Transactions of the Conference on the future of public health in the United States and the education of sanitarians : held at Washington, D.C. March 14 and 15, 1922 under the auspices of the United States Public Health Service.

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

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PROGRAM OF THE CONFERENCE.

Morning Session, March 14, 1922.

Afternoon Session, March 14, 1922.

CONFERENCE ON THE FUTURE OF PUBLIC HEALTH IN THE UNITED STATES AND THE EDUCATION OF SANITARIANS.[1]

THE CONFERENCE.

MORNING SESSION, MARCH 14, 1922.

INTRODUCTORY ADDRESS.

HUGH S. CUMMING, *Surgeon General, United States Public Health Service.*

It was not without a good deal of hesitation and thought and some preliminary correspondence that I ventured to ask such gentlemen as you to leave your work, your fields of endeavor, and meet here in Washington with us. I am very acutely conscious of the fact that there has been quite an epidemic of "conferencitis," as somebody expressed it, in the past year or two, and that much of the time of all of you has been taken up in conferences. But I think the importance of the subject which you have been asked to discuss certainly warrants our getting together for at least two days.

This is, so far as I am aware, the first time at which exactly this sort of a gathering has been called—the presidents of universities and deans of medical schools to meet around a conference table with men who are engaged in practical field work in public health. The situation in the United States at the present time with reference to the supply of public-health officers—local, State, and National—is an acute one. As a result of the war and the knowledge which was brought out at the time, there has been a great awakening of interest in public health throughout the country. This necessitates the training of public-health workers to direct the energies and the potential forces which are available. Without proper directing force, there is grave danger of wasted energy. This has already been seen in certain fields. It is to avoid this danger and to supply the man for the job that we venture to ask you to come together.

I am perfectly aware of the fact that there are splendid schools of public health existing now and they are encouraging. But more particularly the field of the local health officer needs to be filled. There are three factors in this situation. One is the difficulty of the

[1] A conference on the future of public health in the United States and the education of sanitarians was held in Washington March 14 and 15, 1922. Nearly 150 educators and leaders in public-health work from all sections of the country attended. All sessions with the exception of the banquet were held in the American Red Cross Building. A summary report of the conference has already been published (Public Health Bulletin No. 124, May, 1922.)

local man in getting the amount of education necessary for his work. Another, and I think this exceedingly important, is the uncertain tenure of office. There has been, if anything, a backward step in the last ten or eighteen months in this regard; a tendency to throw public health into politics in a way to pay, but in a different sense than we think it pays. The third difficulty is the inadequate remuneration which is received by the public-health officer. We will discuss all of these things, and, I hope, solve one or two.

In looking around for a man to guide us in our deliberations, my mind at once went to one whom we all know, one who needs no introduction. I have found that he is a wise guide, whether it be looking over a menu for a dinner or solving very great international questions in reference to public health. I take a great deal of pleasure in introducing Doctor Welch, director of the Johns Hopkins University School of Hygiene and Public Health.

REMARKS BY THE PRESIDING OFFICER.

DR. WILLIAM H. WELCH, *Director School of Hygiene and Public Health, Johns Hopkins University.*

I need not say that I appreciate very highly the honor of being asked to occupy the chair at this first session of the conference. I am sure that I shall serve your interests best by not indulging in any preliminary remarks but by getting the work under way as speedily as possible. I would like, however, to express in behalf of the staff of the Johns Hopkins University and myself our appreciation, our very grateful appreciation, to the Surgeon General and the officers of the Public Health Service for having made me chairman for this conference, and for the general spirit which obviously has determined the character of the conference.

I am speaking for those engaged in trying to develop better opportunities for the training of public-health officers and others entering the field of sanitation and public health. We welcome very much such a discussion as will take place here. The problems are relatively new and we are in a rather experimental stage. It is of first importance that attention be very closely given to those who are actually at work in the field, and it is important that there should be just such an exchange of views as can be anticipated for this conference. I already feel confident of the success of the conference and do not hesitate, even at its initiation, to express the gratitude which we have for the opportunity which is before us.

It is obvious, if we are going to get through this program this morning, that the speakers must be as brief as possible. I asked one of them whether he had been informed as to time limit; he said he had not, but was willing to conform to whatever suggestions were made. I have no suggestion other than that we have to split up

just as much as possible if all the speakers on the program are to have an opportunity to present what they have presumably prepared for our consideration.

I. THE PRESENT STATUS OF THE EDUCATION OF SANITARIANS.

REVIEW OF EVENTS LEADING TO THE PRESENT SITUATION.

Dr. ALLEN W. FREEMAN, School of Hygiene and Public Health, Johns Hopkins University.

Prior to the middle of the last century medical science, if we may so call it, had made possible the prevention of only one disease—smallpox. In connection with no other disease was the etiology, diagnosis, and means of spread sufficiently well understood to make possible any thoughtful effort at prevention.

About 1850, however, the effect of the unspeakable filth, overcrowding, and misery of certain parts of London in producing disease and death far in excess of that prevailing in more favored parts of the city began to be recognized. Even though the exact mechanism by which these causes operated was not understood, the results were so evident that measures of correction began to be applied.

About the same time those two pioneers in epidemiology, William Budd and John Snow, began independently their remarkable studies into the spread of typhoid fever and Asiatic cholera which made possible for the first time intelligent efforts at the control of these diseases.

The 30 years from 1870 to about 1900, the most fruitful in the history of medical science, stripped from communicable disease the mystery which had so long enshrouded it and laid the foundation of scientific fact on which the structure of preventive medicine is based. Knowledge of microorganisms as causing disease, of the vehicles of transmission, of carrier and missed cases, of insect transmission, and of the phenomena of natural and artificial immunity were the weapons which this period forged and made ready for the coming conflict.

The new century, therefore, found us in possession of a new and effective armentarium. It remained only to demonstrate practically the possibilities of the new science and to establish the machinery necessary to make its practical application possible. The demonstration came quickly. Gorgas at Habana and later in Panama, and the Japanese in Manchuria, supplied those thrilling demonstrations of the power of modern science over disease which were necessary to fire the imagination of the people and supply the stimulus to action.

Of machinery to apply the new science there were available only the time-honored organizations known as boards of health, which had been devised in the last half of the last century, to apply the then existing knowledge of disease prevention.

Originally boards of health were called into existence during periods of epidemics of smallpox, cholera, yellow fever, or plague. Their sole function was to act as medical consultants to the public authority in such emergencies. With the passing of the emergency the board likewise passed. When vaccination had reduced the prevalence and virulence of smallpox to the point where isolation and quarantine were of value in preventing epidemics, the work of caring for smallpox was taken over by the boards of health, and permanent organizations began to be established. The measures against filth and overcrowding, in so far as they were applicable to American conditions, were likewise made the duty of the board of health. In Massachusetts, in the city of New York, and in a few other States and cities the value of the new science had already been recognized, and important work had already been done by the health organizations in connection with water supply, communicable diseases, tuberculosis, and other problems.

The beginning of the century, therefore, found in most of our States and cities, and in many of our counties and towns, boards of health. These were usually composed of practicing physicians, of whom one acted as secretary. Their work in controlling smallpox and nuisance was largely intrusted to lay inspectors called sanitary police. The measures carried out by such a board of health were extremely simple, and the work called for little or no special knowledge or experience. Under these conditions an appointment as member of a board, as secretary or inspector, was usually disposed of as minor political patronage. This was the machinery available to put into effect our new science of preventive medicine. It had in its favor the fact that it was under the control of physicians and that the word "health" occurred in the title.

With the beginning of the new century began the attack on consumption, causing at that time one-seventh of all deaths and one-third of those between the ages of 20 to 30. Controlling consumption was no task for a sanitary policeman or a part-time practicing physician. For success it required accurate, detailed, scientific method. It required coordinated clinical, preventive, and social measures. It required clinics, hospitals, nurses, social workers, physicians, and educators. The hopelessness of expecting the then existing boards of health to conduct such work was so manifest that voluntary agencies were created to carry it on, and even where it was financed by public funds agencies separate and distinct from the board of health were set up to do tuberculosis work alone.

The 20 years just gone have seen one after another of the major problems of public health taken up and made the objects of sustained and successful attack. Typhoid fever, infant mortality, diphtheria, scarlet fever, hookworm disease, malaria, and finally venereal disease

have been successfully added to the program of prevention. Each of these problems has required the development of new methods of attack, differing radically from the simple procedures of quarantine, disinfection, and inspection of the former era. For the successful control of malaria, for example, thorough knowledge is required not only of the disease and of its etiologic agent as it exists in the human host but of its intermediary host, the mosquito, and of all the complicated factors which govern the prevalence and distribution of those species which spread the disease. The "malaria engineer," as he is now designated, is at once a protozoologist and entomologist, icthyologist, botanist, and hydraulic engineer. For the control of diphtheria, once involving only quarantine of the premises where the case is found and subsequent disinfection, there is now required the combined services of the epidemiologist and the public-health nurse working in the field and the bacteriologist and the serologist in the laboratory.

To meet the new needs and to supply the new services our official health agencies have undergone complete metamorphosis. Quarantine, fumigation, and sanitary inspection, once their only function, have become minor activities. The laboratory, the clinic, the epidemiologist, the nurse, and the social worker carry on the real work of a health department to-day.

The health officer is no longer a practicing physician, dropping in for half an hour in the morning to look over the mail and see that the clerk is running things properly. He is a whole-time executive, spending tens or hundreds of thousands of dollars a year and having under his control scores, hundreds, or thousands of employees. His task is exceedingly difficult. The science he has to apply is very extensive, highly specialized, and constantly expanding. The Government of which he is a part and through which he must work is cumbersome, beset by partisan politics and hampered by red tape. The people he serves are in large part ignorant of the purpose and method of health work, are suspicious, sensitive, and inclined to resent interference with established habits and customs.

In spite of all these handicaps, our State, city, and county health departments have responded nobly to the heavy demands made upon them and have adapted themselves surprisingly well to the changed conditions of their operation. There has developed a class of professional sanitarians who, drawn into health work without training, have evolved the technique and brought the subject to its present state of development.

The actual growth in our health organization may perhaps best be seen through a study of existing personnel and expenditures.

Estimate of technical and semitechnical personnel engaged in health work on whole-time basis, 1920–1921.

Principal executives:		
State health officers	42	
City health officers	267	
County health officers	161	
		470
Subordinate executives:		
Employed by States	250	
Employed by cities	250	
		500
Total whole-time executives employed by States, cities, and counties		970
Officers of United States Public Health Service engaged in public-health work (about)		200
Total physicians at present employed in whole-time health work by public agencies		1,170
Public health nurses employed by public agencies (estimated)		5,000
Plumbing, sanitary, dairy, and food inspectors		3,000
Laboratory workers, State	200	
Laboratory workers, city	1,000	
		1,200
Total		10,370

To this number must be added the very large number of physicians, nurses, and other health workers employed by voluntary agencies of one sort or another, and by industrial concerns. This would include at least 500 physicians and 5,000 nurses. An additional number, of which no estimate is available, are employed by schools, colleges, and universities.

Taking the sum of medical, engineering, statistical, laboratory, nursing, and inspectional personnel, therefore, there are approximately 16,000 persons occupying whole-time technical or semitechnical positions in health service in the United States.

The annual expenditures by the States, cities, and counties, based on 1920 figures, may be estimated as follows:

States	$10,000,000
Cities	20,000,000
Counties, towns, and villages	5,000,000
Total	35,000,000

Of this amount, about 75 per cent is expended for personal services.

TRAINING FOR HEALTH WORK.

To spend thirty-five millions of dollars a year wisely and effectively and to direct the labor of 16,000 people in the practical application to human affairs of a science so new and in some of its phases so frankly experimental as is preventive medicine at this time makes heavy demands upon the scientific and administrative ability of those responsible for the conduct of the undertaking.

Of those at present in charge of our health departments but few have had any training in preventive medicine prior to entering the work other than that possessed by the ordinary physician.

Definite information is available regarding two groups of executives. In 72 of the cities of the United States having a population of 100,000 and over, a survey was recently conducted by a committee of the American Public Health Association, and accurate information is at hand regarding the qualifications of these executives. In addition, some information is available regarding the principal and subordinate executives of the State health organizations of the country.

For the executives of the 72 cities referred to we have the following information:

Education and training of executives of 72 municipal health departments in American cities of 100,000 population and over.

	Number.	Per cent.
A. Health officers having neither college nor professional training	5	7.0
B. Health officers having medical training only	27	37.5
C. Health officers having college and medical training	28	38.9
D. Health officers having college, medical, and public-health training [2]	9	12.5
E. Health officers having college, engineering, and public-health training [3]	3	4.1
	72	100.0

For the group of State executives we have the following information:

Professional training of 342 principal and subordinate executive officers in State health departments.

	Number.	Per cent.
Physicians with medical training only	199	58.2
Physicians with medical and public-health training [4]	2	.6
Public-health training [5]	3	.9
Engineers	31	9.0
Nurses	16	4.7
Laboratory and miscellaneous	91	26.6
Total	342	100.0

For the whole group, municipal and State, we have 265 physicians in executive positions, of whom 11, or 4.2 per cent, have had some special training in public health and of whom 5, or 1.9 per cent, possess degrees in public health. In addition, there are 6 executives who have general training in public health but who are not physicians. A large majority of the engineers, nurses, and laboratory workers who are employed by departments of health have had special training in those technical branches of the subject.

[2] Three possess degree of Dr. P. H.
[3] One degree of Dr. P. H.
[4] One Dr. P. H., one M. P. H
[5] One C. P. H., one D. P. H., one B. S.

Taking principal executives only, we have for the 72 cities and the 48 States the following figures:

Professional Training of 72 Municipal and 48 State Executives, Heads of Departments.

	Number.	Per cent.
Physicians without public-health training	101	84.2
Physicians with public-health training	10	8.3
Engineers with public-health training	3	2.5
Laymen without professional training	6	5.0
Total	120	100.0

From the standpoint of general administration, therefore, 92.5 per cent of the health departments studied are administered by physicians of whom 9 per cent have had special training. Two and one-half per cent are administered by engineers with special training and 5 per cent by laymen without any training whatever.

Of the 294 subordinate executives, 153, or 52.1 per cent, are physicians of whom only 1 has apparently had special training in public health.

The first generation of sanitarians were, of course, necessarily self-taught. Many of them are still in active service, and to their intelligence, devotion, and energy is largely due the present development of our health organizations. It is with the second generation, the men who are to be the executives of the next few decades, that we are concerned. It is to the subject of their training that we should devote our deliberations.

THE PRESENT STATUS OF EDUCATION FOR A PUBLIC-HEALTH CAREER.

Dr. MILTON J. ROSENAU, *Professor of Preventive Medicine and Hygiene, Harvard Medical School.*

The present status of education for a public-health career is in a formative and experimental stage. A glance at the situation at once discloses the fact that it is only the morning of the first day. There is only one school separately endowed, namely, the School of Hygiene and Public Health at Johns Hopkins, which is now in the third year of its existence. Through the generosity of the Rockefeller Foundation, another school of public health which is now being organized at Harvard University will open its doors in the autumn. The Harvard School of Public Health is an outgrowth, in fact a direct continuation, of the School of Public Health of Harvard University and the Massachusetts Institute of Technology, which was organized in 1913.

The youthfulness of the present movement in education for public-health service is betrayed by a brief historical review of a few leading facts. The University of Pennsylvania announced courses leading to a degree or certificate in public health in 1906, but the first of these

awards was not made until 1912. Prior to this time (June 22, 1910), the Harvard Medical School offered the degree of doctor of public health and the first student was graduated with this degree in June, 1911. The School of Public Health of Harvard University and the Massachusetts Institute of Technology was opened in September, 1913, and the first class was graduated in June, 1914. Long before any medical school offered courses or degrees in public health, the Massachusetts Institute of Technology trained men and women for careers in sanitation in its department of Biology and Public Health, under the pioneer efforts of Prof. William T. Sedgwick.

This little historical statement with dates is given in order to emphasize how recent education for public-health service is. Young as the movement is, however, this country seems to have taken the lead in establishing separate schools and in organizing courses designed specifically for the training of health officers. Before this the only school was the school of experience.

THE STATUS IN 1920.

The status of public-health education in this country for the year 1920 was studied by a committee of the American Public Health Association which dealt with the standardization of public health training. The report was published in the American Journal of Public Health, April, 1921, page 371.[6] We learn from the studies of this committee that in the year 1920 (academic year 1919–20), public health degrees of one sort or another were conferred at California, Yale, Hopkins, Harvard, the Massachusetts Institute of Technology, New York University-Bellevue, and the University of Pennsylvania. Courses dealing with public-health education were discontinued in 1920 by the University of Colorado and by Tulane University.

Although courses were offered by the Detroit College of Medicine and Surgery, the University of Michigan Medical School, and the University of Wisconsin, no students were registered or graduated during the year in question. Special courses for health officers leading to certificates and degrees in public health were in successful operation at Syracuse, cooperating with Cornell, and at Louisville, where the State department of health cooperates with the University of Louisville.

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[6] An earlier survey of the status of public-health education was collected by Dr. E. C. Howe, in the American Journal of Public Health, August, 1918, and partial data had been presented for several years by the Council on Medical Education of the American Medical Association; see the Journal of the A. M. A., Aug. 7 ,1920 ,and Aug. 13, 1921.

