

life to the best of my ability, in the conviction which has grown with my growth and strengthened with my strength, that there is no alleviation for the sufferings of mankind except veracity of thought and of action, and the resolute facing of the world as it is when the garment of make-believe by which pious hands have hidden its uglier features is stripped off.

ROSS G. HARRISON

PUBLIC HEALTH EDUCATION, WITH SPECIAL REFERENCE TO THE SCHOOL FOR HEALTH OFFICERS OF HARVARD UNIVERSITY AND THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY¹

FROM time immemorial the world has recognized three great professions—the ministry, law, medicine. They stand, respectively, for love, order and health—the great trinity upon which human happiness is founded. During the nineteenth century another profession arose, different from the other three in that it concerns itself with things external, but nevertheless of vast importance to the well being of the race—the profession of engineering. With many parts, heterogeneous, amorphous, the world has not always recognized it as a united whole; but gradually it has become crystallized around the central idea that “engineering is the application of the great forces of nature for the use and convenience of man.” Thus our professional triangle has become four square and our modern civilization may be said to rest upon the four learned professions—the ministry, law, medicine, engineering.

Between these corner posts of education the framing of our social structure is intimate and complex. Beams stretch from one post to the other, and there are braces and cross-braces; combinations of sciences, sub-professions and vocations. As civilization becomes more complex the network thickens until we can scarcely recognize the boundaries of our callings and even our avocations become mixed with our vocations.

¹ Address delivered at the New York State Conference of Sanitary Officers at Saratoga, N. Y., Sept. 15, 1914.

Every once in a while some particular need of the race comes prominently to the front, and as the need becomes filled and men educate themselves for it we say a new profession has come—meaning a new species, not a genus.

At the present time the great need of the world is *peace*. The new science of engineering has built one of its structures too high and it has toppled over. Over-developed armaments have thrown the nations into a sea of blood, from which only the other three professions can rescue them, those which stand for love, order and health. But it is not civil engineering which has wrecked Europe, it is military engineering—the application of the great forces of nature not for the use and convenience of man but for the destruction of man. This is not what is meant when we speak of the new fourth great profession.

Although engineering has failed to blot out war, it has done much to blot out the other great scourges of the race—famine and pestilence. The development of transportation on land and sea has brought the wheat fields of the smiling prairie to the parched desert, and has widened the market gardens of the city. Agricultural engineering has multiplied the fruits of the soil. The development of cold storage has widened our markets in time as well as distance. Future famines from natural causes will occur only when engineering fails to do its work.

In combating pestilence the profession of engineering has combined with that of medicine. When disease comes from without it requires the aid of a profession which deals with things external, and as disease always acts within it requires the aid of a profession which deals with things internal. It is idle to discuss whether the doctor or the engineer plays the greater part in preventing disease. Where so much has been accomplished by both, where the work to be done is so great, there are tasks enough and rewards enough for both professions. In fact we must include the professions of ministry and law because social service and legal force are potent weapons in the campaign for health. Let us recognize as our first principle that the leaders in this cam-

paign, the health officers of the country, must base their work upon all four of the great professions, upon medicine, engineering, law and social service. It is for this ideal that the new School for Health Officers of Harvard University and the Massachusetts Institute of Technology stands and it is about this ideal that I wish to speak to you to-day.

The movement for fostering health and preventing premature death from accident and disease is world wide in its range, and has attained a magnificent popular momentum, thanks to thousands of earnest men and women who have approached the subject from many different angles. It is a mighty stream, and like a mighty stream has power for good and power for harm. It needs to be controlled. The movement needs to be organized through regularly constituted governmental agencies. The mechanism for this already exists in crude and diversified forms. We have departments of health in most states and cities, local boards of health in small communities, occasional county or district organizations, voluntary associations, philanthropic agencies, and last but not least our ambitious and constantly improving national Public Health Service. Without in any way belittling what is being done, on the contrary with a just pride in what has been accomplished, we must all admit that, take it the country through, the public health service is ineffectively organized and insufficiently supported. The need of the hour is for official leadership and for the public recognition of this need for official leadership.

