice of medicine, and emphasizes the point I wish to make, that the public health officer needs a separate and special training and should have a separate and special title or degree to designate his special qualifications.

The commissioner of health of a large city cannot be qualified in all the sanitary sciences. He cannot be an expert diagnostician, a good statistician, a competent engineer, a skilled laboratory technician, a capable sanitary lawyer as well as a good administrator, yet he must know something of all these. The commissioner of health of a large city has a corps of specialists to help him in each of these separate fields. On the other hand, the health officer of the small community must be a Jack of all trades. The great point here is that the latter shall be qualified to know his limitations and be ready to call on experts who are furnished by the state and government to assist in troublesome, novel or particularly dangerous situations. To discuss this phase of the subject would carry us far afield; but the facts are brought out here to show that there is need of several kinds of degrees in public health work, such as certificates, diplomas and doctorates.

The certificate or diploma in public health should be used to designate those who have the minimum training believed necessary to carry on public health work. This means at least four years of special study equivalent to college grade; while the doctor of public health degree should be limited to those who have longer training and have in addition carried on original research in some branch of sanitation and hygiene.

How the problem is met may perhaps best be approached by describing a special instance. Permit me, therefore, to tell you how Harvard University has endeavored to solve the problem. At present, the certificate in public health (C.P.H.) and the doctorate of public health (Dr.P.H.) are given in Boston. The certificate in public health is issued by the School for Health Officers of Harvard University and the Massachusetts Institute of Technology, while the doctorate of public health is one of the higher degrees offered by Harvard University.

2. At this point it should be made clear that there is a distinction between the medical officer of health and the health officer, and it should be remembered that it is only the latter of whom we are now speaking, for the country needs health officers.

SCHOOL FOR HEALTH OFFICERS

The School for Health Officers is an enterprise conducted by Harvard University and the Massachusetts Institute of Technology acting in cooperation through an administrative board appointed for this purpose by both institutions. Prof. William T. Sedgwick is chairman of the administrative board, Prof. G. C. Whipple is secretary, and Prof. M. J. Rosenau is director of the school.

The object of the school is to prepare young men for public health work and especially to fit them to occupy administrative positions as health officers, or members of boards of health, or sanitary agents, district health inspectors or technical experts of health organizations.

To this end, lectures, laboratory work and other forms of instruction are offered by both Harvard and the Massachusetts Institute of Technology and by special instructors from national, state and local health agencies. The School for Health Officers also enjoys close cooperation with the Harvard School of Tropical Medicine, so ably presided over by Prof. Richard P. Strong.

The primary object of the School for Health Officers is to provide the scientific groundwork in the sanitary sciences which underlies efficient health administration. The country needs leaders in every community fitted to guide and instruct the people in the art of hygienic living; qualified to direct the expenditure of energy, time and money in public health work into fruitful channels, and able to initiate plans to meet novel conditions as they arise.

The requirements for admission are practically the same as those for Grade A medical schools, that is, two years of college work including physics, chemistry and biology, French and German. Such students are then required to spend not less than two and usually three years in the School for Health Officers in order to get the certificate in public health (C.P.H.).

Students, of course, may be admitted to advanced standing; graduates in medicine of recognized schools as well as bachelors of science, or biology and public health, of the Massachusetts Institute of Technology, who are likewise admitted on their records, may achieve the certificate after one year's work. Candidates for the certificate are not required to have the medical degree, but must have credits in the fundamental medical sciences. While the medical degree is not a prerequisite for the certificate in public health, candidates are advised to get the medical degree before specializing in public health work. Experience teaches that preferment for employment and advancement to the higher positions come more readily to those who have the medical degree.

The certificate in public health is not granted unless the candidate has satisfactorily completed courses in the following fundamental subjects: anatomy, physiology, pathology, bacteriology, biologic chemistry, sanitary biology, preventive medicine and hygiene, demography and sanitary engineering.

Furthermore, every candidate for the certificate in public health must make a sanitary survey of some city or town and submit a report on it. Special emphasis is laid on this sanitary survey on account of its practical importance.

The courses available in the School for Health Officers are not restricted to those stated in the catalogue, but may include subjects in any department of Harvard University or the Massachusetts Institute of

Technology, provided they are in harmony with the objects of the school. Certain special courses are given by instructors not otherwise connected with either institution, and practical work is taken in city, state and national health departments and in the hospitals of Boston. All such work in each instance is conducted under suitable supervision and restrictions. At the completion of his course, every candidate is required to submit to a general oral examination by the administrative board in order to obtain the certificate in public health.

DOCTOR OF PUBLIC HEALTH

This is one of the higher degrees offered by Harvard University. It corresponds in certain particulars to the doctorate in philosophy. To obtain the doctor of public health degree (Dr.P.H.), the candidate must have a satisfactory knowledge of the medical sciences as well as the related physical and biologic sciences that form the basis of preventive medicine. Candidates for the degree of doctor of public health are advised first to take the course leading to the degree of M.D.