The following table is modified from that published in the report of the committee of the American Public Health Association, the changes being due to more recent information:

TABLE I.—*Number enrolled and degrees conferred in courses leading to a public health career in 1920.*

University.	Degree.	Time required.	Number graduated.	Number of instructors.
University of California	Gr. P. H.	1½ to 4 years	10	20
Yale University	Dr. P. H.	2 years	2	Staff.
	C. P. H., Ph. D., and M. S.	1 year	2	
Johns Hopkins	Dr. P. H.	2 years	2	49
	Dr. Sc. (in Hyg.)	3 years	1	49
	B. S. (in Hyg.)	2 years	1	49
	C. P. H.	1 year	0	49
Harvard Medical School	Dr. P. H.	2 years	2	Staff.
Harvard—Technology	C. P. H.	1 year	9	40
Harvard University	Ph. D. (in Hyg.)	3 years	0	Staff.
Massachusetts Institute of Technology.	B. S.	4 years	10	Staff.
	M. S.	5 years	1	
Detroit College of Medicine and Surgery.	M. P. H.	1 year	0	10
University of Louisville and State department of health.	Dr. P. H.	2 years	0	Staff.
	C. P. H.	1 year	2	
University of Michigan Medical School.	M. S. (in P. H.)	1 to 2 years	0	10
	Dr. P. H.	2 to 3 years	0	10
New York University and Bellevue Hospital Medical College.	....do	2 years	0	30
	C. P. H.	25 days residence, or, 300 hours reading plus 6 days residence.	25	30
Syracuse University	Certificate	Special courses for health officers to meet requirements of New York State.	.....	
Albany Medical College	.....do	6 weeks correspondence and 1 week attendance.	.....	
Ohio State University	M. S. (in P. H.)	1 year	.....	
University of Pennsylvania	Dr. P. H.	2 years	1	19
	Certified sanitarian	1 year	4	19
University of Wisconsin	M. P. H.	1 year	.....	
	Dr. P. H.	2 years	.....	

NOTE.—Special students are omitted in this tabulation. Public-health nursing is not included.

From this table it will be seen that 72 public-health degrees were conferred by 9 institutions during the year 1920, as follows:

Certificate in public health	38
Certified sanitarian	4
Graduate in public health	10
Bachelor of science (in hygiene)	11
Master of science (in hygiene)	1
Doctor of science (in hygiene)	1
Doctor of public health	7
	72

Public-health nursing.—Courses and opportunities for training in public-health nursing are omitted from this discussion. The education of the public-health nurse is dealt with as a separate problem. To inject it into this survey would only add confusion to our present purpose. In my judgment, however, this separation serves no useful purpose, for it should be the function of a school of public health to include facilities for adequate training in this profession.

The public-health nurse is an admirable instrument of direct contact with the individual. She sells health and hygiene to the ultimate consumer. There has long been a wide gap between the health officer and the individual he serves. This is bridged by the public-health nurse, who has become one of the important links in the chain of good-health administration.

THE STATUS IN 1921.

The following table is made up from information obtained by sending out a questionnaire to all schools known to be interested in the subject:

TABLE II.—*Number enrolled and degrees conferred in courses leading to a public-health career in 1921.*

University.	Degree.	Number Enrolled.	Number graduated.
University of California	A. B. (majoring in public health, bacteriology, medical entomology, parasitology, nutrition).	28	.....
	B. S. (majoring in sanitary engineering)	2	.....
Yale University	Dr. P. H.	1	0
	C. P. H.	3	1
	M. S. (in Bact. and P. H.)	6	2
	Ph. D. (in Bact. and P. H.)	6	3
Johns Hopkins	Dr. P. H.	22	14
	Dr. S. (in Hyg.)	21	1
	B. S. (in Hyg.)	9	4
	C. P. H.	4	6
Harvard Medical School	Dr. P. H.	2	2
Harvard—Technology	C. P. H.	24	16
	C. P. H. (in Ind. Hyg.)	3	0
Massachusetts Institute of Technology.	Biol. and P. H.	35	[1] 7
	San. Eng.	15	[2] 1
University of Louisville and State department health.	Dr. P. H.	0	0
	C. P. H.	2	2
University of Michigan	M. S. (in P. H.)	3	2
New York University—Bellevue.	C. P. H.:		
	25 days' residence	18	40
	Correspondence course	22	.....
	Dr. P. H.	1	0
Syracuse University	Certificate (special courses for health officers; 13 took course at Cornell and 10 at Syracuse).	23	.....
University of Pennsylvania [3]	M. S. or Ph. D. (in Hyg.)	6	.....
	C. S. or Dr. P. H.	6	5

[1] B. S. (in P. H.).
[2] Ph. D. (in P. H.).
[3] In addition, 14 students in the college, school of education, and the graduate school are given courses in bacteriology in relation to sanitation, domestic sciences and industry; and 50 students from the Towne Scientific School are given courses in bacteriology in relation to biology, sanitary engineering, and the sanitary supervision of contractors' camps.
NOTE.—Special students are not included in this tabulation. Public health nursing is omitted.

In 1921, then, a total of 106 public-health degrees of various sorts were conferred by 9 institutions:

Certificate in public health	65
Bachelor of science (in hygiene)	11
Master of science (in hygiene)	4
Doctor of science (in hygiene)	1
Doctor of philosophy (in hygiene)	4
Doctor of public health	21
Total	106

This information from recent correspondence is approximately correct, although probably not complete. The difficulty of tabulating the present status in any uniform scheme of arrangement is due to the formative and changing nature of curricula and requirements for degrees.

The following statements show the state of flux of the present situation in public-health education, and also give the important developments in some of our universities. These quotations are extracts from letters recently received in response to a questionnaire.

University of California:

It is rather difficult to answer your letter concerning public-health work in this university at the present time, owing to the fact that we are just going through what we believe are the final stages in forming a school of public health.

The establishment of this school will enable us to bring together curricula and standardized courses much better than we have been doing, although we have been endeavoring to give a thoroughly rounded course for several years and to turn out students of three or four different types in this field.

The course at present is given in a number of different departments, and our system of departmental majors for the bachelor's degree means that students majoring in any one of these departments which will eventually constitute the school of public health will eventually be grouped as public-health majors.

I may say in explanation that the curricula as outlined have been administered by a committee of the graduate school, pending the establishment of a school of public health. As soon as this school is established, certain minor changes will be made in the curricula, and in addition it is planned to give the degree of doctor of public health instead of the degree of graduate of public health, as at present, and instead of a master's degree of the graduate school (A. M.) the degree of master of science in public health.

FREDERICK P. GAY.

University of Michigan:

These courses, however, I ought to add, are now under radical revision. Indeed, in the announcement soon to replace that which I am sending you separately, the paragraphs given on the inclosed sheet will be included and will show that we are working upon a new plan for the conduct of all the work in public health.

ALFRED H. LLOYD.

Johns Hopkins University:

For the sake of completeness I may say that our registration for the present year is:

Doctors of public health	18
Doctors of science in hygiene	31
Bachelors of science in hygiene	4
Certificates in public health	11

This list does not include any special students, of which this year we have 67.

W. H. HOWELL.

Massachusetts Institute of Technology:

Regarding the period when public-health training was first given to the students in the Institute, I may say that this really had its inception with the coming of Professor Sedgwick to the Institute in 1883. The first graduates under this instruction for the whole period of four years were therefore in the class of 1887, of which Professor Jordan was a member, and which also included two or three other men and women who went into medical or allied work. Special emphasis was given to the public-health side of the work with the establishment of the course in sanitary engineering, the first graduates of which were in the class of 1892. Much emphasis was placed

on public-health administration and courses specially pertaining to this field given in the middle of the nineties, and so far as I can recall we turned out our first man, who immediately took a job as health officer, in 1896. Since that time men have been going into this profession from both the course in biology and the course in sanitary engineering regularly every year. The number of men and women entering the courses in biology and sanitary engineering has shown a gradual upward tendency, except that since the war the number of men who have gone into sanitary engineering has been very much smaller than previously. In 1914, 19 men were graduated from this department, and for several years the average was 15. This has now dropped temporarily to a much smaller number, presumably because of the fact that chemical engineering seems to have been the field in which the attractive positions lay, outside the old stand-bys of civil, mechanical, and electrical engineering. With reference to the present tendency in our own department, it is undoubtedly for larger numbers of men to seek the training in biology and public health than previously. If I am correct in my data we now have in the department about 30 men enrolled in the course in biology and public health. I can not speak exactly on this point because we do not come in actual contact with the students until the middle of the second year, and it is not possible to know exactly how many first-year students are aiming toward public-health work. It is a fact, however, that the number is gradually increasing. We shall graduate this year 9 men in biology and public health, and there will be some special students who had nearly all the courses required for a degree in addition. In sanitary engineering I think there will be 8 men.

SAMUEL C. PRESCOTT.

New York University:

The courses given by New York University are chiefly for those who are already in public health.

The 25 days of residence, or the 300 hours of reading, plus 6 days of residence are courses giving a certificate and are approved of by the New York State Council on Public Health.

At the present time, there are about 30 taking the correspondence course and three the doctor of public health course.

WILLIAM H. PARK.

University of Wisconsin:

Since the marked development of your school and the one at Hopkins, with the large number of fellowships available, I have adopted the principle that it would be wrong to urge men to come here when better opportunities are available elsewhere, so in each instance when men have come to me for advice I have urged them to go for public-health work either to Hopkins or Harvard. We have had a half-dozen graduates taking either a master of public health degree or a doctor of public health degree, but none within the last two or three years. We do have a number of young women majoring in bacteriology either in the medical school or in the school of agriculture with a view of doing laboratory work either in public-health laboratories or hospitals. I assume, however, that it is not that type of student that you are interested in.

PAUL F. CLARK.

Detroit College of Medicine and Surgery:

Correspondence with various applicants seems to indicate that there are schools where the doctorate in public health can be secured by any man possessing a baccalaureate degree as a preliminary qualification, upon completion of an amount of professional study considerably below that which we demand.

W. H. MACCRACKEN.

Syracuse and Cornell Universities:

So far as our course for health officers is concerned, there were 23 members, 13 of whom took the course at Ithaca in connection with Cornell University and 10 in connection with Syracuse. The number graduated from the two courses was 22.

We simply give certificates for these graduates, as they do not have a sufficient length of course to take the degree. The college gives a very good course in connection with the medical school, but it does not give them a special certificate for the health work; this is simply included in their regular college course, for which they receive a single college diploma.

F. W. SEARS.

Yale University:

So far as actual graduate courses were concerned, we are reasonably well satisfied with the situation, but we believe that a closer contact with the medical school is essential in order to attract the younger graduates in medicine into this field. We have just secured a revision of the curriculum of the medical school which frees the student of nearly a year of the present work. Sixty per cent of the time thus freed will have to be spent on electives, and we have arranged a combined course by which a student electing the public health option in his medical course would spend the summer between his third and fourth medical years in the dispensary to secure the degree of doctor of public health in one year after graduation. This will not go into force until the class of 1926, but the step is, I think, a very important one, not primarily on account of the saving of time, but on account of the opportunity of calling the existence of the public health field to the attention of medical students at an early stage.

C.-E. A. WINSLOW.

THE STATUS OF STANDARDIZATION.

The amount of discord with reference to courses and degrees in public health offered by different institutions is shown very clearly in the following table, taken from the report of the committee of the American Public Health Association, above referred to.

TABLE III.

Degree.	Number of schools giving degree.	Time required.
Bachelor of science in hygiene	1	2 years.
Bachelor of science in public health	1	4 weeks.
Certificate	1	7 weeks.
Certificate	1	Indefinite.
Certificate in public health	3	1 year.
Certificate in public health	1	Indefinite.
C. P. H. in industrial hygiene	1	1 year.
C. P. H. nursing	1	1 year.
Certified sanitarian	1	1 year.
Diploma in public health	1	3–6 months.
Diploma in public health	2	1 year.
Diploma in public hygiene	1	1 year.
Diploma in tropical medicine and hygiene	1	1 year.
Doctor of philosophy in public health	2	Indefinite.
Doctor of public health	1	36 hours.
Doctor of public health	1	2–3 years.
Doctor of public health	7	2 years.
Dr. P. H. in industrial hygiene	1	2 years.
Doctor of science in hygiene	1	3 years.
Doctor of science in public health	1	3 years.
Graduate in public health	1	1½–4 years.
Master of arts in public health	1	1 year.
Master of public health	2	1 year.
Master of science in public health	2	1 year.
Master of science in public health	1	1–2 years.

This exhibit makes plain the woeful lack of standardization. Some institutions give not only a certificate in public health, but even a doctorate in public health through correspondence courses and a few weeks' attendance in residence. The tendency, however, is to require a minimum of one year of residence devoted entirely to serious study for a certificate in public health and no less than two years of advanced graduate work for a doctorate in public health.

A good beginning was made in the task of standardizing degrees in public health at a conference called at Yale University early in 1919, at which representatives from certain eastern universities particularly interested in the subject were brought together. Johns Hopkins University was represented by Dr. W. H. Welch; the Massachusetts Institute of Technology by Prof. W. T. Sedgwick; Harvard University by Dr. M. J. Rosenau; New York University by Dr. W. H. Park; and the University of Pennsylvania by Dr. H. F. Smyth; while Yale University was represented by a special committee from the graduate school, including Prof. S. E. Barney, Prof. L. B. Mendel, Prof. L. F. Rettger, Prof. M. C. Winternitz, and Prof. C.-E. A. Winslow. Resolutions unanimously adopted at this conference were published.

Certain definite views have crystallized out of the situation with reference to the standardization of entrance requirements, curricula, and degrees. The best practice may be summarized as follows: Those who wish to enter public health work should have a knowledge of physics, chemistry, and biology of college grade. Following this, it is essential to know normal structure and function—in other words, anatomy and physiology; also abnormal structure and function—that is, pathology and bacteriology. The fundamental preliminary requirements, then, for admission to a satisfactory education for a public health career rest first of all upon a knowledge of the achievements of and an acquaintance with the methods of science. To this must be added training in the fundamental medical sciences which usually occupy the first two years of a medical curriculum. More specifically, these are embryology, histology, anatomy, physiology, biological chemistry, bacteriology, and pathology. With this foundation, a student is prepared to matriculate for a degree which would involve the following minimum conditions:

Bachelor of public health.—One year in residence, including courses in vital statistics, sanitary engineering, epidemiology, public health administration, etc.

Master of public health.—One year of graduate study following the bachelor's degree.

Doctor of philosophy or doctor of science in hygiene.—At least three years of work following the bachelor's degree, including high attainments and special study in a particular field. These degrees,

in order to conform with academic usage, should include a major and several minors and also a thesis showing original treatment based upon research of a special problem.

Doctor of public health.—Candidacy to this degree should be limited to those who have a medical degree and should include two years of graduate work following the medical degree. The object of this degree should be either (1) to train men for administrative or teaching positions, or (2) to develop specialists in the various lines of hygiene and sanitation.

While a certain amount of academic uniformity is desirable, especially with reference to requirements for degrees, on the other hand it would be a serious mistake to encourage a fixed system of curricula and degrees that would freeze health education into rigidity. The present status calls for freedom, elasticity, and individuality. The same mistake should not be made in schools of public health that has arisen in schools of medicine. A satisfactory method of training health officers seems to have crystallized out of our short experience, but we should take the attitude that the best methods are still to be discovered.

Experience has shown that training for public-health service divides itself rather sharply into those who wish to fit themselves for administrative positions and those who wish to fit themselves for some specialty, such as laboratory work, sanitary engineering, vital statistics, sanitary chemistry, etc. The above scheme provides for the training of both medical and non-medical men, but in both cases requires the fundamental medical sciences.

THE PRESENT STATUS OF THE STUDENT IN PUBLIC HEALTH.

The number of students attracted to the various schools offering courses in public health is showing slow but steady and wholesome growth. Those familiar with the present state of affairs are quite well aware that the demand for well-trained health officials exceeds the supply. It is further quite evident that the fruits of hygiene and sanitation and the benefits of preventive medicine are not garnered for want of trained leadership.

There is a decided lag between knowledge and accomplishment. In other words, our knowledge has not yet become part of the wisdom of the community. In order to bridge this gap, educational and economic improvements are necessary, sometimes amounting in magnitude to social reformations. The next step in the health program evidently is to provide well-trained administrators who will also be sound teachers, able to guide the people in the art of hygienic living and instruct them in the prevention of infection.

Public-health careers and the education for public health service are not yet sufficiently developed to attract the best men into the field. The present status in this regard, then, is unsatisfactory. All those interested in public health education are straining at the leash in order to improve this phase of the situation. At present progress is slow, for the rewards of the clinician are alluring when contrasted with the meager pay and uncertain tenure of office of the health officer. Until quite recently there were almost no special laboratories devoted primarily to the advancement of the sanitary sciences to attract devotees of pure science in public health problems. It is clear to those who have education for public health service at heart that it is important to attract the best men in the early stages of their careers, and it is a pleasure to see that adequate institutions are being established to supply one feature of this want. The other feature will come more gradually with improvement in health administration and public recognition of its usefulness.

THE STATUS OF THE RELATION TO MEDICAL EDUCATION.