We are all familiar with the term "captains of industry." We know that the men so called are leaders in the industrial world. But we also know that industrial organization would go to smash were it not for the sergeants of industry and for the corporals of industry, for those who come into actual contact with the rank and file of business men. Similarly we have our "captains of health." Their great names are known to us all. We recognize their ability. When they speak the world listens and takes heed. But as an organization

we lack the sergeants of health and the corporals of health, we lack the local leaders.

Our present local health officers have risen from the ranks, generally from the medical profession. All honor to those who have served so faithfully and so well. Those who have succeeded and have become not only sergeants, but captains of health, have done so only by long service, individual study and personal sacrifice. Individuals here and there have succeeded, yet the method is wrong.

Our present service is unequal in efficiency. The large city, with a large problem, can afford to pay a large salary to a large man. The small town with a small problem has likewise been obliged to pay a small salary to a small man, or, to put it less harshly, to pay a small salary to some man who, because of the small salary, can not give all of his time or thought to the public health service. We also have local boards of health where no one is paid, and where the service is consequently irresponsible. A great fault is that the ultimate unit has been too small. The problem of caring for a people's health is so complicated that the man who attempts it should not try to do anything else. He can not do so in justice to himself and to his work.

In order that he may give his whole time to his job he must be paid a living wage. And in order that he may be paid a living wage he must serve a district large enough to afford such payment. Hence the ultimate unit must be made larger than it has been in the past. Improvements in transportation and the communication of thought make this possible to-day to a much greater extent than formerly. The town, or the borough, or the village, or the small city will not ordinarily prove adequate, and one of the signs of the times is the establishment of public health districts presided over by a district health officer. The state of New York has adopted this system and Massachusetts is following her example.

We also have in Massachusetts examples of voluntary combinations of neighboring towns to secure the services of a health officer who

gives his full time to the towns included in the arrangement. The towns have the advantage of the services of a specialist and the man receives joint compensation commensurate with his services.

The first step in perfecting our public health organization, therefore is to provide for full time health officers, serving districts large enough to afford an adequate salary for a well-trained man.

The second step is that of securing stability of service, by establishing long terms for health officers. To train one's self for this work costs time and money. It requires capital in the shape of education and experience. No man can afford to enter upon this career unless his livelihood is assured. Furthermore, a health officer's success does not depend wholly upon his knowledge of sanitary principles; it depends equally upon his knowledge of the community. He must know his territory geographically and physically, and he must know his people and their habits of life. This knowledge can be acquired only by familiarity.

The third step is coordination. Lines of authority should be established from the health officials of the smallest communities through the districts to the state departments of health, which in some states are already well organized. Cooperation between the states under the general direction of the federal government will also be necessary.

But let us come now to the man himself. What shall the health officer be, a doctor, an engineer, a lawyer, a minister? Yes, any one of these, provided he knows enough about the other three professions and has the proper personality. Instances may be cited where lawyers and where ministers have become public health officers, and in recent years many engineers have proved conspicuously successful in this field. It must be admitted, however, that in the majority of cases men have entered this service through the profession of medicine. This was natural and proper as long as disease was regarded as something wholly personal, and it probably will remain true that for many years to come the best

portal of entry to the public health service will be that of the profession of medicine. By this is meant that the man already learned in medicine will have less to learn of the other sciences than he who is already trained in some other profession will have to learn of matters that are biological and medical. Again, the world has for so long regarded the medical practitioner as the custodian of the public health that the title of doctor carries with it a certain prestige which is of advantage from an administrative point of view.

We have seen, however, that the profession of public health has greatly broadened. Young men starting afresh for this career can not afford in most cases to become a doctor of medicine first and a doctor of public health afterwards, or an engineer first and a doctor of medicine afterwards. Also the training for the degree of M.D. contains many matters which relate to healing and have practically nothing to do with the prevention of disease. The time devoted to them can be spent to better advantage in the study of other subjects more directly connected with public health administration, such as sanitary engineering and demography.