Graduates in medicine who have a knowledge of sanitary engineering, vital statistics and preventive medicine must spend not less than one year on a special subject, and present an acceptable thesis containing results of original research in order to gain the degree of Dr.P.H. Each candidate must, in addition, make a sanitary survey of a city. While one year in residence is the minimum requisite, it is impossible without special experience and qualifications to accomplish all of the requirements in this short time.

While candidates for the degree of Dr.P.H. are advised first to take the medical course, the medical degree is not a prerequisite. Those who desire to specialize in sanitary engineering, sanitary architecture, sanitary biology, sanitary chemistry, demography or some other branch of public health work may receive the degree after no less than four years of graduate work in approved subjects, including an acceptable thesis embodying the results of original research.

The degree of Dr.P.H. does not rest on any computation of time, or on any enumeration of courses; although a student cannot become a candidate until he has, in the judgment of the committee on the degree, fulfilled the requirements of residence and study. The degree is not given for the mere reason of faithful study for a prescribed time or for fulfillment of a determinate program, and never for miscellaneous studies; but only on the ground of long study and high attainment in the special branch of learning manifested not only by examination, but especially by the thesis.

The oral examination consists of a searching inquiry in the fields related to the subject of the candidate's thesis, and furthermore, includes the following subjects: communicable diseases, immunity, heredity, demography, sanitary engineering, sanitary law, hygiene, sanitation and preventive medicine.

The following list of titles illustrates the nature of the work of the candidates for the degree Dr.P.H. at Harvard University:

E. B. BEASLEY, A.B., M.D., DR.P.H.: An Investigation on the Permeability of Slow Sand Filters to Bacillus Typhosus, *Jour. Med. Research,* 1911, xxv, 101.

A. I. KENDALL, S.B., PH.D., DR.P.H.: Certain Fundamental Principles Relating to the Activity of Bacteria in the Intestinal Tract: Their Relation to Therapeutics, *Jour. Med. Research,* 1911, xxv, 117.

E. H. SCHORER, B.S., M.D., DR.P.H.: Experimental Studies on Milk, *Jour. Infect. Dis.,* 1912, xi, 295.

H. L. AMOSS, S.M., M.D., DR.P.H.: Organic Matter in the Expired Breath, with Special Reference to Its Inhibiting Power on Oxidizing Ferments, *Jour. Exper. Med.,* 1913, xviii, 132.

W. G. ANDERSON, M.A., M.Sc., M.D., DR.P.H.: Heat, Moisture and Carbon Dioxide as Factors in Fatigue, Part published under title of On the Agitation of Air Rich in Carbon Dioxide, A Problem in Ventilation, *Med. Times,* January, 1914.

L. W. HACKETT, A.B., M.D., DR.P.H.: The Application of New Methods to the Study of Bacteria in the Air (not published: on file in the library).

W. D. FROST, S.B., S.M., PH.D., DR.P.H.: The Bacteriological Control of Public Milk Supplies, *Wisconsin Acad. Sc. Rep.,* 1914, xvii, Part II.

M. R. EDWARDS, M.D., DR.P.H.: The Bacteriological Standardization of Disinfectants, with Especial Reference to the Presence of Organic Matter.

J. P. SIMONDS, A.B., M.D., DR.P.H.: Studies in B. Welchii, with Special Reference to Classification and to Its Relation to Diarrhea (in press — Rockefeller Institute Monograph).

SPLENECTOMY IN PRIMARY PERNICIOUS ANEMIA

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Since Addison called the attention of the medical profession to the symptom complex called by him "idiopathic anemia," there has been an immense amount of study devoted to it. In spite of this, until very recently, it has continued to be one of the most hopeless conditions with which we have been called on to cope. Since the middle of 1913, occasional case reports and some lengthy articles have appeared in current medical literature concerning the treatment of this disease by splenectomy. Inasmuch as they have nearly all appeared in German magazines, that this work seems to be of great importance and that up to the present time a careful tabulation of the information on this subject has not been made in THE JOURNAL, it appears that the study which follows will be of profit.

The inquiry naturally divides itself into a consideration of:

1. The cause or causes of primary pernicious anemia.
2. The normal function of the spleen.
3. The effects of splenectomy.
4. The clinical results.

CAUSE OF PRIMARY PERNICIOUS ANEMIA

Primary pernicious anemia may be defined as a systemic disease, characterized by a blood picture which shows a high color index, a decrease in number of the erythrocytes, and the constant presence of poikilocytes, megalocytes, nucleated red cells, especially megaloblasts, and polychromatophilic red cells. There is progressive bodily weakness, the lemon-colored skin, digestive disorders, spinal cord symptoms, which may be tabetiform, paralytic or spastic in character, and no pronounced enlargement of the spleen or liver. The etiology is not settled, but the disease must be due to (1) a toxin, which destroys the cells or inhibits their development; (2) a disease of the blood-forming organs, or (3) an increased destruc-