The object of public health work is to improve human efficiency and to prevent disease. Both of these objects make for a longer, a surer, a happier, and a better existence. It is clear that both these objects, namely, better health and less disease, rest in great part upon the medical sciences. To improve health depends upon physiology, and to prevent disease rests upon pathology. In other words, both individual efficiency and private health, as well as community progress and public health, depend to a large extent upon the fundamental medical sciences. These must therefore be the background of education for a public health career. Without them failure and even disaster is invited, for there is apt to be imperfect perspective and confusion of relative values. The present status of public health education in this country has shown two directions: (1) To organize schools of public health apart from medical schools; and (2) to organize schools of public health in direct association with medical schools. In my judgment, the latter arrangement is sound and logical and will best serve the purpose. This is the plan at Harvard. I am free to predict that it will be the future and final development. The effect of two schools, one of public health and one of medicine, closely coordinated must be mutually favorable. The public health school obviously profits by much that the medical school has to offer and is in a strategic position to attract students during their formative stage into the field of hygiene and sanitation. On the other hand, the medical school will inevitably profit by a close correlation with a school of public health in various ways, directly and indirectly. The influence both upon the faculty and the students in gaining the viewpoint of prevention, as well as of cure, will be impressive and will

inevitably broaden the practicing physician and make him a more useful member of the community.

Whether or not schools of public health develop alongside of medical schools, men and women will continue for a long time to enter the field of public health from various educational directions. Many, as heretofore, will have a medical education with no special training in public health: others will come in through engineering, bacteriology, or chemistry, etc.

This is not the proper place to consider the teaching of preventive medicine and hygiene in medical schools, and I would not open this subject had it not been mentioned in the agenda. A school of public health, however closely associated with a medical school, only accentuates the need of adequate teaching in hygiene in the medical curriculum. Every student working for a medical degree should get not only the facts but also the viewpoint of prevention. In no other way can he do his full duty to both the patient and the public. The close association should inspire both the medical faculty and the medical student with the ideals of prevention and serve, furthermore, to reveal the opportunities and soul satisfaction derived in the service of Hygeia.

No school of public health, however well organized and conducted, can hope to turn out a finished product. In other words, a man is not necessarily a competent administrator or a successful sanitarian just because he has been trained in a school of public health. We find the same situation in other professional schools. Just because a man receives a medical degree does not mean he is a good doctor. A graduate of a law school has only the foundation to practice law. We would not place the responsibility of designing and building a large bridge in the hands of the honor man who has just received his degree from the best engineering school in the world. In addition to the fundamental education which is given at school, the graduate then needs experience, perspective, vision, and maturity. In addition, he must have character and qualities of leadership. Many of these traits can not be originated in school, although aptitudes can be developed, latent characteristics made dominant, and moral fiber fortified. The spirit of the training should be to give adequate instruction in the fundamental sciences on which successful health administration rests, with some insight into the best types of Federal, State, and local practice.

THE PRESENT STATUS IN ENGLAND.

It is interesting to compare the present status in our own country with that in England. I commissioned one of my students (Miss Caroline Stevens) to make a survey of public health education in England, and her report, just at hand, clearly gives the situation there.

THE PRESENT STATUS OF PUBLIC HEALTH EDUCATION IN ENGLAND.[7]

By Caroline Stevens.

Public health education in England is organized at present to reach four types of workers. Each group will be considered separately.

I. *Doctors of hygiene or of public health*—"*D. P. H.*"—Courses leading to this degree are open only to men and women holding a medical degree from a recognized medical school. The shortest length of time in which the whole course may be taken is nine months, generally divided as follows:

Six months' laboratory work.
Three months' chemical.
Three months' bacteriological.
Three months in a fever hospital for administrative purposes.

Six months' practical work with a medical officer of health, or reduced to three months if attending a course of lectures by recognized teachers.

An examination must be passed at the conclusion of these courses, "which extends over not less than four days, one of which shall have been devoted to practical work in a laboratory and one to practical examination in and reporting on subjects which fall within the duties of a medical officer." In October these rules were under consideration and it was probable that in the near future they would be altered slightly in an effort to increase the standard.

This course is obtainable in some 22 universities well distributed throughout the British Isles and at the Royal Institute of Public Health in London. Some of the more important schools are Durham, Leeds, Liverpool, Birmingham, Edinburgh, Manchester, Bristol, Sheffield, Cambridge, Kings College of London, University College of London, Aberdeen, Glasgow, which gives a B. Sc. and D. Sc., but not yet a D. P. H., and Wales.

The courses given at the University of Cambridge show that the English training is similar to the American, although probably less theoretical and more practical. The following subjects are either treated differently or not at all in the American schools:

Under meteorology and climate—Meteorological charts and reports.

Under elementary physics—Physical properties of gases and liquids, laws of pressure in liquids, gases dissolved in liquids, specific heat and latent heat, dew point, hygrometry.

Under bacteriology—Methods of bacteriological examination of animals dead of bacterial diseases.

Under practical sanitary administration—Houses in course of construction, drainage, testing drains (smoke test, water test), defects, reconstructions. Office books and records kept.

During the three months' work in a fever hospital the subjects covered are as follows:[8]

Site, situation, general arrangements of buildings, number of beds, recommendations of late L. G. B.

General supervision—Work of assistant medical officers, stewards, dispenser, relation to ambulance station, control of nursing staff.

General public—Admission of visitors, control of public in hospital grounds, exclusion from wards, disinfection on entering and leaving grounds, warning notices, reinfection.

Hospital committee—Relation to medical superintendent, meetings, joint hospital boards, admission of cases from other districts, M. O. H. relation to hospital.

Laboratory—stores—laundry.

The following diseases are particularly studied while at the fever hospital:

Scarlet fever—Admission of cases, allocation to suitable wards as regards age, sex, and severity of disease; acute wards, septic wards, plans of large and small wards, doubtful cases, differential diagnosis, transfer convalescents, discharge of patients,

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[7] In October, 1921, I made a survey of public health education in England, at the request of Dr. M. J. Rosenau. In order to obtain my information I interviewed Sir George Newman, minister of health; Sir Arthur Newsholme; and Dr. MacDonnel, a recent student in public health, and I visited 5 educational institutions in London. I also gathered information through correspondence with 14 universities in England, Scotland, and Wales, and with the General Medical Council. Although the only means of ascertaining the more practical details of the courses is by participation in the public health course of a university, a general idea of the British plan of health education was obtained.—C. S.

[8] Taken from the report of the University of Manchester.

methods of disinfection, warning to patients; brief résumé of anomalous types and points in differential diagnosis.

Diphtheria—Admission of cases, etc.; general routine in wards; clinical and bacteriological diagnosis; methods of giving antitoxin—subcutaneous, intramuscular, and intravenous. Schick reaction; importance and use. Intubation and tracheotomy. Discharge of patients.

Enteric fever—Admission, etc.; general routine in wards, clinical and bacteriological diagnosis, discharge of patients.

The following special problems are studied:

"Barrier" cases—When needed; routine, essentials for success.

Cross infection—Different ways in which it may occur; how to deal with the patient, the other patients, and the wards.

"Carriers"—Diseases, virulent or not, segregation, treatment.

Disinfection—Of patients, of staff, or wards, of clothing, bedding, etc.

As to vital statistics, only the simpler calculations are required, such as methods of estimating population, death, birth, and marriage rates; mortality as affected by age, sex, and occupation; case mortality; life tables; the use of logarithms, the slide rule, and the arithometer.

Three to six months is spent in working directly under a medical officer of health who usually arranges a course of instruction in outdoor and office sanitary work.

The following are examples of textbooks studied and consulted: [9]

Rosenau's Preventive Medicine and Hygiene.
Notter and Firth's Practical Hygiene.
Newsholme and Kerr's School Hygiene.
Kerr's Infectious Diseases.
Manson's Tropical Diseases.
Cobbett's Causes of Tuberculosis.
Rambousek's Industrial Poisoning; translated by Legge.
Herrind Shaw's Domestic Sanitation and Plumbing.
Edelmann's Meat Hygiene; translated by Mohler and Eichhorn.
Public Health (Scotland) Act; edited by McDougall and Murray.
Robertson and Porter's Sanitary Law and Practice.
Bell's Sale of Food and Drugs Act.
Muir and Ritchie's Bacteriology.
Sommerville's Practical Sanitary Science.
Turneure and Russell's Public Water Supplies.
Lane-Claypon's Milk and Its Hygienic Relations.
Moore's Descriptive Meteorology.

The method of examination used by the University of Sheffield is exemplary.

PART I.

1. A three hours' written examination on chemistry as applied to public health.
2. A four hours' practical examination on chemistry as applied to public health.
3. A four hours' practical examination on practical pathology and bacteriology as applied to public health.
4. A three hours' written paper on bacteriology.
5. An oral examination on the above subjects.

PART II.

1. Two written examinations in public health.
2. Sanitary reporting.
3. Oral examination on the above subjects.

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[9] Taken from the catalogue of the University of Aberdeen.

II. *Nonmedical but professional officers* (midwives, sanitary inspectors, and health visitors).

There are three or four institutes in London providing courses for this class of worker. Only what corresponds to our elementary-school education and some practical experience in the subject to be studied is required of candidates.

(*a*) The Royal Sanitary Institute in London has done a great deal to standardize health work throughout the United Kingdom by giving courses and maintaining carefully supervised examinations for a certificate in many centers in England, Scotland, Ireland, India, Canada, Hongkong, South China, South Africa, Australia, Tasmania, New Zealand, and the British West Indies. The places for examination vary somewhat from year to year. The Institute maintains a lecture hall, a library, and an exceedingly interesting museum in London and publishes a journal. It also does considerable parliamentary work and holds public meetings, lectures, and exhibitions. Courses and examinations are held according to the following plan:

(1) Sanitary science as applied to buildings and public works for sanitary officers or inspectors.

(2) School hygiene, including elementary physiology, for school-teachers.

(3) Course leading to a certification of qualification for post of smoke inspector.

(4) Courses fulfilling the requirements of the board of education for women health visitors and school nurses.

(5) Courses and examination for maternity and child welfare workers. This course requires a wider experience and more developed knowledge of subjects pertaining to child welfare than for the health visitor.

(6) Course for inspector of meat and other foods.

(7) Course for inspector of nuisances.

(*b*) National Health Society.—This society, unlike the Royal Sanitary Institute, has only one institution, and that is in London. It provides the following training courses:

(1) For health visitors and infant welfare workers.

(*a*) A full course of two years for inexperienced students.

(*b*) A shortened course of one year for hospital nurse graduates, health visitors who have spent not less than three years in full-time employment, students who have obtained a university degree or its equivalent.

(2) For sanitary inspectors.

In these courses, as in those for the D. P. H., there is a great deal of practical work. The health visitor or child welfare worker if taking course (*a*) must spend at least four months at an infant and child welfare center the first year, and practically all her time the second year in a poor-law infirmary or infants' nursing home and ophthalmic hospital and infant welfare center.

(*c*) Midwives.—Throughout the country there are institutions, approved by the central board, where midwives and nurses may obtain training in midwifery. A certificate approved by said board is granted to those satisfactorily completing the course, which lasts six months (or less for nurses). A graduate must have brought into the world no less than 20 babies.

III. *School-teachers.*—There are about 80 "training colleges for teachers" (comparable to our normal schools) in Great Britain, where secondary-school teachers obtain their training. One of the several courses which teachers are required to pass in is hygiene, and covers the following subjects:

Section 1. Food; fresh air; exercise; warmth; rest and sleep; cleanliness.

Section 2. The senses and their training.

Section 3. Training the child in the practice of hygiene.

Section 4. Common ailments in school children.

Section 5. Special groups of school children, statutory power and duties relating to abnormal children; physically defective, dull, and backward children, etc.

Section 6. Welfare of infants and young children, principal causes of infant mortality, etc.

Section 7. The work of the school medical service.

Section 8. The school building and its surroundings.

A so-called "temperance" syllabus which outlines for the teacher the misuse and abuse of foods and of alcohol and is a guide for her in teaching the "hygiene of food and drink" has been published by the board of education and extensively used by teachers in the schools.

IV. *Voluntary workers.*—There are many "polytechnic institutes" and similar technical and scientific schools throughout Great Britain providing training courses for high-school graduates who do not wish to become as highly trained as the ordinary sanitary inspector, but who wish to take some of the courses for the health visitor or infant welfare worker, etc. The London Battersea Polytechnic Institute gives, in addition to the above-mentioned courses, an advanced hygiene course for secondary-school teachers who wish to make more of a specialty of hygiene than is possible in the board of education training colleges. Often high-school graduates who are still too young to enter a nurses' training school take a preparatory course here. Although intended for nonprofessional as well as professional men and women the school maintains a high standard and has extraordinarily practical courses for all sorts of health inspectors as well as for general public-health workers. It helps to meet the great demand of public-health officers for trained assistants. The Royal Sanitary Institute, mentioned above, also trains voluntary workers.

CONCLUSION.

From the above analysis one immediately sees that many training courses are provided for the voluntary worker, the professional worker who has not a medical degree, and for the highly specialized doctor, and that a great deal of emphasis is put on the practical part of the training.

The administration of public-health activities is so completely organized that the demand for such workers is extremely great. London itself is divided into 28 boroughs, plus the city of London, each with its representative council, who employ as specialists an architect, a lawyer, a financial adviser, etc., and a sanitary officer. The sanitary officer is responsible for all the health work of the district, and is the executive having under him clerks, a sanitary inspector, a health visitor, and possibly a nurse. The child welfare and other clinics are all under his direction. He is responsible through the council to the people. It is under such an officer that each D. P. H. student must spend from three to six months of his time. This sanitary officer must have a D. P. H., and also practically all school doctors are required by the ministry of health to have the degree.

The schools that give a D. P. H. degree (comparable to our C. P. H.) require, I believe, a higher standard than ours, because they only take candidates who already have a medical degree. The nonmedical students are trained in schools of their own. The fact that the ministry of health requires practically all school doctors and sanitary officers to have this degree makes the training very desirable. It differs from ours because much more time is spent doing the actual work under trained supervision. Vital statistics are only touched, and in the laboratory much more time is spent on the practical tests and analyses than on theory. Also, almost every large university has a well-established department of public health, thus making the training easily available.

THE 1922 CONGRESS ON MEDICAL EDUCATION, MEDICAL LICENSURE, PUBLIC HEALTH AND HOSPITALS AND ITS CONCLUSIONS REGARDING THE EDUCATION OF SANITARIANS.

Dr. FREDERICK R. GREEN, *American Medical Association.*

My subject as assigned by the chairman is a discussion of the points that were brought out at the Conference on Medical Education, Hospitals and Public Health of the American Medical Association at Chicago last week. I understand that there was one paper presented on the second day of the conference that slightly touched on this question. I asked the official reporter to give me a synopsis of it by Monday morning before I left, but I did not receive it. With that exception there was no consideration given that question. We had the most successful conference that has been held under the general supervision of the American Medical Association, the Association of the State Examining Boards, the Association of State Medical Colleges, and this year, for the first time, the Hospital Conference. The five-day conference was practically filled with every subject that could be imagined in the field of medical education. But the question of the education of health officers was not considered as far as I know.

This being the case, with the permission of the chairman and the Surgeon General, I would like to devote the few minutes assigned me to discussing another question which has been in my mind for many years, concerning not only the education of health officers but also the education of physicians.

John Fiske in the introduction to his History of the Discovery of America stated that in the hundred years between 1450 and 1550 the knowledge of the civilized world regarding the Western Continent increased so rapidly as to make it impossible for one or even two generations to assimilate the knowledge which had been gained, or to estimate the benefit of these discoveries on civilization. The same statement may be applied to the last 50 years in medicine. Our knowledge has increased so rapidly and we have gained such minute medical knowledge that the present generation fails to grasp or realize the effect that it is going to have on civilization and society in the future. Therefore it is not strange that our methods of medical education have very largely remained the same in principle, with a very large increase in detail, as they were 50 years ago.

The admirable sketch of the history of the development of our knowledge of public health given by Doctor Freeman and the résumé of the present status of public-health education given by Professor Rosenau make it necessary to allude to the details of the history of the last 50 years, familiar to all of you. I am sure that all of us got some additional facts and some additional light from the two papers which have preceded. There is one striking feature, however,

that it seems to me has not yet been sufficiently dwelt upon. The fact is that while our medical education has increased enormously as far as detail is concerned, it remains largely the same as far as principle is concerned in that to-day as yesterday instruction given to medical students is individualistic; that is, it bears entirely on the relation of the individual physician to the individual patient and has to do with the examination and treatment of patients as individuals. Prior to the middle of the last century the only responsibility which a physician had was his individual responsibility as a practitioner to an individual patient. As Sir George Newman said, prior to 1850 the only public-health functions that any medical man had were the enforcement of the police laws for the prevention of the mingling of the infected and the uninfected. The relation of the physician to the community was entirely individual. He had no conception whatever of any social duties or any social relations. No act of his in any way could affect society, because he had no knowledge of his relation to the community of which he was a part, nor of the social facts of disease nor of any duty to society en masse.

There are two distinct methods of approach to any problem, just as there are two distinct kinds of minds. There is the analytical mind, which analyzes all questions and devotes itself to the study of minute and concrete details, and the synthetical mind, which from the mass of data accumulated formulates the general principles which will be a guide for future action. The work of the medical profession in the last 50 years has been along analytical rather than synthetical lines. We have come to the point where we have an enormous mass of data which has not been worked out. Until this is done, the relation of the medical profession to the public, to the community, or to the State can not be definitely determined.

As Doctor Rosenau says, the education of the medical man and the education of the public-health officer necessarily run along parallel lines. There would seem to be only three ways in which public-health officers could be educated. First, by regarding the public-health course as a special course to be taken as an addition or a supplementary course to a general medical course. Second, by regarding the first two years as a basic course, for either physicians or public-health officers; by having all men who intended to do medical work or public-health work take the same two years of a basic course and then each one switch off into the particular line he was going to follow, the public-health officer taking a special course in his last two years, while the medical man takes up scientific medicine and diseases. Third, to regard them as independent and separate lines of work and give each class a separate training. The third, so far as I know, has never been suggested. The first two have often been discussed.