It is a fatal mistake, therefore, to make the medical degree a prerequisite to public health positions, as it tends to disbar from the service young men who are giving themselves the broadest and best possible education for the positions that need to be filled. Some of our best and most recent laws still contain provisions for this outgrown and unfortunate limitation. The requirement of an M.D. was doubtless made in order to safeguard the service from the political appointment of unfit men, but it now needs modification in order to provide for the new conditions and to admit to the service those who are specializing in preventive medicine and the control of the public health. It is true that the harm will come in the future rather than at present, but it is the future of the service to which we should look. Laws which prescribe an M.D. degree should be amended by the addition of some such modifying clause as this—"A doctor of medicine or a person trained in public

health holding a degree or certificate in public health from a school of recognized standing." This would open the field of service to those best qualified to serve and would at the same time prevent the unscrupulous political appointment of unqualified persons.

There is an increasing number of young men who without an M.D. degree are fitting themselves for public health service. What is more they include some of the best of the college graduates, men who have come to realize that they can best serve humanity by helping to maintain humanity's health, men who are going to devote their lives to the cause. The states and cities which remove the present disbarment will get the services of these enthusiastic progressive specialists and will benefit accordingly.

Before the field of service in the public health is fully opened to men without the medical degree it is right and proper that the training which students are getting in the acquirement of a degree or certificate in public health be carefully examined to see if it is adequate. Unless the training is adequate the change in the laws should not be made. I bring before you to-day the program of studies at the School for Health Officers of Harvard University and the Massachusetts Institute of Technology—the first school of its kind in the country, trusting that it will be studied and that we may have the benefit of advice founded on experience.

The School for Health Officers is conducted by Harvard University and the Massachusetts Institute of Technology, acting in co-operation, through an administrative board appointed for this purpose, by both institutions. At the present time the board consists of Professor William T. Sedgwick, chairman, Professor Milton J. Rosenau and Professor George C. Whipple. It is significant of the spirit of the school that these men are respectively a doctor of science, a doctor of medicine and a civil engineer. Dr. Rosenau is director of the school, with headquarters at Harvard Medical School.

The principal object of the school is to prepare young men for public health work of

all kinds and especially to fit them to occupy administrative and executive positions, as health officers, or members of boards of health, or secretaries, agents or inspectors of health organizations. To this end, lectures, laboratory work and other forms of instruction are offered by both institutions, and by special instructors from national, state and local health agencies. The subjects embraced in the course of study have been selected to cover a wide range, including medical, biological, hygienic and engineering sciences, together with practical health administration.

A certificate in public health (C.P.H.) is granted to candidates who have satisfactorily completed the studies in an approved schedule, who have spent not less than one academic year in residence, and who have otherwise complied with all requirements. This certificate is issued by Harvard University and the Massachusetts Institute of Technology and signed by the presidents of both institutions. The first class graduated in June, 1914, when five men received their certificates. It happened that all of these had previously received a medical degree. The membership in the school is now eleven.

The question may naturally occur to some one, why call this a certificate in public health, and not a doctor of public health, or a diploma in public health. The reason is that the degree of Dr.P.H. is already administered by Harvard University in its medical school, and stands for a larger body of work, and a longer course than most men can afford to take or than it is necessary to take in preparation for many of the positions in the public health service. The reason that the "Diploma in Public Health," *i. e.*, D.P.H. was not chosen was because these letters sometimes stand for doctor of public health and our school desired to avoid giving what might appear to be a doctor's degree, but technically was not.

The following are the requirements for admission: Graduates in Medicine of Harvard University and other recognized medical schools are admitted upon their records and registered as candidates for the certificate in public health. Bachelors of science in biology

and public health of the Massachusetts Institute of Technology and other recognized institutions are likewise admitted and registered as candidates for the certificate.

Masters of civil engineering of Harvard University who have specialized in sanitary engineering and bachelors of science in sanitary engineering of the Massachusetts Institute of Technology and other recognized institutions, who lack the necessary preparation in medical and other sciences, are admitted upon their records, but are required to spend at least one year in preparation before being accepted as candidates for the certificate in public health.

Other graduates of colleges or technical or scientific schools are admitted to the school without examination, provided their collegiate courses have included adequate instruction in physics, chemistry, biology, French and German; but, as a rule, they are required to spend two or more years in preparation before being accepted as candidates for the certificate in public health. Applications for admission to the school will be considered from those who have spent at least two years in a recognized college or technical or scientific school and have pursued satisfactory courses in physics, chemistry, biology, French and German, and also from persons of unusual experience or special qualifications; but, as a rule, such persons are required to spend two or more years in preparation before being admitted as candidates for the certificate.

Special students, not candidates for the certificate in public health, who desire to fit themselves for some special field are admitted to the school, and may take any course or courses for which they are properly qualified, on approval of the administrative board.

Women are admitted to the School for Health Officers on the same terms as men, and are equally eligible for the certificate in public health. Women are admitted to many of the courses given in the Harvard Graduate School of Medicine, but not to undergraduate courses in the Harvard Medical School. If women require the latter courses they must be

obtained elsewhere, preferably before entering the School for Health Officers.

As the school is now in its infancy no uniform curriculum is required of candidates for the certificate in public health. Each student is required to choose a schedule of courses to meet his individual needs. In general, the choice of studies must be such that the candidate on the completion of his course will have covered in a broad way the subjects included in the varied duties of a public health officer, together with such allied subjects as anatomy, physiology, pathology, biological chemistry, sanitary biology, preventive medicine and hygiene, demography and sanitary engineering.

After a few years' experience it is probable that some standard curriculum will be prescribed, but the time for this has not yet arrived, as the qualifications of the average student on entrance remain to be learned. It is probable also that different standard schedules will be made for students who wish to prepare for different fields of work.

Every candidate for the certificate in public health is required to complete satisfactorily each course taken by him and, on the completion of his approved schedule, to submit to a general oral examination by the administrative board. This examination covers not only his work in the school, but his previous studies and experiences. Last year the oral examination of each student lasted at least two hours.

The courses available in the school are not restricted to those stated in the catalogue of the school, but may include subjects in any department of Harvard University or the Massachusetts Institute of Technology, provided the work is in harmony with the objects of the school and meets with the approval of the instructor in charge of the course and of the administrative board. Certain special courses are given by instructors not otherwise connected with either institution, and practical work may be taken in city, state and national health departments and in the hospitals of Boston. As time goes on it is the intention to increase the opportunities for this practical work, or apprenticeship, which obviously is an

important element in a health officers' training.

The courses offered are divided into two lists. The first is a list of so-called regular courses, which demand considerable time and ordinarily cover a half year or more. It is from this list that the student is required to make his principal selection and do his most serious work. The second is a list of special courses and lectures.

The courses are also divided into eight groups according to subject. These groups are as follows:

1. Preventive Medicine.
2. Personal Hygiene.
3. Public Health Administration.
4. Sanitary Biology and Sanitary Chemistry.
5. Special Pathology.
6. Communicable Diseases.
7. Sanitary Engineering.
8. Demography (Vital Statistics).

The following is a list of the courses offered in 1914:

REGULAR COURSES

Group I. Preventive Medicine

Principles of Sanitary Science and Public Health. Professors W. T. Sedgwick and S. M. Gunn.
Preventive Medicine and Hygiene. Professor M. J. Rosenau, Dr. L. W. Hackett, Dr. E. S. Birge and Dr. F. B. Grinnell.
Public Health Problems. Professor S. M. Gunn.
Epidemiology. Professor W. T. Sedgwick.
Relation of Animal Diseases to the Public Health. Professor Theobald Smith and Dr. Carlon Ten-Broeck.
Tropical Medicine. Professor R. P. Strong.

Group II. Personal Hygiene

Personal Hygiene. Professor W. B. Cannon.
Personal Hygiene. Professor P. G. Stiles.
Industrial Hygiene and Sanitation. Professor S. M. Gunn.

Group III. Public Health Administration

Practical Health Administration. Dr. M. W. Richardson, Dr. W. C. Hanson and Mr. H. C. Lythgoe.
Sanitary Law. Professors W. T. Sedgwick, S. C. Prescott, R. S. Weston and S. M. Gunn.
Municipal Sanitation. Professor S. M. Gunn, Mr. R. N. Hoyt.

Sanitation of Houses and Public Buildings. Professor S. M. Gunn.

Public Health Administration. Professor S. M. Gunn and Mr. R. N. Hoyt.

Hygiene of Ventilation and Heating. Professor W. T. Sedgwick.

Group IV. Sanitary Biology and Sanitary Chemistry

Protozoology. Professors Theobald Smith and E. E. Tyzzer.

Entomology. Professor W. M. Wheeler and Asst. Professor C. T. Brues.

Advanced Bacteriology. Dr. E. C. Howe.