Whichever of these two courses is followed, we know what the public-health officer of the future is to be as far as his basic training is concerned. In addition he must have some training in the relation of the physician either as an individual practitioner or as a health officer to the community or to society en masse. The medical student to-day gets very little systematic instruction in his social relations to his fellow practitioners, to the public, or to the State. He has consequently very hazy ideas regarding social and economic questions. I have been occupied very largely for the past 18 years answering letters and in offering advice to medical men and to medical organizations in regard to the solution of these problems, but rather in the field of applied or social medicine. It is perfectly astonishing to realize how very little thought physicians have given to such questions as the legal regulation of the practice of medicine, the relation of the physician to the State, health insurance, social and community medicine, the relation of modern medicine to industrialism. They have received hardly any instruction whatever in medical courses along these lines. The bulk of the time of the medical student is given almost exclusively to the study of medicine as applied to the individual patient without any instruction of the duties of the physician to society or the mass. The average physician is so little informed as to his personal relations that he does not realize that it is not the duty of the State by forceful law to protect him from competition. He thinks that medical practice acts are passed to confer certain rights on him; therefore he regards the sectarian as an invader and as a rival to be suppressed by law.

I simply want to suggest that, in the reorganization of the medical course, of the medical curriculum, coming in the near future through choice or necessity, some place should be provided for some such course of instruction. It is my view that the freshman class should be given at least one hour a week throughout the course on the history of medicine, so that the student will know something about the growth of his profession. During the second year, at least one hour a week should be given to medical sociology and the application of medicine and our knowledge of prevention of disease to social problems and social conditions. During the third year, one hour a week should be given to the economics of medicine. We are sending out to-day the most capable and highly trained medical graduates, so far as scientific training is concerned, we have ever been turning out. But we are not teaching them enough of the practical aspect of the profession. The result is that many thoroughly capable men fall down on the business side. During the fourth year, one hour a week should be given to instruction, first, in the legal side of medicine—the legal relations of the physician to society, to his individual patient, to his own professional associates—and then additional

instruction should be given in the ethical side of medicine. Also instruction should be given regarding medical organization—the necessity for it, the history of medical organization, and the policies of our organizations throughout the country.

If we can do this, and in this short time give the medical student of to-day, in addition to the highly scientific and the highly effective training that he is getting in the scientific phase of medicine, a sociological education, he will have a better conception of his duties toward those suffering from specific disease, and understand something in regard to his social relations to the community. Also, through this instruction, we will very greatly relieve much of the unrest which is to-day caused by these problems. Whether he engages in public-health work or in the private practice of medicine, the physician of the future will need this knowledge.

II. NEWER ASPECTS OF PUBLIC HEALTH AND THEIR IMPORTANCE IN TRAINING OF SANITARIANS.

MENTAL HYGIENE.

Dr. WILLIAM A. WHITE, *Superintendent St. Elizabeths Hospital.*

Those of us who are interested in mental hygiene are inclined to think that to leave out of a course of instruction in public health the mental hygiene aspects would be a good deal like leaving Hamlet out of "Hamlet."

We have been engaged in a propaganda for a good many years to get psychiatry introduced in the medical curriculum, and we are succeeding fairly well in that respect. It is equally important to get mental hygiene introduced into the courses in public health which are now growing up in the large universities of the United States. I may make this point briefly by asking this question: What particular use is the healthy body, which the sanitarian is aiming to insure, if it does not have a reasonably healthy mind to guide and direct it? The body is only an instrument to bring to pass the ideals, the ideas, the aims and objects which our minds formulate, and unless our minds can formulate reasonable aims and objects, our healthy bodies are not very much good. I know many idiots who have perfectly healthy bodies, and many individuals with very wonderful minds who have very delicate bodies.

Every life, as Spencer defines it, is a continuous adjustment to its outer and inner relations. It would seem that in the past the work of the sanitarian has been confined very largely to what might be called outer relations, and that the time is now coming when the inner relations might be inquired into. I remember when I was doing quantitative analysis in chemistry the first job I had was to find out whether the graduations on the burette for liquid measurement were correct, and if not then to make the necessary corrections.

We are very much in the same position with reference to the human mind. The human mind must know something or other about the way it is going to use this body of ours. We must be able to calibrate it. We can not get very far when the graduations are inaccurate and we do not know how to correct them.

With that rather platitudinous introduction to an audience of this caliber, may I say that the program of mental hygiene has a host of accomplishments already back of it to which it can point, which serve as sufficient arguments for its claim to be included in the course of instruction in public health. Let me cite just a few of them. Take, for example, in the institutions for the care of the insane. A great many of these institutions throughout the country are now conducting out-patient departments—dispensary departments—where patients may come for medical advice and where they keep track of patients on parole. The out-patient department of St. Elizabeths Hospital in something less than two years has succeeded in increasing the number of patients on parole 300 per cent and in increasing the number of days on parole approximately 600 per cent. That is a perfectly concrete result of actual mental hygiene work, and that, along with many other facts, indicates that mental diseases, just like other diseases, show perfectly evident signs of our ability to bring them within the operation of the principles of preventive medicine, with a very large degree of success.

I call attention to the activities of the juvenile delinquency courts and to the work that has been done, such as Healy did and is now doing in Chicago and Boston. I call attention to similar work which is being done in what might be called industrial psychiatry, and the work of physicians in the large industrial organizations—the seeking out of troubles, the causes of the maladjustment of individual workmen, finding out why people get discharged, and why they leave their jobs, making an effort to fit the job to the man, the man to the job. This makes for efficiency, and is a welfare movement on behalf of the man, too. It is largely of a psychiatric nature, and those who are engaged in it are frequently psychiatrists. They are the men who have the work of adjustment to perform, the work of guidance, which comes essentially within the mental hygiene work of the future. All this is exceedingly important. There is also the work of occupational therapy, which has been introduced so largely into many of our hospitals since the war and which produces its results largely through its mental effects.

I will mention a few other examples in which the fundamental problems involved are mental problems. For example, there is the problem of drug addiction—a very important social problem of today. There is no question but that this problem will never be adequately handled until the psychological factors which enter into it

are understood. The same is true with regard to the problem of intoxication. Feeble-mindedness is obviously a problem which belongs to mental medicine, to preventive medicine. The problem of the criminal is also 50 per cent psychological and of first importance socially, as the developments of recent years have clearly indicated. The problem of the unusual child; the problem of morale, which was developed so largely during the war; the problem of industrial fatigue—all of them have large psychological components. The solution of them all is of the greatest social significance.

There are a number of other problems which are of psychological importance, which would come within the purview of a course in mental hygiene, largely conceived. Take the problem of social unrest. The British commission which investigated the problem of social unrest in 1917 showed very clearly that this problem was essentially a psychological problem and that it could not be attacked without attention to the psychological factors. For instance, a group of defectives, a group of idiots or psychopaths, is a focus of serious danger to the community. It is perfectly evident that wherever you find a group of defectives or psychopaths you find a potential focus of unrest, of social disease, of filth, which, if you can read the signs accurately, is just as dangerous, if not more dangerous, to the social organization than physical disease. A great deal of social unrest is therefore dependent upon various degrees of psychopathy and feeble-mindedness. There is a social unrest which is legitimate, and which is the manifest sign of progress and development; but there is a destructive unrest which is exceedingly dangerous, and it is of exceeding importance that something should be known about it. It is important that we know how beliefs spread by contagion, and the methods of attacking them. We know in psychiatry that we can not attack delusions by reason, nor can we attack these social manifestations in any such way.

The turnover in industrial plants, the enormous amount of change in our big industrial centers, is a matter which is also largely psychological, and has its mental hygiene significance. It is often dependent upon mental defect or aberration. A study of the causes that lie behind these great turnovers will develop, I am sure, a program which will enable us to use some types of defective or psychopathic individuals much more advantageously in industrial work.

The studies in connection with matters of social unrest, fatigue, the adaption of the human machine to the machine of steel and iron, which are taking place in our industrial centers, are all matters of the utmost significance for the general mental health of the community, and for social welfare, and I think they come within a program of mental hygiene when that program is widely conceived.

They are also all matters which the psychiatrist and social worker are at present ready, more or less, to tackle, because of their special training. The psychiatrist and the psychiatric social worker are engaged all the time in solving problems of maladjustment and individual unrest. Their education makes them look at those problems from the individual's point of view. Now if the sanitarian has been engaged in looking at things from the outside and is to turn his attention to the inside, the development is going to be beyond matters concerning only personal sanitation and personal hygiene, and it will be essential that public health courses retain some orientation to these problems of mental hygiene, and that the student taking up a course in public health should have some instruction along these general lines, or else at least that he should have an opportunity in his postgraduate work to specialize in these directions

CHILD HYGIENE.

Dr. RICHARD M. SMITH, *Instructor in Pediatrics, Harvard University Medical School.*

In the first place may I say that it is impossible to consider the subject of child hygiene apart from the whole public-health field, because anything which has to do with the health of the community is shown directly in the improvement of the health of the child. The child is the most sensitive index of the work in the social field.

There are several things which seem to me especially important if we are interested in child hygiene. It is important that we separate instruction in child hygiene which is given to undergraduates from that which is given to older students, or students who are specializing in public health. The undergraduate is not ready, has not a sufficient background to comprehend most of the problems which concern the administration of child health in the community. With the undergraduate we shall have to confine ourselves mostly to insuring that he has sufficient instruction in the care and understanding of the well child. We find that very much of the instruction in pediatrics in most medical schools is concerned with diagnoses of the children ill with diseases and that relatively little time is given to the consideration of the well child. When the physician is confronted with a series of questions which the anxious mother asks him concerning her well baby or child, he is unqualified to give an answer. Few medical students who go out from our universities go ready to answer questions with regard to normal infants or children.

The development of the child hygiene movement has gone hand in hand with a definite encroachment on the field of the private physician in private practice. If a man goes out from the medical school into practice feeling that the child hygiene movement is taking away from him his legitimate field of private practice, he will

be antagonistic to the development of the child hygiene movement. We must see to it that he goes out into the community feeling that this is a definite part of public-health work to which he must make his contribution—that he must be friendly to the advancement of child hygiene and not hostile.

We should see to it that the undergraduate has some slight insight into the organization of public-health work in child hygiene and knows something of the work that private organizations are doing in that line. If he wishes to specialize, he should have at least an opportunity presented to him to do so.

When we come to discuss the instruction of the person who is to make public-health work his career, we come into a very much more complicated and broader field. If any man is going into this course, whether or not he has had a medical-school training, it is essential that he have instruction in certain fundamental medical sciences. He must be able in the field of obstetrics to know whether patients are given proper obstetrical care. He must have a knowledge of the diseases of the new born. These are connected with a community problem with which he must deal—the problem of infant feeding, inadequate nutrition, as it affects children. There is constantly growing a popular agitation in the matter of nutrition, a good many features of which are not founded on very sound scientific facts. The man who is going into public-health work must be able to judge between the good and the bad in nutrition work. He must know the standards of normal development in infants and children; he must be able to decide whether the standards of growth, weight, etc., are proper standards. He must be familiar with the care of the normal child, the thing which I mentioned with reference to the undergraduate. He must know what is the proper food, the proper care, for the normal infant and child. Then he must know also this thing that Doctor White has been speaking about, which is particularly important with reference to the child—he must understand, or at least have some understanding, of the question of mental hygiene. I think there is probably no field of mental hygiene as important as the mental hygiene of childhood. We realize that most of our habits are formed in the early period of life, and upon that period we must place the emphasis if we are going to accomplish the greatest results. He must be familiar with some of the more modern phases of normal development. He must understand the importance of the question of bodily mechanics—the posture, etc.—must direct and guide the work which is done in the community in that connection, must understand the importance of the teeth and their close relation to the problem of nutrition. He must also have a very thorough understanding of infectious diseases, particularly the so-called contagious diseases, not necessarily with particular reference to the treatment,

but he must be able to make diagnoses. He must be able to apply the principles of prevention, and this must include recent modern knowledge of heart disease, which we no longer consider a degenerative disease, but which may be treated and prevented.

With this fundamental background, the man who is going into child hygiene work must also receive instruction in the actual operation of child hygiene in the community. This will include instruction regarding the governmental agencies which are demonstrating the work. He must be able to see these agencies in operation and must be able to form his opinion of the value of the different operations. He must become familiar with the private organizations which are working in the community for the children. He must be able to understand the value of prenatal clinics. He must be able to organize and run them and infant clinics and clinics for children of pre-school age. He must certainly have some knowledge of the personnel necessary for running these clinics—we are beginning to feel we must modify the training of field workers in many of these branches. He must be able to organize and conduct faulty posture and nutrition classes, and give dental instruction in the community. All these things which have to do with the actual application of the knowledge which he has received are necessary in order that they may be applied to the community as a whole rather than to the individual.

Then he must be familiar with the problems of school hygiene and school sanitation and the more recent development of health education for children. This is probably the field which has been given the most consideration in the past, but there is still very much that can be done. He must, of course, be familiar with the broader aspects of health problems in the community. I shall only mention this, because it will be discussed later. He must know the social relationships of medicine. There is no field of public health which shows more intimately the connection of the infant group and the general development. The infant is the most sensitive index of the status of the development of the community. He must have some instruction with reference to the feeble-minded and the delinquent. He must have some comprehension of the preparation of the child for industry, which would include an understanding of the occupations which are undesirable and of the occupations which are permissible, and the age limits which are permissible. In addition there are a number of closely allied subjects with which he should certainly be familiar and with which he should be able to exercise a considerable amount of control—the question of illegitimacy, the licensing of midwives, the care of children in institutions, the medical supervision of children in foster homes, the day nurseries, which are now becoming closely associated with the health movement, the lay organizations in the community which are attempting to teach

health. All those organizations which are engaged in giving information with reference to health, the man who is interested in child hygiene must know about and he must be able to use. He must know something about the juvenile courts.

The man who is going into child hygiene work or who is to be instructed in it must have a very fundamental knowledge of medical sciences with reference to the diseases of children, and must have knowledge of the application of that knowledge to the community.

ECONOMIC AND SOCIOLOGICAL ASPECTS OF PUBLIC HEALTH.

LEE K. FRANKEL, *Third Vice President, Metropolitan Life Insurance Co.*

Thirteen years have gone by since Prof. Irving Fisher, as a member of the National Conservation Commission, presented his report on National Vitality. The report was both a statement and a prophecy. As a statement it indicated the conditions existing in the United States with respect to health and disease. He pointed out, on the basis of certain data, that the average expectation of life in this country was about 45 years. He estimated that approximately 3,000,000 people were seriously ill in the United States all the time and that of these 500,000 probably had tuberculosis. The economic data were equally interesting. Professor Fisher assumed on the basis of average earnings of $700 per annum that each life sacrificed by preventable disease was worth $1,700. He made the further assumption that 42.3 per cent of existing illnesses are preventable. The economic gain which would result from the prevention of such diseases would exceed one billion dollars.

Along the line of prophecy Professor Fisher predicted that the span of human life could be lengthened from 45 to 60 years, or, approximately, an increase of 15 years. This would mean a reduction in the death rate of 25 per cent. Doctor Fisher pointed out the causes of death which occasioned high mortality. It was his impression that 60 per cent of infantile diarrhea and enteritis could be prevented. Pneumonia could be prevented to the extent of 45 per cent; meningitis by at least 70 per cent; typhoid fever by 85 per cent; tuberculosis of the lungs by 75 per cent. Similarly deaths from violence could be reduced 35 per cent. These six causes of death alone if reduced in the amounts given would lengthen life by nearly eight years. To bring this about four specific conditions, among others, are needed—pure milk, pure water, pure air, and protection from accidents.

To what extent has the experience of recent years proved the correctness of the assumption made by Professor Fisher 13 years ago? Will recent mortality data bear out these statements that human life can be extended? Nothing is clearer in recent statistical data than that life is being lengthened year by year, largely through the

reduction in the causes of death referred to in the report on national vitality. There has been an almost constant downward tendency in mortality. Between 1911 and 1920, for ages 1 to 74, there has been a decline of 6.9 per cent for all causes of death in the United States registration area. For the same ages and over the same period there has been a decline of 27.9 per cent in deaths from tuberculosis, 10.5 per cent from children's diseases, 12.8 per cent from chronic nephritis, 16.4 per cent from accidents, 63.1 per cent from typhoid fever. The experience of the Metropolitan Life Insurance Co. for the same ages and period shows a decline of 38.6 per cent for tuberculosis; 22.6 per cent for diseases of children, 17.5 per cent for diseases of the heart, 25.5 per cent for chronic nephritis, 23 per cent for accidents, 70.6 per cent for typhoid fever.

Facts on the expectation of life of wage earners insured in the Metropolitan Life Insurance Co. will be of interest in this connection. Comparing the life expectancy at age 10 in the two calendar years 1911–1912 combined, with the figures for 1919–1920, it was found that the after life-span of white males was increased from 45.6 to 49.5 years. For white females the expectation of life increased from 50.7 to 52.1 years. For colored males and females it rose from 41.3 to 43.8 years.

These data are so well known to sanitarians to-day that they are hardly worth extended comment. No one doubts that the human life can be extended. No one doubts that if the preventable diseases are eradicated, Professor Fisher's prediction of an extension of 15 years to the average human life would be more than fulfilled. For certain diseases we have already reached a low point in the death rate. The measures for the eradication of these diseases are well known and the application of these measures is simple and routine.

The real problem which confronts this conference, therefore, is not that of the prevention of so-called preventable diseases. That such prevention is possible is almost axiomatic. It is true there are certain infectious and contagious diseases about which comparatively little is still understood, notwithstanding the fact that we have known of them for centuries and that these diseases are constantly appearing in our midst. The common ailments such as measles, scarlet fever, whooping cough, and influenza are, in a sense, an unknown field of exploration about which as yet we have known very little. They take their toll of deaths annually, and without knowledge of their cause and origin we have no effective methods of control. It may, however, be safely assumed that these, too, will shortly come to be diseases as readily preventable as smallpox and typhoid fever, yellow fever and cholera. Their prevention and eradication will become the routine task of the health officer and the sanitarian. When their incidence and recurrence has been reduced—and there is

every indication that they can be reduced—human life will be materially extended.

There is, however, another group of diseases which requires attention if prolongation of human life is to be accomplished to an even greater extent than it has been in the past. Some of these may be transmissible in the sense that they are of bacterial origin. Others are either the cause or result of certain social or economic influences which still prevail in practically all communities. I refer to the diseases of old age and middle life, the so-called "degenerative diseases," many of which are now being traced back to illnesses which occurred in childhood or early adult life. Others are due to conditions existing in industry, to the rapid rate at which life must be led in large cities, to the marked changes which have taken place generally in our industrial development. Others, again, are either caused by or are the result of ignorance of personal hygiene, inadequate nursing, bad medical practice, insufficient and bad housing conditions. Poverty, it is well realized to-day, is largely due to physical breakdown and in its vicious train brings other diseases of malnutrition, overcrowding, and lack of vitality. From the industrial standpoint, we know that there are industrial poisons and that there are conditions existing in factories, mills, mines, and stores which create their own industrial hazards. We are just beginning to learn the effects of overwork and fatigue due to the length of the working day and the intensity of labor. Our conceptions regarding nutrition and diet are rapidly becoming revolutionized. There are indications that malnutrition is found even in the children of the well-to-do. Notwithstanding the intensive campaign which has been carried on in the reduction of infant mortality, hundreds of thousands of babies and of older children still die year by year—the victims of prenatal and hereditary influences. The results of sex excesses transmitted to progeny still play a tremendous rôle and make the development of eugenics exceedingly difficult. We still know comparatively little about the influences of the climatic elements. While definite statistical data are not available, it is apparent that with an increase in unemployment there is a corresponding increase in the sickness rate.

Legislation also plays a part in producing these conditions. Lack of proper safeguards over the sale of narcotics, stimulants, and drugs of one kind or another and inadequate laws for the protection of child life all play their part. There are still other factors, such as the lack of recreation facilities, lack of sleep, lack of opportunities for play and enjoyment, lack of laws forcing ventilation, ignorance of proper methods of cooking, which add to the lengthy category of evil conditions militating against what should be in an enlightened civilization a progressive normal tendency toward greater length of life.

It is important to note here one of the marked differences between this class of disease and the so-called transmissible diseases. With few exceptions, the latter group manifest themselves in epidemic form. They affect not merely isolated individuals but groups of individuals. Their onset is sudden and the effects often spectacular, and as such many of them run their course very rapidly. The other class of diseases are frequently of slow and insidious development. They affect individuals rather than groups. They become known frequently only when they have been well developed and when they have entered the so-called chronic stage. It is for this reason that the problem of control of this class of diseases means an entirely different procedure if deaths from these diseases are to be reduced or prevented. In substance, any deliberate attempt on a comprehensive scale to lengthen life by the reduction of what for want of a better term I must call the nontransmissible diseases will require the elaboration of a technique which as yet has been developed to a comparatively slight extent, but which, if results are to be obtained, must be universal in its application.

I have stated above that many of these diseases are discovered only when they have reached the chronic stage. In fact, many of them are found only when the possibilities of cure have disappeared and the patients, after long series of suffering and disability, eventually die. We shall accomplish nothing with this class of diseases until we learn, as a common and general practice, how to discover these diseases at their very inception and when they are still amenable to treatment. We must incorporate in our health procedure the business principle of periodic inventory of stock and machinery. Flywheels, boilers, engines are constantly being watched and examined to ascertain whether they are in good running order, so that accidents and shutdowns due to impairment may be avoided. No sensible automobile owner to-day runs his car continually without overhauling. For his own safety he sees to it that the bearings and cylinders, the pumps and the gears, are gone over by competent machinists to see that they are in good condition. This practice is almost universal, and where it is not applied breakdowns and accidents occur. The same principle must be applied in the same universal manner to our human machinery.

No further evidence is needed to-day to prove the need of such periodic physical examinations. The draft examination during the war indicated in an alarming and startling fashion the large number of young men of working age suffering from some type or other of physical impairment. The same results could be shown in a number of industries which realized the need and value of such periodic examination in order to increase efficiency in their work people. Of 1,000 employees of the Metropolitan Life Insurance Co. who were

given careful medical examination, 245 showed defects in heart, lungs, and kidney. A recent examination of 100 postal employees, all of whom were at work at the time of the examination, shows that 12 of them were suffering from serious physical impairments, which were disabling until treated, and which required immediate medical or surgical attention; 53 showed advanced physical defects or impairments requiring systematic medical or surgical supervision and treatment; 33 showed moderable physical defects or impairments requiring medical supervision and treatment as well as hygienic correction, although the impairments were not necessarily disabling; and 5 showed moderate defects or impairments requiring hygienic correction or minor medical, surgical, or dental treatment which were not necessarily disabling. Not one of the 100 examined were free from some slight physical defect or impairment. Illustrations of this kind could be multiplied in the experience of other industries and will show conclusively what must be the method of the future if we are to reduce this type of morbidity and its resulting mortality.

I have referred above to the experience of the Metropolitan Life Insurance Co. with its employees. Out of every thousand examined 245 show marked defects of heart, lungs, and kidney. The group was placed under competent medical direction and advice. At the end of the year they were reexamined. It was found that 53 per cent of the impairments had practically disappeared. Nor is this experience unusual.

A study of a comparatively large group of policyholders who had been medically examined, subsequently advised regarding personal hygiene, mode of living, diet, etc., indicated most clearly a vast improvement in the mortality of this group over others who had not been examined and advised. There was a net saving of 28 per cent in the mortality of this group in a period of five years.

I believe there can be no question to-day that if this practice could be universally extended, if periodic health examination could be made a matter of common practice, and if it could be extended to the whole community and not merely to particular groups, we should find in a comparatively short time that the mortality of these diseases could be materially reduced.

As an example of what can be done along community liñes the Framingham demonstration is typical. I have stated above that in the registration area the decline in tuberculosis mortality for the 10 years 1910 to 1920 was 27.9 per cent. In the decade prior to 1917 the tuberculosis mortality in Framingham averaged 120 per hundred thousand. In the year 1921 the mortality from this disease was 40 per hundred thousand, or a reduction of 66.7 per cent. Incidentally, there were marked reductions in the general mortality and in infant mortality. I am convinced that these improvements are largely due

to the fact that during the demonstration nearly two-thirds of the population was physically examined. Many cases of disease were found which had previously been unknown. This was particularly true of tuberculosis. So far as it was possible, all of these individuals were advised and directed and instructed in matters of personal hygiene and correct methods of living. The results speak for themselves.

The point at issue is not whether periodic medical examination shall become universal or whether further data are needed to prove its value. The data already available and the results which have been obtained through such periodic health inventory and advice need no further elaboration. We are concerned now with the next step in procedure: What will be the practice of the future? Will it become the function of the community through its constituted health officials to offer such examinations? May we look forward to the time when such examinations will be available to the entire population in the same manner as we are now offering public-school education to our children? The city of New York is now spending upward of $35,000,000 per annum to educate its citizens. How much will this city or other cities be willing to spend so that coming citizens shall be not only mentally but physically sound and physically efficient? If this is to be a community problem, can they be taught that no wiser investment can be made than for such periodic inventory of the citizens of all ages?

If for the present this is not a community problem, will it be the problem of industry? Can the employer of labor be taught that efficiency and good health go hand in hand? Can he be made to see that from the standpoint of production poor health in an employee means financial loss to both the employee and to himself? Can he be made to understand that if the slogan of the modern industrialist, "100 per cent efficiency," is to be accomplished, the men and women working for him can not be below par physically? Can he be made to see that physical examination of employees is as directly a charge upon industry as the safeguarding and care of his other machinery?

Or, lastly, shall such periodic medical inventory be left to individual initiative? If such is to be the development of the immediate future, it will entail a change in medical practice to enable the individual to obtain adequate and competent medical examinations at a cost commensurate with earnings. This may involve a reorganization and readjustment of present medical practice. The limitations of this paper will not permit a more detailed discussion of this important matter at this time.

Whichever method may be finally developed to bring about universal health examinations, certain conditions are prerequisite. Of these probably the most important is the well-educated and thor-

oughly trained health officer. It is he who must bring the lesson of public and private hygiene and sanitation to every member of his community. He must be the guiding spirit in developing a realization of the need and value of periodic health inventory. Secondly, it will mean the training of medical men in the facts of preventive medicine. The physician of the new era will not only treat and cure disease but will greatly stress its prevention. Finally, there will be the education of the public itself. Without the heartfelt cooperation of the public, progress will be impossible. The public school must be the great health educator. Lessons in health must begin in childhood. The value of periodic health examinations must be ingrained in the child at the earliest moment. If we can combine the efforts of the trained and enlightened health official, the trained physician with a conception of the preventive side of medicine, and the intelligent, educated citizen for a common end, all understanding the value of discovering disease in its incipiency through careful, exhaustive, and scientific examination, we shall have taken the next great step in the lengthening of human life.

PHYSICAL EDUCATION.

Dr. JESSE F. WILLIAMS, *Associate Professor, Physical Education, Teachers' College, Columbia University.*

Only recently has physical education been considered as an aspect of public health. The years have given little encouragement to the ideas brought to this country by Lieber, Beck, and Posse, and only varying favor to the pleadings of Sargent, Gulick, and Wood. But following the memorable date of 1914, and in particular since the revelations of the selective service act of 1917, physical education has been viewed in the light of national needs. As typical of the newer point of view comes the report of the commission for the study of secondary education in which health and physical education are ranked first in a statement of "cardinal principles." The presence of the topic on a program for public-health specialists indicates a new emphasis in public health on physical education.

The importance of physical education to public-health specialists and to all educators is founded directly on five striking facts of human biologic and social development. In the first place men and women to-day share in the biologic inheritance of the race. Primitive man in the primordial mud and his successors, whether as arboreal or ground creatures, marked out for us for all time the physical and organic bases of life. The development of the muscular system and the subsequent rise and elaboration of the vital systems of the body determined the fundamental importance of physical activities for the individual. Modern civilization, shaped by economic needs, by artificial selection, tends to ignore the biologic story. The increase in functional nervous diseases, the disorders of the mind and per-

sonality, the increase in the chronic degenerative diseases of middle life propound serious questions for our civilization.

Secondly, the importance of physical education in the United States is to be seen in the history of our industrial development since the Civil War. The growth of industrialism and the factory system, the stripping of the home of occupations and activities, the segregating in shops, stores, and industrial plants of thousands who guide machinery with a minimum of physical effort, present not only problems for capital and labor but also problems in man's social development.

In the third place, the swing of the population from rural to urban districts constricts greatly the range and character of life. In 1800 only 3.9 per cent and in 1840 only 8.5 per cent of the total population lived in cities of over 8,000 inhabitants, as compared with 35 per cent in 1910 and over 50 per cent in 1920. This swing to the city has been accompanied by increases in the number of women and children engaged in industrial occupations.

In the fourth place, recent world-wide events give predilection to the belief that nationalism rather than internationalism will be the controlling policy of nations in international commitments. The reaction from the World War and its sequelæ have emphasized nationalistic aims and have cemented nationalistic programs.

And, finally, physical education, concerned as it is with activities of the child in which primitive impulses and desires are expressed, will remain the principal means for moral education of the young of the race. This is placed last in the group because of its importance. We may well consider that, after all, health, vitality, and national vigor are to be judged very largely by the uses to which they are dedicated. Moral education rests upon these immemorial racial activities and their expressions, and physical education forms the chief means by which such expressions may be guided to social ends.

Now, physical education has, hitherto, not enjoyed any wide recognition that was based upon its possibilities. Most programs for physical education in the school, college, or community are moderately antiseptic. Most of the efforts are combative and antidotal. Only occasionally is there set up a program that views physical education as a positive measure, and all too often is its value circumscribed by the conception of it as a corrective measure. The effort to use physical education as a corrective of bad schoolroom conditions is similar to the tendency to substitute belts for muscles, arch supports for ligaments. Contrariwise, we should think of physical education as an organization of activities to provide for children all that is needed for adequate biologic growth and development, and for necessary and acceptable moral education, and for adults maintenance of maximum efficiency.

I take it that public health is interested in physical education because of its health implications. Physical education has health values and possible contributions to health. But public health ought to see in physical education something more than the physiological results of exercise. Physical education bears the same relation to public health that it does to education in general. Public health is concerned with certain definite concrete responsibilities even as education is, but both are or should be vitally interested in the larger aspects of life in which the finest and best types of citizenship are the larger goals.

It is difficult to conceive of public health as interested only in disease prevention. The tremendous success of the efforts to control infant mortality and to decrease the toll of communicable disease is a handicap when the losses of vitality and early adult deaths are considered. The increase in the cardio-vascular-renal diseases, where their etiology is not parasitic or bacterial, indicates the necessity for viewing the problem as one of adjustment to the conditions of modern civilization, as one of high personal standards of living, as one essentially of education, hygiene, and physical education in which knowledges, habits, attitudes, appreciations, and ideals are to be our chief reliance.

It would appear, therefore, that public health may well consider how it can best serve in shaping a modern and dynamic view of health. Such a view must, so it seems, not hold physical education as a supplementary means to be employed as a corrective of life but as a fundamental scheme of physical activities for all, directed in accordance with the biologic, social, and human needs of boys and girls and men and women everywhere.

It would appear also that the public-health movement must view health as something more than freedom from disease. Health as freedom from disease is a standard of mediocrity. Health ought to be given a social interpretation. In fact all the special and technical procedures aiming at the welfare of the group need a social interpretation. With agreement on this point there will come new emphasis in our professional courses on health and hygiene. Technical sanitary instruction and disease control must be presented, of course, but hygiene as taught in our medical schools will be changed. Sterile sanitation and toothbrush hygiene will be interpreted in the light of national and individual needs, national and individual responsibilities.

The problem of proper emphasis is largely a problem of instruction and instructors. The traditional gymnast with his training all in his heels and none in his head has usually failed to sense the problem. The need for adequately trained leaders of physical education is very great. These leaders must know education, and just because most

of the possible health work is done with school children in the school, it follows that public-health leaders must know education.

The tendency in educational administration to-day is to consolidate in one department the activities of physical education, health instruction, and medical inspection or supervision. Most school systems have, or seek to have, as the head of such work, a physical education specialist who is also a physician. The number of men so trained is very small. A present favorable tendency is to select as the administrative officer of such a consolidated department a man who knows education, physical education, and the problems of health. Men with a Ph. D. degree and adequately trained would be acceptable. Such organization would require that the medical supervision, as one phase of the general program, would be in charge of a physician, as chief medical inspector.

Such organization of educational administration would center in the board of education the responsibility for the health and physical development of boys and girls. In some places this is not done. In some places the school looks after the child's mind, the board of health looks after the child's health, and the park department looks after the child's play. This was logical enough when psychology and philosophy viewed the mind and body as separate entities. But the present general understanding that the child is a unity, that mind and body are one, renders such division of responsibility as absurd as the reported plan in the Federal Government where one department of the Government looks after the black bear and another department is responsible for the brown bear in our national parks.

Schools of public health could help tremendously in this problem of child health and child development by providing a training that would prepare men to head up such consolidated departments in our city school systems. Such schools would need to provide adequate instruction in the philosophy, sociology, and psychology of education, the history, aims, and scope of physical education with reference to modern developments and tendencies, and the means and methods of health instruction. The health problem in the child would be viewed as something immensely greater than transmissible disease prevention. Statistics show that not more than 4 per cent of children are excluded from school per year. On the other hand, from 60 to 70 per cent of children suffer from noncontagious defects that are severe handicaps not only for education but also for life. Such a course for doctors of public health would include in addition to the fundamentals in the sciences, instruction in educational hygiene, the hygiene of instruction, and the hygiene of childhood. Organic development, growth handicaps and hazards, factors influencing normal growth, and modern movements to promote child welfare would be understood. And, finally, we should

hope that through it all there would be presented such a vision of human possibilities that health would come to be thought of in terms of service and worth-while work for the world. To suggest to you who know the public health field the larger possibilities of your work is, I know, to stimulate your thought, for your attitude has always been social and your password service.

INDUSTRIAL HYGIENE.

Dr. OTTO P. GEIER, *Director, Employees' Service Department, Cincinnati Milling Machine Co.*

I have enjoyed this discussion very much and I thank the men who have preceded me, particularly Doctor White and Doctor Green, and also Doctor Frankel, because they have partly told my story. They have emphasized in no uncertain way that what we must have in public health work is the machinery by which we may carry out the particular details of the practical application of preventive and curative medicine.