Bacteriology of Tropical Diseases. Professors H. C. Ernst and S. B. Wolbach and Dr. Austin.

Dairy Bacteriology. Professor S. C. Prescott.

Bacteriology of Water and Sewage. Professor S. C. Prescott.

Zoology and Parasitology. Professor R. P. Bigelow.

Helminthology. Dr. Philip E. Garrison.

Sanitary Biology. Dr. J. W. M. Bunker.

Analysis of Water, Sewage and Air. Dr. J. W. M. Bunker.

Water and Air Analysis. Dr. J. F. Norton.

Water Supplies and Waste Disposal. Dr. J. F. Norton.

Food Analysis. Professor A. G. Woodman.

Advanced Food Analysis. Professor A. G. Woodman.

Group V. Special Pathology

Comparative Pathology of Tropical Diseases. Professor Theobald Smith.

Pathology of Tropical Diseases. Professor F. B. Mallory.

Clinical Laboratory Work. Professors H. C. Ernst and S. B. Wolbach and Dr. Austin.

Group VI. Communicable Diseases

Communicable Diseases. Dr. E. H. Place.

Communicable Diseases (Internship at South Department, Boston City Hospital). Dr. E. H. Place.

Biology of Infectious Diseases. Professor S. M. Gunn.

Board of Health Diagnosis. Dr. F. H. Slack.

Public Health Laboratory Methods. Professor S. M. Gunn and Associates.

The Diagnosis of Rabies and Glanders by Laboratory Methods. Dr. Langdon Frothingham and Dr. E. F. Walsh.

Group VII. Sanitary Engineering

Sanitary Engineering. Professor G. C. Whipple and Assistants.

Sanitary Engineering—Summer Course. Professor G. C. Whipple and Assistants.

Water Supply Engineering. Professor G. C. Whipple.

Sewerage Engineering. Professor G. C. Whipple.

Limnology. Professor G. C. Whipple, Dr. J. W. M. Bunker and Assistants.

Sanitary Research Laboratory. Mr. M. C. Whipple.

Rural Sanitation. Dr. J. W. M. Bunker.

Hydraulic and Sanitary Engineering. Professor Dwight Porter.

Advanced Hydraulic and Sanitary Engineering. Professor Dwight Porter.

Engineering of Water and Sewage Purification. Professor Dwight Porter.

Theory and Practise of Water and Sewage Purification. Professor R. S. Weston.

Group VIII. Demography

Demography. Professor G. C. Whipple and Assistants.

Sanitary Biometrics. Professor S. M. Gunn.

Vital and Sanitary Statistics. Professor D. R. Dewey.

SPECIAL COURSES AND LECTURES

Group I. Preventive Medicine

Infant Mortality. Professor J. L. Morse.

Genetics and Eugenics. Professor W. E. Castle.

Social Service Work. Professor R. C. Cabot and Miss Ida Cannon.

Tropical Dermatology. Professor R. P. Strong and Dr. H. P. Towle.

Group II. Personal Hygiene

School Hygiene. Dr. T. F. Harrington.

Mental Hygiene. Professor E. E. Southard and Associates.

Venereal Prophylaxis. Professor E. H. Nichols.

Tropical Sunlight. Professor Theodore Lyman.

Posture and Deformities. Professor R. W. Lovett.

Ocular Hygiene. Dr. F. H. Verhoeff.

Oral Prophylaxis. Professor W. H. Potter.

Prevention of Diseases of the Ear. Dr. H. P. Mosher.

Group III. Public Health Administration

Sanitary Law—Legal Powers of Health Officers. Professor Eugene Wambaugh.

Medical Inspection of Immigrants. Dr. M. V. Safford.

Municipal Sanitation. Dr. C. V. Chapin.

Group IV. Sanitary Biology and Sanitary Chemistry

Venomous Animals. Dr. Thomas Barbour.

Poisonous Plants of the Tropics. Professor W. J. V. Osterhout.

Climatology. Professor R. DeC. Ward.

Group VI. Communicable Diseases

Tuberculosis. Dr. J. B. Hawes, 2d.

Group IX. Medical and Other Sciences

The following courses are also open to students registered in the School for Health Officers:

At Harvard Medical School:

Anatomy, gross and microscopical.