We must know that 1,170 lone health officers of this country can not effectively struggle with the problem of 110,000,000 people. After all, it is the average health officer, the average medical man, who must finally carry to the individual 110,000,000 people lessons of preventive medicine, periodic examinations, and so on. In speaking for industrial medicine, I believe that we have here a piece of machinery that offers great opportunities for the average doctor. The doctor in the field of industrial medicine has to cope with the problem of preventive medicine, periodic physical examination, and the other things we have heard about this morning which would bring about greater efficiency and a higher standard of living, thinking, and work.

May I say just this other word. I want to warn you men who have to plan these programs for the country to be careful not to plan in terms of the large city. After all, it is the small city that is your problem. The large cities plan for themselves. They have the means and the brains to work out their own problems. So in planning a public health program, it seems to me, that we must adjust ourselves to the work of the small city, and perhaps the larger units therein.

I have lost courage several times in the last few years in trying to emphasize and bring to the attention of the social engineers of this country the question of the value of industrial medicine. But recently I have taken courage from just one experience. On the way here I saw a former assistant of mine and he told me in the five minutes that we were together things that may be of interest to you. In an industrial plant where there are 2,000 men and women, equally divided, and where no industrial medicine had been carried on, excepting that of an industrial nurse, almost on the

first day of his work 116 cases voluntarily presented themselves for attention. He found 4 cases of tuberculosis, 2 sinus infections, and a series of other focal infections—all on one day—besides the usual kind of cases that appear in an industrial dispensary. I believe that in an average good industrial clinic they see from 4 to 6 or 7 per cent of the employees in one day. Of course, no such thing occurs in private practice.

With the above day's work in mind we may agree with the following definition: Industrial medicine is the knowledge of medicine, surgery, personal hygiene, sanitation, and safety, as well as the economics and psychology of business management daily and intensively applied to groups, for the purpose of preventing and shortening disabilities due to illness and accidents, of adjusting unhealthful working and living conditions, of correcting unhealthy attitudes toward the job, thereby increasing individual efficiency, mass production, and contentment. Doctor Quimby, at Watertown, has reduced the average number of days of sickness from nine to three.

If periodic physical examinations, daily supervision of workers and working conditions, if early diagnosis of disease contribute anything to public health, to the clearing up of physical defects and inducing hygienic living, then the training of industrial physicians becomes a vital part of any economic health program and should be reflected in the education imparted to the modern health officer.

In support of this idea I would present the following statements which seem to be more or less axiomatic:

First. We are living in an industrial country, in the era of "The Iron Man," with the resulting problems of health and physical efficiency.

Second. The industrial physician is the humanitarian answer of medicine to the health needs of all groups in this era.

Third. A physician devoting his whole time to the health problems of industry will deliver more units of useful surgery, of diagnosis, of curative care, of preventive medicine, of educational hygiene both collective and individual, than can possibly occur in the private individualistic practice.

Fourth. Placing a physician in industry, in stores, banks, etc., makes health a part of the workaday life—adds it to the cost of doing business—puts health matters on a business basis.

Fifth. Consultation for diagnosis is encouraged by the industrial physician to a greater degree than by the practitioner because the industrial physician's failures stare him in the face daily; his uncured cases are advertised to all of the group, including the management.

Sixth. The industrial physician sees the human machine under a load test. He sees it gradually get out of alignment and makes repairs before a complete breakdown occurs. Before and after an

illness he adjusts the load to the ability of the weakened human machine.

Seventh. In the supervising of as few as 5 per cent of those gainfully employed the industrial physician perhaps makes more physical examinations per year where no illness is involved than are made on the other 95 per cent of the workers. (Less than 3 per cent of the policyholders of the Metropolitan availed themselves of the free periodic examinations offered to them. Those that did accept showed 67 per cent reduction in mortality.)

Eighth. Teaching the breadwinner the worthwhileness of personal hygiene, prompt attention to minor injury and illness and the value of physical examinations, means that more money will be cheerfully spent on these same facilities for the members of the family for whom he or she provides.

Ninth. In case of preventable illness or accident under a system of industrial medicine the worker blames himself for the loss of wages and knows his employer is being robbed of production. In the other case, he usually curses his "bad luck" and feels that the physician in private practice is fattening on his God-sent misfortunes.

Tenth. Industrial medicine is one of the safe, sane stop-gaps between whatever is unsatisfactory in the present system of medicine and that much heralded socialized medicine. It supplies the economical advantages of the organized treatment of large groups, but preserves the real values of the individualistic competitive system. Our statecraft is of such low grade that we should desist from overloading our ship of state until the present political leaks are stopped.

Eleventh. Industrial medicine now supervising perhaps 4,000,000 workers and employing the part or whole time of possibly 2,000 physicians has developed in spite of the indifference of our medical leaders toward this specialty and has attracted many good men despite the patronizing attitude of the profession at large. It has succeeded in the face of this opposition because it is economically and socially sound.

Twelfth. The sanitarian should be the strongest proponent of the extension of industrial medicine, which is applying preventive medicine, collective and individual, in its most intense form—compelling periodic physical examination and demonstrating the value of the prompt seeking of medical attention and early diagnosis. Sanitation and the detection of contagious diseases and of sources of occupational disease add further argument to the value of the industrial physician's work, to say nothing of his ability to furnish reliable morbidity statistics covering large groups.

Thirteenth. If mortality and morbidity are to be reduced to the minimum it must be through the more direct appeal to individuals to observe the laws of personal hygiene, to avoid quacks and nos-

trums, and to seek the physician's aid early If such interest be placed on an economic basis, as in industry, this program will be definitely accelerated.

In closing, we must, as I have said, be careful that in planning for the education of the public health officer that we do not think too much in terms of the needs of large cities. Our purpose to-day is to lengthen the span of life by assuring positive health, increased bodily and mental vigor, so as to increase the pleasure of work. We must improve the environment of work and of living from the physical and mental point of view. To increase the comforts and conveniences of the average man we must increase production, for, after all, society greatly depends on those who work with their hands. Here we find the greatest neglect. Therefore to raise the general standard of living we must apply our energies and life conservation to these groups whom we will find most ready to accept our teachings. This instruction can best be given during the working hours, when the minds are most impressionable.

Interest in personal hygiene begins with the revelations of the physical examination. Gunshot prescriptions in personal hygiene, fired at the mass of people, do not hit the target. The science of right living follows knowledge of the needs of the individual discovered by physical examinations and not by mind readings. The industrial dispensary, with its physical examinations and opportunities for daily follow up, with its accessibility to the patient for minor ills and complaints, is perhaps the only machinery to-day that determines the extent and character of physical defects of adult groups of individuals, and which also is ready not only to educate but actually care for those physical and mental needs, or to see to it that the specialist and others are consulted.

The industrial physician is the countercurrent against intense specialism inasmuch as he enjoys that very valuable personal relationship of the general practitioner to the individual, where the sense of touch, eye, ear, and hand combined with a friendly relationship with the individual, a knowledge of his job, and an ability to measure his efficiency in that job, to know his mental reaction to the job. These frequent contacts and observations, occurring in the industrial dispensary, do more perhaps to actually bring the man to his highest capacities for enjoyment of work and life than result from the spasmodic attention, the shuttlecocking from specialist to specialist.

If every public health officer, every professor of hygiene and preventive medicine, every specialist, every surgeon, would spend several days a year in a good industrial clinic, his viewpoint of medicine as a whole and of the application of his particular specialty to the masses would change. These specialists would appreciate that the

prompt education of a large group of industrial physicians would be the best way of taking the pressure off the public health officer, at the same time supplying a greater number of people with adequate medical service. All phases of industrial medicine should be brought into the schools of public health so as to give the student a slant on workaday life—to see preventive medicine, physical examinations, and curative medicine closely combined.

PUBLIC-HEALTH EDUCATION.

Dr. C. E. SEASHORE, *Chairman Division of Anthropology and Psychology, National Research Council.*

I wonder how many of us feel well qualified to go into the job of public-health education after listening to this morning's program. It is particularly gratifying to notice the distinct trend away from the material attitude and from the attitude of formal instruction, and this health movement carries this symptom together with many other movements which are going on at the present time. What has been called natural evolution for the determination of society seems to be passing, and the deliberate voluntary control of social evolution seems to be the program ahead of us and this is a large part of that movement. It is particularly gratifying to look forward not only to the remedying of disease, not only to the prevention of disease in those who come up to the average standard of to-day, but rather to human betterment. In my State of Iowa we have had a slogan which I had the pleasure of starting in more than one community: "Better average children in Iowa." I would say, "Better average men and women" should be our slogan in health education.

Now, I have formulated a very brief statement from the point of view of the psychologist as to what can be done to help the educator to organize this program.

From the psychological point of view the first fundamental need in the organization of health education is a job analysis, i. e., a critical and constructive inventory of the situation showing, in profile, the various aspects of man toward which health education should be directed and the means at our disposal.

This inventory should yield a classification of the now recognized objectives of health education, carefully weighed as to relative prominence, and should fill the gaps representing neglected, unrecognized, and unknown objectives as deduced from a careful survey of the sciences, arts, and conditions which influence the health of man. Such a survey would throw into relief, first, a classification of the health acts and situations to be reached; second, an inventory of the motives, means, and avenues of personal appeal; and, third, the environmental approaches.

A good beginning in the first direction is Dr. McPhee Campbell's chart of the levels at which mental disorders may appear. Such a

scheme should be extended so as to cover in a skeletal outline all the disorders to which man is subject and, in so far as possible, some indication of the interrelations of these. This is within the province of medicine; but the problem should be solved with reference to the needs of health education, and thus becomes a pedagogical problem. Such a schedule of objectives should be popularized and adapted for all levels of instruction in order that teachers and those to be taught may actually acquire a clear conception of our objectives. Such a clarifying of the objective is also one of the most effective means of instruction and personal guidance. It gives orientation.

Parallel with this outline of objectives should be the outline of motives and means of influencing men. It is one thing to teach the laws of health; it is quite another to make this knowledge mold the emotions and impulses and pave the way for right action. The demand is not so much for knowledge as for a motivation of health activities.

Parallel with these two reliefs we should have a relief of the means of betterment of the environment in the interest of health. This is strategic not only because a healthy environment is essential to good health but pedagogically because nine-tenths of the people readily grow enthusiastic about the betterment of the environment where they might resent suggestions of direct self-betterment. This approach has the advantage of being concrete, tangible, and satisfying.

Give us a job analysis showing the possible approaches for the betterment of the health, not only in sanitation but also in orderliness, comfort, and beauty, and we shall have one of the most effective approaches to the health betterment of man. Indeed, it would be an interesting experiment to determine how the personal health and happiness of a people might be changed by a cooperative program of civic betterment of the outward conditions of health. A good example of this is the campaign against infant mortality so successfully conducted in some quarters. Pedagogically it is important that this environment betterment should be a cooperative affair, arising so far as possible from initiative within the social group itself; because it is only in participation in activities of this kind that the individual really feels himself into the movement. Federal, State, corporation, and other official betterment of the environment often fails to reach the individual and even fails to be appreciated. But let us educate the individual to initiative and give the social group of the community the feeling of responsibility and the joy of achievement, and the individuals will identify their personal lives with the environmental improvement. It is worth while for the sanitary engineer to investigate this principle of pedagogy; and the educator should know where to begin education; namely, by teaching the people to do these out-

ward things for themselves. Pure-food agitation would be a good example.

In the second place, we need to make personnel specifications in health education somewhat on the order of the specifications now being formulated in the United States Army for the division of labor, for determining fitness for each branch of service, for organizing training for each unit, and for integrating the various branches of service.

There was a time when the shoemaker in the village not only shod both men and horses, but pulled their teeth and preached in the meeting house. As industry has differentiated, so health education must be organized into a large number of coordinated specialties: each with a knowledge of the other; each respecting and profiting by the efforts of the other; each the exponent of its most highly developed science, art, or skill; and this must be done in the spirit of science and not of formality and officialdom.

This is the opportune time to take an inventory of the health promulgating agencies of our day and thereby secure two most desirable things—the division of labor, and cooperation.

It is now recognized that teaching requires professional training. We must therefore recognize and specify professional training for the teachers of health education, and we must provide for the specialized training of officers for the direction of civic health betterment through various forms of sanitation, and other health promotion.

We need, in the third place, a critique of specific methods and means. By the introduction of scientific methods of analysis and motivation of the task more advance has taken place in the teaching of reading, spelling, and arithmetic in the last twenty-five years than in the previous twenty-five hundred years. The more complex the object, the more need there is for logical designing and experimental evaluation of the medium, the method and its results.

Recent studies in the field of motion-picture films in sex education show the enormous complexity of the situation and the countless dangers inherent. Telling a child not to do a thing is often an inducement for him to do it. Exposing the horrors of a situation often stimulates the instinct of exploitation. What is grateful knowledge to the ignorant person may be an insult to a cultured man. Familiarity with effects tends to make them commonplace. Intense fear may aggravate nervous disorders.

At present we do not know whether, on the whole, the films now used are having a good or bad influence; but that is no reason for abandoning them. It should merely stimulate us to a rigid and constructive experimental procedure in the adaptation of this extraordinary avenue of appeal; and in this we have much to learn from the films which to-day are most influential in corrupting public

health. For the laws for learning the good are very often the same as the laws for learning evil.

We must learn especially how to give health acts a setting in what to the young in particular is regarded as good fellowship, good nature, propriety from the point of view of the group, generosity, bravery, courage, competition, and reward. We must use the leverage of humor, laughter, scorn, ridicule, just at the level at which there is a spontaneous outbreak of the person appealed to. We must not forget that self-control and self-direction can not be taught in one lesson nor ten. It is not fair to expect marked, positive good from the showing of one film, no matter how impressive or instructive it may be. It would be the utmost folly to depend mainly on the counterattack through films. We must motivate the source of corrupt films not only by judicious censorship, but more effectively by soliciting the interested cooperation of the professional entertainers in the promotion of the health program for the public. We already have this in part, and by organized, sympathetic effort it can be extended with extraordinary effect. Film to-day is a most effective teacher because it is not regarded as teaching, but as entertaining. It deals with actual life in the concrete; it sets the tone of the community. If we can get the movie audiences to laugh and weep at the right thing, we shall be touching the sources of conduct.

In brief, I have tried to point out that in the interests of health education we should have a thorough clarifying of the health objectives, of the means of influencing men for health, and of the methods of working through the environment. The organization of health activities, shown in their true relations, requires personnel specification for division of labor, for determining fitness, for organizing training, and for integrating the various types of service. The work so organized will then proceed through systematic, educational experiments, testing methods and means.

Each of these activities in human engineering requires a knowledge of normal human nature. This fact has been neglected with obvious results. It is being neglected at the present time in institutions which train health officers. I therefore enter a plea for the recognition of training of health educators in psychology regarded as the science of human behavior, the explanation of its nature and laws, and the direction of its forces.

DISCUSSION.

Chairman, Dr. William H. Welch:

There remains some time for discussion. I think it is very desirable that several here in the audience should have an opportunity to participate in the discussion, so I trust that those who are assigned

for the discussion will not take more than five minutes apiece. May I volunteer the suggestion that I trust the discussion will relate very largely to the problems of education, training for health officials, and, of course, for those going into any other activities in the health line. The subject for the morning is essentially the educational side of our topic. Doctor Ravenel will open the discussion.

Dr. M. P. Ravenel:

I believe we all will agree as to the essential truth of what has been said in the admirable presentations to which we have just listened. It is, however, evident that it would be a very wonderful man who could acquire expert knowledge of so many different subjects, especially in the length of time which is usually allotted to one's education. Should such an one be found, he would be a macrocephalic monster, and not much use as a health officer. It must also be recognized that the time allotted does not allow of any full discussion of so broad a field. I will, therefore, confine myself to a few practical points.

Admitting, as we all do, the essential facts which have been presented to us, and their value to the health officer, it must be remembered that what we need is a practical man—one who combines fundamental knowledge of these subjects with common sense, and the ability to put his knowledge into effect. The health officer must be a man who is fitted to translate research into practice, and who can carry to the common people, in language which they can understand, the message which the specialists have formulated.

I deprecate the multiplication of degrees. For practical purposes, the two outstanding ones are sufficient—certificate or master of public health and doctor of public health. What we need is a degree which will certify to the average public a man's qualifications for the position of health officer, and will guarantee to them that he has pursued courses of study which fit him to be the guardian of health in a certain community.

I would lay special stress on the personal qualifications of those desiring degrees in public health. Not only must the health officer be a master of the material which is furnished to him by the schools, but he must have personal qualifications which will enable him to be a leader in his community; a teacher not only of the public but of the medical practitioner. I am one of those who believe that the medical degree should be a prerequisite for any public-health degree. In the future, when we have obtained an abundance of health officers who have added this special training to their medical degrees, it may be advisable to allow others who have taken certain medical studies to take also the doctorate of public health. In view of the condition of things as they are at the present time, a medical degree seems to me to be necessary.

In the training of medical men and health officers, too much stress has been laid on contagious disease and its prevention and not enough on good health and general fitness. Even the terrible influenza epidemic, which cost so much in money and in the lives of those who would doubtless have become useful and even great citizens, has not left any scar on our Nation at all comparable to some other diseases which bring about incompetence and dependency. It is the cripple who is a drag on the Nation and not the man who is gone. We have in the past spent too much time teaching men physical examinations for the detection of disease and too little time in teaching such examination for health.

It has been pointed out that teaching along almost all lines is too far removed from practical application. As in medicine, so in public health, it takes the graduate a long time to find himself and to learn the application of his knowledge to practical matters. The English system of training medical officers of health obviates this to a certain extent, and it would not seem difficult to devise ways in this country by which the aspirant for the position of health officer could be farmed out, as it were, to learn the actual practice of public health work. We have, in our Public Health Service, the largest and best trained body of sanitarians in the world, engaged in public-health activities of every sort. Surely, some plan can be found by which students could be placed in different divisions of this service for practical training.

In closing, I would once more emphasize the importance of selecting students. I could wish that the psychiatric tests, which Doctor White has spoken of, could be applied to all applicants entering schools of public health. The health officer should be fitted to his job. I would exhort the bishops and other officials serving in the Temple of Medicine to apply to students what an English poet advised in regard to students of the church: "Lay not careless hands on skulls that can not teach and will not learn."

Dr. Willard S. Small:

Doctor Welch has limited us to five minutes and said that we should discuss some matter relevant to the program. It would be difficult to discuss anything not relevant to the program, as the universe has been pretty well looked over. But I want to confide to you that I was not given any liberty of choice; I was told to discuss the last topic just presented by Doctor Seashore. In doing this, I must adopt, because of the time limits, the dangerous expedient of making unqualified statements when every statement should be qualified.

Now, I am in full agreement with everything that was said by the last speaker, Doctor Seashore, and I have very little to contribute.

I want to say this, however, that we must get a better idea of what public-health education means.

In the past as the term has been used it has too frequently meant nothing but propaganda. It has meant selling public health knowledge to the public. And the methods employed have been advertising methods, good or bad, as the case might be. Judging from the results, except in certain specific instances, they have not been very effective. Doctor Seashore, of course, is right in saying that all these methods by which we attempt to sell public health knowledge and faith—because it is that—must be subjected to reexamination. After all, propaganda means nothing but creating faith or supplying faith. It means nothing but influencing the mass consciousness for that purpose and making mass consciousness assent to and conform to certain things that we want done. You, as public health workers, want certain things done; you want your public to react in a certain way.

Now, I have little faith that propaganda alone is going to get you very far. In my opinion, the really important things in education are not achieved by bold and unsupported propaganda methods. They are not brought about that way. They are brought about by long, intensive, and carefully planned efforts in education. Somebody referred to the fact that it took the world 50 years, two generations or more, to assimilate the new knowledge brought back to Europe by the discovery of America. It is going to take us a longer time than that to make generally effective the new knowledge of science, which is the working material of those who are to choose careers in public health. The influence of personal contacts, industrial physicians, social workers, and family physicians will be unseen but potent.

One other thing I want to say is that if we are to have an assent on the part of the public that will be thoroughly effective for you, it must come through the education in health of that which we are pleased to call the educated part of the public. Even if it were possible to win the assent of the mass of the public by unaided publicity methods, it will not be possible to get over effective programs until the educated part of the public, the few leaders in every community who set the standards and give the momentum, are genuinely educated in health. We have got to reach the higher educational institutions which educate that 10 or 15 or 5 or 1 per cent who are leaders of communities, in order that they may be intelligently and scientifically furnished with respect to personal and public hygiene. If we can do that, we shall have on the part of educated men and women the basis upon which the public health official can depend for assent and consent to essential programs and for dynamic power in the community in getting the programs over.

Dr. Donald B. Armstrong:

I need not say that I can not claim to be the wonderful five-minute man that Doctor Ravenel spoke of, so I shall take up very little of your time. It seems to me that out of this series of admirable papers have come two or three points that would bear emphasis. The first is the question of qualitative standards, to which both Doctor White and Doctor Smith referred. In particular, there is the necessity in our medical schools of teaching the physicians not only to recognize disease, but also to be able to examine for health.

There is also another important point that has not been touched upon so extensively and that is a question of quantity rather than quality. If we are to have, as Doctor Frankel urges, universal medical examinations, if we are to have in our schools and industrial establishments the thorough medical and nursing work which is necessary, if disease is to be detected in its early stages and if hygiene is to be encouraged, an adequate supply of physicians or sanitarians for this work greatly beyond our present resources must be created.

Finally we come to another point that has arisen in my mind out of Doctor Seashore's paper, the question of the application of modern psychology to public health education and public health work in general, and in particular the economic and social aspects of our problem. There is a relationship between the economic status of individual workers and their health. There is an ascending stairway, good wages lead to good health, and a descending stairway of poor wages and poor health leading down to disease. Now, that is one side of the problem. The other side is this: How are we going to make sure that the worker makes use of an adequate income for health? That question applies to you and to me and to all of us. It is a question which I think we are always up against. Therefore, we must look to psychology to tell us how to find a motive force that will make our knowledge of hygiene effective for the individual and for the improvement of community life.

Dr. Hermann M. Biggs:

I just want to say one or two words first, in reference to Doctor Freeman's excellent address, in regard to the date of the beginning of the modern public-health work in the United States. The date was given as 1900. That is a serious mistake, I think. The activities of the New York City health department began in 1890. The tuberculosis work began before 1890; the public health laboratories were established in 1892. Child hygiene was going even before 1890 and the tuberculosis work was very actively going on long before 1900.

Then it seems to me that the significance of the public health laboratory in the development of the public health in the United States and the present situation was not sufficiently emphasized.

The public-health laboratory in my judgment is the most outstanding feature of the public-health work in the United States and it has influenced and it is bound to influence the future fundamentally.

I wish to disagree with almost everything that the last speaker (Doctor Small) said; all the things he said about educating the leaders in order to develop public-health education. It seems to me that we have accomplished almost everything by propaganda. The achievements have been outstanding. No one who commenced public-health work 30 years ago could possibly be uncertain about the achievements that have been brought about. They have resulted from propaganda and from nothing else. The death rate in New York City from preventable diseases has been reduced 50 per cent. This has been by the education not of the highest class, but of the lowest class. The speaker is going to educate the few leading men in the community. They are the last ones that I should deal with. The proper thing is to educate the children and the population of the tenement houses, and when you have taught them you can turn to the so-called educated groups. Last of all comes the medical profession. The most difficult element of the population to teach is the medical profession. In New York we have not found that we could bring the medical profession into line by direct attack. First we educate the tenement-house population and teach the children. They will teach their parents. The parents in turn teach the medical profession. You can teach the mass of the people and they will teach the leaders.

Chairman, Dr. William H. Welch:

I was impressed very much by the statement made by Doctor Freeman. I understood him to picture the general average, and he was very careful, I think, to safeguard his statement with a few exceptions, and New York City would certainly have been one of the exceptions.

Dr. George M. Kober:

The achievements of hygiene and public health in the United States are certainly very gratifying to all interested in this movement. Much has been accomplished and much remains to be done. There is certainly need for additional health officers in a great country like ours, and the question is how this supply is to be assured. We all know that the average young medical student is of a sympathetic nature and that courses can be arranged to appeal to these students in the medical schools. I believe that certain influences with which he may be surrounded can be called upon to interest him in the prevention of diseases, because after all the highest aim of scientific medicine is the eradication of preventable disease. With such an attitude of mind the student would not find it a bore to listen to a regular systematic course of hygiene, and undoubtedly these courses

will stimulate interest and enthusiasm in preventive medicine. This much every medical school and professor of hygiene owes to the public. Much can be done in undergraduate courses to prepare the way for subsequent training in public-health work. With two well-endowed schools of public health now in existence the opportunities for proper training for a special career are certainly ample. I believe the demand for full-time health officers will be fully met and quite a number of cities may be willing to pay a fair salary and make such positions more permanent.

A more important and difficult problem is what can be done for our rural districts. I feel that many young medical men would gladly enter the field if they were assured of any adequate wage. How can we make it possible for such men to take up public-health work and make a living? The answer would be the employment of salaried men with privilege to engage in private practice. You all remember that Robert Koch, one of the greatest leaders in scientific medicine, was nothing but a county physician and health officer, and while so engaged also did great things which placed him in the front ranks in medical science. All that is really necessary is for a man to be interested in science and the ways and means will be found. But I suggest, in seeking a solution of the problem, some expression should be given by this body that the people of the Nation owe it to themselves to provide competent health officers and country doctors and to assure them an adequate living.

Chairman, Dr. William H. Welch:

The subject Doctor Kober has brought forward is one of first importance. It is a subject which it is essential to consider. I think it is included on the program later. It is perfectly obvious that unless rewarding careers are open to those who have spent time and money in getting the necessary extra training no matter what opportunities may be provided we shall fall very far short of our aim.

I would like to hear a point touched upon that seems to me of rather fundamental importance, namely, how can we systematize the methods of practical training for those who are engaged in study in our schools? It is perfectly obvious that the organized health departments of a State, county, and municipality, the public health laboratories attached to them, and also the hospitals for infectious diseases must furnish for students of hygiene and those contemplating careers in public health the sort of training which ordinary hospitals do for medical students. But it has got to be systematized; it has got to be better arranged and made more generally available. We are hoping in connection with our school in Baltimore to secure an area in the city which will be of course under the city health department but in which the health authorities will be aided by the school of hygiene. Possibly other teaching areas for the study of certain problems may

be secured. I agree with the importance of emphasizing training in a small town and rural hygiene, and believe rural areas should also be secured.

I would like to have this matter discussed if possible. How can we secure for our students at least three months of practical training right in the field which will in a way correspond to the training afforded medical students in our teaching hospitals?

In some way the various organizations must cooperate with the schools in order to enable them to supply this training. The English system of training for the development of public health officers is very good so far as it goes. But I should hope that something more than mere apprenticeship training would be provided. They are waking up to the situation in England. I would like to hear any discussion along that line. Can we have something corresponding to teaching hospitals for medical schools in the way of teaching physicians in the various governmental health organizations?

Dr. Alexander C. Abbott:

We are trying an experiment at Pennsylvania. Whether it will work out successfully or not I do not know. The health department of the State of Pennsylvania—I speak only of Pennsylvania—and the health department of the city of Philadelphia put at my disposal all their facilities and enable me to send students who have been fundamentally trained to serve an apprenticeship. I like the word "apprenticeship" because that is precisely what I want. The apprenticeship may be good or bad according to the manner in which the work is controlled. If a student be placed in certain of the divisions of the departments of health that I know in my own city and State and no warning given to him, I can imagine that a good deal of what we have done for him may be destroyed. My plan has been to place students in such divisions with the requirement that they give to me at the end of their apprenticeship a written criticism of all they have seen. Such criticism will be evaluated for the degree or diploma toward which they are working. That plan, up to the present, has put the students on their mettle to such an extent that most of the defects are readily seen and often constructively criticized. I do not know how the method will turn out ultimately, but I believe it is worth trying further.

Dr. M. P. Ravenel:

About 10 years ago I took this matter up before the Public Health Association. Before doing that, I corresponded with the Surgeon General of the United States Public Health Service, which is doing every sort of public-health work, and so would be particularly valuable as a training agency. I would like to ask before this conference adjourns whether the Surgeon General can not inform us concerning the possibility of using the Public Health Service for part of the training of public-health officers.

AFTERNOON SESSION, MARCH 14, 1922.

REMARKS BY THE PRESIDING OFFICER.

Dr. HUBERT WORK, *Postmaster General, United States.*

General Cumming asked to say a word himself, giving as a reason, "I want to tell these men what a great man you are." If you will notice, it took him less than a minute to cover the subject. [Laughter.] I am encouraged by his reference to my different occupations to hope that because of my diversity of interests you will not expect a long speech or a very scientific one.

Curiously enough, in the period between the time when I first began to study medicine and the time when I ceased to practice, I saw the field change from curative to preventive medicine. There is no general practice of medicine, nor branch of it, as pursued in these days which does not have for its ultimate object prevention. The whole system of medicine resolves itself in its last analysis into preventive medicine. We instruct how to prevent acute diseases; to prevent contact by infection and by contagion wherever possible. If disease does occur, our whole effort is to prevent sequelæ that may be dangerous or disabling after its acute stages have passed. If there are conditions that must be corrected, they are taken up by practitioners of medicine and relieved if possible. Even this is in line with preventive measures. It may not be its immediate purpose to prevent death, but to prevent disability or death coming indirectly, through impairment of health. The removal of adenoids from a child, or of the tonsils, now a common recognized practice, is really preventive medicine.

The greatest exponent of preventive medicine is the United States Public Health Service. Recently I heard a very distinguished man say at a dinner that the United States had the best equipped and most efficient Public Health Service of any country in the world. I did not realize it had attained to such distinction. I realized its efficiency and responsibility in what it was created for. Its functions originally were those of quarantine—quarantine, of course, as locally applied and also applied between nations. But during the late disturbed period of war the United States Public Health Service went through the most trying period of its existence. It was asked to do things that it was never intended it should do, and to do them without sufficient men or adequate appliances. Yet it did in a remarkably acceptable way work that was quite foreign to its previous duties.

Medical education when I first went to medical school was all directed toward curing disease. We at that time called it "curing diseases," although we later became more modest and stated that we

"cured" nothing, but "assisted" in recovery. However, the diseases which we were taught to diagnose, recognize promptly, and to treat have almost disappeared. In the first few years of my professional life I was largely supported by typhoid fever. Now it is a rare disease. I recall the first year of my practice when I was 40 miles from any other physician that I went through an epidemic of diphtheria with a mortality rate of 40 per cent—not considered extraordinary at that time. Now that could not occur. Typhoid fever has been or can be abolished, and the death rate from diphtheria is very low. The day of preventive medicine is here, and it is the duty of physicians to encourage educational schools to instruct their students thoroughly in preventive medicine.

We have developed curative medicine well toward a point of perfection. We must now turn our attention to the development of schools for public-health officers and for sanitarians and to bring them up to the demands of the public. The public has advanced really further in their conception and their sense of the necessity of preventive medicine than has the medical profession. It now acts promptly if it anticipates some pending disease in order that the people may be protected. The medical profession should advance with the people and teach them what should be done to prevent disease or its sequelæ.

I was going to speak of irregular practitioners; the pathies and cults and those associations that feel it necessary to attach some prefix to their names to distinguish them. They are opposed to preventive medicine and to the contribution of funds by the Government to the Public Health Service. We would like to assume that they do not understand that all of this money is spent to prevent disease. The difference between the purposes of the quack and of the physician may be summed up in this statement: The physician prevents disease; the quack invents it and preys upon it for his own financial advantage. There never has been a time within my recollection when the cults and tradesmen using medical titles for the purpose of furthering their business were more active and less effective than now. The public has educated itself, but I think it wise for physicians, whose first object is to prevent disease, to realize that it is time they get this fact before the public and demonstrate that this is their purpose and that they are not waiting around until disease occurs with the idea of curing it for a fee.

III. WHAT KIND OF SANITARIANS ARE NEEDED FOR THE FUTURE?

INTO WHAT SPECIALIZED FIELDS WILL PUBLIC-HEALTH WORK BE DIFFERENTIATED IN THE FUTURE AND IN WHAT COLLEGES AND PROFESSIONAL SCHOOLS WILL MEN FOR THESE VARIOUS FIELDS BE TRAINED?

C.-E. A. WINSLOW, *Professor of Public Health, Yale School of Medicine.*

It is essential in considering the problem of the training of sanitarians to recognize at the outset that public health is not a definitely delimited discipline, an individualized branch of science like chemistry or mathematics. It is rather a field of social activity employing diverse groups of specialists for a common aim. When we employ the term "public-health worker" we are using a classification based on objectives rather than on technique, a regional not a functional classification.

In attempting to enumerate the different types of specialists involved in the modern public-health campaign it is easy to elaborate a list of public-health workers so extensive that our ambitions seem to embrace the entire range of human thought and action; for the field is a temptingly inclusive one. I shall limit myself this afternoon to the clearly differentiated types of public-health workers who are to-day actually employed by State or municipal departments of health and of education and by voluntary public-health organizations. Even with this limitation one can not avoid the enumeration of more than a dozen separate types, which may be grouped for convenience under four main heads according as their basic interests concern: (A) the human body; (B) its nonliving environment; (C) its parasitic foes; and (D) the social organism of which it forms a part.

(A) Specialists whose viewpoint and training are primarily concerned with the human body and its functions.

1. *The physician.*—The physician has always been the leading figure in the public health campaign, and if I am correct in my estimate of the tendencies of the present day the growth of public dispensaries and other agencies of State medicine will inevitably produce a closer and closer approximation between the fields of medicine and public health. Official health authorities and voluntary groups interested in the public health will more and more tend to practice medicine and the private practitioner will to an increasing degree become an auxiliary in the public health campaign.

2. *The nurse.*—The nurse is second only to the physician in the conduct of the public health movement at the present day. She is par excellence the teacher who carries the gospel of health into the individual home, and I am convinced that by far the most efficient type of public health nurse is the nurse who combines with her educational work the actual care of the sick on an hourly basis. Here, even more than in the case of the physician, it is clear that the principal energies of the nursing profession will steadily and surely be incorporated in the public health campaign.

3. *The nutrition expert.*—With the present emphasis on education in nutrition as a basic factor in the promotion of health the expert on nutrition is becoming an essential factor in the work of health centers, visiting nurse associations, and the like, and will almost certainly in the future be frequently employed by the official health organizations of city and State.

4. *Expert in physical training.*—The specialists in physical training employed by departments of education may very logically and properly be considered as members of the army of public health.

5. *The dentist.*—The dentist and the dental hygienist must naturally be recognized as essential factors in the machinery for safeguarding the health of the community.