Embryology.

Physiology.

Biological Chemistry.

Pathology.

Bacteriology.

At the Massachusetts Institute of Technology:

General Bacteriology. Professor S. G. Prescott.

General Physiology. Professor P. G. Stiles.

Physiological Laboratory. Dr. E. C. Howe.

Vertebrate Anatomy. Professor R. P. Bigelow.

At Harvard University:

Elementary Bacteriology. Dr. J. W. M. Bunker.

This intellectual bill of fare is not as complicated as it looks, but the long list of courses shows the opportunities offered by the educational institutions in Boston for students of public health. In fact, the resources of one of the oldest and best medical schools and the first great engineering school of the country are available, and to these should be added the opportunities presented for cooperation with the Massachusetts State Board of Health, the Board of Health of the City of Boston, the various hospitals in the city, and the excellent medical and engineering libraries.

It is not the food which is put upon the table, but that which is eaten and digested, which nourishes. It is not what the student has opportunity to learn, but what he does

learn that counts. And perhaps the best thing to be said about the new School for Health Officers is that it is a combination of schools which have been noted for efficient instruction and for the hard work done by the students. The Harvard motto "Veritas" is combined with the Institute motto "Mens et manus"—mind and hand working together for the truth, or truth expressing itself through mind and hand. We believe that the spirit which has created these two institutions will not fail to build up a school of public health which will faithfully serve its day and generation.

But lest I be accused of screwing the nut too tightly upon Boston as the hub of the universe let me say that we who shelter ourselves beneath the fins of the codfish do not claim to have a monopoly of the sea. What has most impressed us in making our plans has been not the magnificence of our Boston institutions, but the magnitude of the problem which the country has to solve—the problem of ministering to the health of a hundred million people gathered from all the quarters of the globe.

In conclusion, let me restate the ideal for which the School for Health Officers of Harvard University and the Massachusetts Institute of Technology stands—for a body of educated sanitarians working in many fields and well-trained for their particular work—but especially for the health officer whose education is based on all four of the great professions—medicine, engineering, law and social service. And it calls to the states and cities and towns of the country and says, "This is the kind of a man you need to protect your public health, a man broadly trained and well-paid who can afford to give all his time and all of the best that is in him to the work." It calls to the legislators and says, "Amend your laws so that you can get this kind of men." It calls to the young men of the country and says, "The field is ripe for the harvest." And it calls to the other universities and says, "Join us in this great movement to secure men for the public health service." Let us all

work together for the health of the country and the health of the world.

GEORGE C. WHIPPLE

HARVARD UNIVERSITY

SCIENTIFIC NOTES AND NEWS

AMONG the thirty-seven honorary degrees conferred on the occasion of the one hundred and fiftieth anniversary of the founding of Brown University were two doctorates of science, given to Dr. Simon Flexner, director of the laboratories of the Rockefeller Institute for Medical Research, and Dr. L. A. Bauer, director of the department of terrestrial magnetism of the Carnegie Institution.

AT the celebration of the twenty-fifth anniversary of the Johns Hopkins Hospital a portrait of Sir William Osler, by Mr. Sargeant, was presented.

MR. DOUGLAS W. FRESHFIELD, known for his publications on mountains and other subjects, has been elected president of the Royal Geographical Society.

PROFESSORS Roentgen, Lenard and Behring have each recently been reported to have repudiated the gold medals conferred on them by scientific associations in Great Britain, and have donated them to the Red Cross or other relief work, and now it is said that the Hanbury medal has likewise been donated for relief work by its recipient, Dr. E. Schmidt, professor of pharmacology at Marburg.

DR. GEORGE H. WHIPPLE, a graduate in 1900 of Yale and M.D. in 1905 of Johns Hopkins, and since 1906 a member of the faculty of the department of pathology of Johns Hopkins Medical School, has taken up his new duties as director of the George Williams Hooper Foundation for Medical Research, to endow which Mrs. Sophronia T. Hooper of San Francisco recently gave to the University of California property valued at much more than a million dollars. Three other appointments have been made to the foundation. Dr. Karl Friedrich Meyer and Dr. Ernest Linwood are to become associate professors of tropical medicine, and Dr. Charles W. Hooper is to be fellow in research medicine. The head-