6. *The psychologist.*—In addition to the medical man who specializes in mental disease and mental defects, we frequently find men and women trained specifically as psychologists assisting in the mental examinations which are so essential in the control of diseases of this type.

(B) Specialists whose viewpoint and training are primarily concerned with the nonliving environment of man.

7. *The chemist.*—The chemist, specializing in the application of his science to problems of water supply and sewage disposal, food control, and the testing of disinfectants, has long been a fundamental factor in the scheme of health organizations. His importance is relatively less great than it was 20 years ago, but in the laboratory of every State and large city he must always find a place.

8. *The sanitary engineer.*—In order to avoid unduly complex classification I would include under this heading not only the engineer who has specialized in water supply and sewage disposal but also the heating and ventilating engineer and the specialist on building construction—all workers, in short, who deal with the designing of material structures primarily from the standpoint of their effect on health.

9. *The inspector.*—We may naturally place in this general group one of the most important and most neglected figures in the whole public health campaign, the inspector in the control of sanitary conditions and in the supervision of food supplies. There is urgent need for a large group of men or women who do not necessarily require a college education but who do need substantial training of an elementary kind for which as yet no provision whatever has been made in the United States.

(C) Specialists whose viewpoint and training are primarily concerned with the parasitic enemies of man.

10. *The bacteriologist and the protozoologist.*—As in the case of the sanitary engineer, I am using this classification in a broad sense to include all workers whose fundamental interest lies in the micro-

scopic world of life. Here will come not only the water bacteriologist and the milk bacteriologist but the student of tropical medicine, of pathology, and of immunology if his work be primarily along microbiological rather than medical lines, and also a small group of specialists concerned with the study of microorganisms which cause taste and odors in water supply. Obviously this is a group of supreme importance to the public health, ranking in this respect with the physician, nurse, and sanitary engineer.

It will be noted that I have made no place in this tentative classification for the epidemiologist, as I have never been able to convince myself that epidemiology was in fact a distinct and separate discipline. The etiology of disease may be approached either from the standpoint of the physician or the standpoint of the bacteriologist or the standpoint of the statistician, and most epidemiological investigations can be naturally grouped under one or the other of these three heads or a combination of the three. Epidemiology, like public health as a whole, is a field rather than a method of work.

11. *The entomologist.*—A minor but important specialty in public health is that of the entomologist who will be called in as an expert and occasionally employed by a health department, particularly in the Tropics, for the study and control of insect carriers of disease.

(D) Specialists whose viewpoint and training are primarily concerned with the social environment of man.

12. *The sociologist and the social worker.*—The most advanced voluntary public-health organizations of the present day, such as hospitals, dispensaries, and visiting nurse associations, are already employing specialists in social diagnosis and social readjustments to deal with the economic and social factors which play such an important part in the causation of disease. Here, as in the case of the nutrition expert, it seems certain that public authorities will expand along similar lines in the near future, so that the social worker must be recognized as an integral part of the public health campaign.

13. *The statistician.*—The statistician as a figure in the public-health movement is as definitely established and as important as the bacteriologist and the sanitary engineer.

14. *The lawyer.*—Specialists in sanitary law are not numerous, but in the development of city and State organization and in the teaching of public health there must always be a place for the expert of this type.

15. *The expert in public health propaganda.*—As the public health campaign has become more and more consciously a campaign of education the larger State and city departments have begun to employ specialists in the technique of publicity. This is another field which is certain to grow and expand in the near future. The

technique of lecture service and the organization of exhibits, of motion pictures, of newspaper and other publicity is a technique which can only be fully mastered by one who devotes himself pre-eminently to this special type of service.

The most conservative classification of public health workers must, I believe, recognize at least the 15 types listed above, and I am sure that the enumeration errs on the side of omission rather than on that of too great inclusiveness. It will be noted in particular that I have made no mention of the public health administrator and of the teacher of public health. I have omitted these two workers because I have tried in this outline to define definite functional fields of activity and because the administrator and the teacher must deal not with the functional field but with the application of all or sundry of the specialties that have been indicated above. The public health administrator and the teacher of public health will in general receive his basic training in one or the other of these specialties and with one or the other of these viewpoints; and as his knowledge broadens through experience or through postgraduate education he will gradually assimilate and correlate the various factors in the general problem.

In the past the public health administrator has generally received his first training either as a physician, a bacteriologist, a sanitary engineer, or a social worker, and men from all of these disciplines and others will continue in the future as in the past to earn through native merit and the power of growth the right to serve in administrative capacities. It is obviously possible, however, to devise a special type of training which will combine those elements of medicine, of bacteriology, of sanitary engineering, and of vital statistics which are most essential for the sanitarian and will directly prepare the student for administrative responsibility in the public health field without making him at the same time a qualified physician or a fully equipped sanitary engineer or a specialist of any other kind. The lack of men combining medical and sanitary training in the past has made the development of such courses seem imperative. My own teacher, the late Professor Sedgwick, was the pioneer in this field, and shortly before his death he urged that medical schools should be reorganized on "the Y plan" so that after two common years the students should in the last two years diverge either to the degree of doctor of medicine or to the degree of doctor of public health. Whether this type of special training for a nonmedical doctorate in public health will prove wholly adequate or whether the tendency will be rather toward a course of perhaps five years involving the taking of both medical and public health degrees the future alone will show.

In any case it seems clear that a school of public health is less a parent stem from which its various specialties branch off than a finishing place at which men trained in diverse fundamental disciplines may come to gain a broader knowledge of the place in this field of their own specialty. For certain types of workers specified above such subsequent extensive education is not essential, since the specialized nature of their work makes it possible for them to render adequate service without passing beyond the limits of their chosen field. In this group, requiring merely the specialized training which they may receive in the ordinary college or university, I should place the nutrition expert, the expert in physical training, the dentist, the psychologist, the entomologist, and the lawyer, while the sanitary engineer, unless he desires to become an administrator, needs nothing more than he can obtain in the broadest and best existing schools of engineering. Most of the other types of workers after completing their fundamental course should receive in a school of public health at least one year of education which will fit them to apply the viewpoint they have acquired to the broader problems of sanitation. The physician who is to play a large part in the public health campaign must be more than a physician. The nurse who is to be a satisfactory public health nurse must take the eight months' graduate course in public health nursing now provided in so many American cities. The bacteriologist must add to the bacteriological training he receives in college special advanced work in bacteriology and a broad vision of the other disciplines that contribute to the art of public health. The chemist is a similar case. The social worker and the statistician, in addition to a broad college training in the social or statistical sciences, should spend at least a year in learning what the public health movement is about; and the public health propagandist, in addition to an ordinary college training, should also devote at least one academic year to the study of the problems he is to teach. It is for this purpose—of converting the physician, the nurse, the bacteriologist, the social worker, the statistician into a public health physician, a public health nurse, a public health bacteriologist, a public health social worker, and a public health statistician—that the certificate in public health has been created, including, as it does in most of our leading universities, fundamental courses in the principles of public health and sanitary engineering, in public health bacteriology, and in vital statistics, so as to give a broad conspectus of the entire field and permit additional specialization along the particular line which the student may desire to pursue.

For the advanced worker, and the teacher, in any of these specialties such as sanitary bacteriology, sanitary chemistry, vital statistics, and the like, the ordinary degree of doctor of philosophy must be open, and for the administrator our more conservative universities

reserve the degree of doctor of public health, representing the essential equivalent of two years of postgraduate training following the medical degree, or correlated with the medical degree in a combined 5-year course.

I am inclined to believe that the experience of the past 10 years has not only clarified our thought in regard to the field of public health and the kind of workers needed to cultivate it, but that it has given us in the C. P. H. (or its equivalent, the M. S. or M. A. in public health), in the Ph. D. in public health, and the doctorate in public health essentially the educational machinery needed for the solution of our problem. Provision for the training of sanitary inspectors has as yet, however, found no place at all in our educational scheme, and this is a problem to which very serious consideration must be given in the coming years. In England it has been admirably carried on by institutions like the Royal Sanitary Institute, and it may well be that this type of training can best be organized outside the walls of the university and by special organizations created for the purpose.

As Doctor Rosenau stated this morning, it is simply a question of getting the right people to come in. We are not concerned with quantity—the quantity is all right. But the quality is not all right. Our chief problem is to attract the right type of young men and women as they graduate from our medical schools into this field of public health. This is a problem that must be worked out if our educational machinery is to be complete.

WHAT KIND OF MEN AND WOMEN WILL BE NEEDED IN THE LOCAL HEALTH UNIT IN BRINGING PUBLIC HEALTH TO THE "ULTIMATE CONSUMER"?

WALTER H. BROWN, M. D., *National Child Health Council.*

Had I been present at the meeting this morning and listened to the discussion of what it was necessary to know and to understand and to be skilled in before I had the temerity to accept the responsibility for the direction of a local health unit, I assure you that my courage would have failed me and I should never have been a local health officer. And yet I come to you this afternoon to make a statement that I believe is worthy of your consideration, namely, that the type of individual that we need in the field of public health at this moment is the general practitioner of public health. [Applause.] I believe this, notwithstanding the fact that I look forward with great enthusiasm to the time when each one of these men who must deliver to the ultimate consumer the things that we want delivered to him shall have all of this skill and all of these qualities and all of these specialities. But, pending that time, my friends, we must produce a group of men and women in this country who will do what the general practitioner of medicine has done—ordinary everyday tasks,

imperfectly perhaps in the beginning, until such time as we set up machinery, recruit personnel, and properly train it for giving to all the United States the specialized services every one of us desires to see for our country.

I believe that it will be necessary for us, therefore, to improve constantly the character and efficiency of the work of our local health units. Whether we like it or not, we have not been able to give to public health, in the minds of the average person and the people who control our governmental functions, the relative importance which its place justifies. I do not fail to recognize that we have made immense strides. Whether we have accomplished this by means of propaganda or otherwise is not for me to discuss. Nevertheless, it has been accomplished. We have made progress. But to-day we know that public health does not occupy its proper relative position. The assumption and the holding of this position depends upon a well-informed public which appreciates the value of the service being rendered. In the last analysis, our progress in public health varies directly with the efficiency of the local health units.

Now, I do not think that it is necessary for us to argue this afternoon what the most intelligent of our people now realize, that no modern community can afford to be without adequate machinery for the prevention of disease. Promotion of public health actually is possible; we believe this thing is practical. But we must translate our knowledge into machinery; machinery to make the available knowledge effective. This machinery includes a health unit that has adequate powers, sufficient funds, and a trained personnel.

It would be beyond the scope of what my subject includes to discuss with you the details of an ideal health service for cities and counties. They must necessarily vary in different parts of the country and with varying local conditions. However, it is well to say that we do have a well-accepted set of standards of the fundamental services that are required for the protection of the public health. These standards have been recorded in the numerous surveys of health administration by members of the United States Public Health Service; in the reports of city health officers, and, for the county field, in the "Transactions of the Conference on County Health Work" held at Johns Hopkins School of Hygiene and Public Health in December, 1920, under the auspices of the International Board. In other words, the pressing problem in the field of public health is not one of production nor of program but of selling and distribution.

The most important single factor required to secure adequate health service for a local community is a competent sanitarian. This particular health worker occupies a most important place in our present plan of health administration. He is the selling and dis-

tributing agent. Through him must be delivered to the "ultimate consumer" the accumulated results of research and experience. Consequently the success of our efforts to improve the public health will be largely conditioned upon the character, training, and experience of this group of individuals.

The type of sanitarian needed for this task is a "general practitioner" of public health. He should be well grounded in the basic medical sciences and possess a knowledge of the elements of medicine, surgery, and pediatrics. To this must be added a sound training in hygiene, sanitation, preventive medicine, vital statistics, and public-health administration. In addition he needs a speaking acquaintance with all of the specialties of public health. This is his technical equipment.

We have many courses of training which can furnish our sanitarian with all of this equipment. We have not provided, however, a way for him to acquire skill in "social engineering." By this I mean an ability to use all of the forces in the field of health, both official and nonofficial. Now it seems almost tragic that the public-health movement has not been able to utilize more fully the resources of the great volunteer agencies such as the Red Cross, National Tuberculosis Association, and American Child Hygiene Association. They represent a great potential force for securing support for the work of the sanitarian. They also help to translate into permanent governmental machinery the newer ideas for the preservation of health.

The successful leader in public health must by his presence and personality be able to influence people. Armed with a knowledge of social and political organization, he must be capable of meeting Government officials and the general public. This necessitates the ability to speak effectively and to exercise public-health diplomacy. Few trained sanitarians fail on account of a lack of technical knowledge; many fail for the lack of the qualities of leadership. It is true that some of these skills and qualities are difficult to impart, but our schools for training sanitarians should make a serious attempt to solve the problem. I am convinced that much can be accomplished by providing in our public-health courses a training in social engineering and the conscious stimulation of the powers of leadership in the student.

The details of training courses for sanitarians will be presented at a future session of this conference. I believe it is pertinent at this time to suggest that in addition to the training already mentioned provision should be made for actual "clinical" experience in order to produce the proper type of local health official. I believe that it is feasible to develop a practical method whereby selected State, city, and county health departments may become actual

training centers just as our great hospitals have become an essential part of our plan of medical education.

To summarize, the future progress in public health demands that the character and efficiency of the health units be improved and that public health be given its proper relative place among governmental functions. In order to accomplish this we must sell and deliver to the "ultimate consumer" the results of scientific research and practical experience. To this end we must produce a type of trained sanitarian who is a "general practitioner" with a speaking acquaintance with all of the specialties; has had "clinical experience"; is an effective speaker; is a social engineer; and who, in the words of Professor Whipple, "can understand the relation between community health and community environment; who is a sanitary statesman."

Now this is a difficult set of specifications for the ordinary health officer. But I believe that if we can remove the health officer from the field of partisan politics, giving him a reasonable tenure of office based upon efficiency, we can give to him a position that will enable him to meet his obligations as a man. I have absolute faith in the fact that if this message is presented to the young men and women of our universities and medical schools, out of that group will come a high type of idealists that will enable us to produce this new kind of statesmen.

WHAT KIND OF MEN WILL BE NEEDED IN THE FUTURE DEPARTMENT OF HEALTH, ESPECIALLY FOR THE LARGER ADMINISTRATIVE TASKS?

Dr. A. J. McLAUGHLIN, *Assistant Surgeon General, United States Public Health Service.*

The evolution of health departments and the widening of their scope of activity has necessitated the development of specialists in sanitary engineering, epidemiology, bacteriology, vital statistics, public-health education, and the newer aspects of public health. The great need for these highly specialized workers is now almost universally recognized. The question arises naturally, Do these specialists need the complete training of the health officer? I should answer that question by saying that if the specialist aspires to the higher administrative positions he should have the complete training of a health officer.

While specialists in various phases of public health work, bacteriology, epidemiology, vital statistics, sanitary engineering, or any other specialty may have this special training added to the basic training of the B. S. degree, it is certain that the public health administrator of the future should be a general practitioner of public health as well as a specialist. He will need a medical basis for his training, and added to this he must have a general knowledge of every phase of health work—epidemiology, vital statistics, bacteriology, sanitary engineer-

ing; child, mental, and industrial hygiene; and public health administration, including business methods and public health education.

This means that a young man with perhaps an arts or science degree who acquires a special knowledge of vital statistics, bacteriology, or any other single specialty without a basic medical training must be satisfied to be a useful cog in a machine of his specialty, without ambition or aspiration for the larger administrative positions. This does not mean that the basic medical training referred to should be the conventional four-year course now given in our medical colleges leading to the degree M. D. It is quite certain that this course does not contain all the essentials. Nor does it give sufficient accent to those fundamentals of public health which happen to be included. It is equally certain that the ordinary curriculum of a medical college as applied to the prospective health officer contains subjects which could be either eliminated or the number of hours devoted to them greatly curtailed. Modification of existing curricula to meet public health requirements is necessary. The "Y" plan suggested by the late Professor Sedgwick has much to recommend it, and it will be explained and discussed in detail by other speakers. Educators should frankly inform students of the possibilities, and should particularly accentuate the limitations of partial, highly specialized public-health training.

The public-health administrator of the future must be less of a policeman and more of a statesman than the health officer of the past. The old health officer type was usually a practicing physician who upon assuming his new position was most impressed by the very large police powers which came to him with the position. He considered it his duty to confine his activity to enforcing law and regulation and clamoring for more law and regulation.

Most health officers of experience now know that the best results can be obtained voluntarily by the lever of public opinion and that a law or regulation which is not supported by popular opinion will be ineffective. The wise health officer will regard police power as similar to the foundation of a building. We like to know that it is adequate and strong, but once satisfied of this, we may almost forget it and devote our energies to securing the proper type of superstructure. We also realize that the limits of our activity under law and ordinance have been reached and that significant reduction in morbidity or mortality will depend upon voluntary cooperation rather than compulsion.

The public-health administrator should be a business man and a statesman. Too often you hear the trite calumny that doctors are poor business men. This popular impression extends to the medical health officer. Training in health administration should include thorough courses in business methods, cost accounting, and budgetary systems.

He must not only include in his program of work all the newer aspects of public health which have developed in recent years, but he must have the vision to plan and take up promptly new lines of attack on public health problems. This does not mean that all such work must be carried out in the health department itself. Some of it may well be carried out by other departments of government cooperating with the health department. He must have the wisdom and the courage to relegate to other departments of government indirect health activities which do not properly belong in the health department, retaining through cooperation a consultant relation to such work.

He should possess the qualifications of a statesman because he will find it necessary to control and utilize all sorts of unofficial, voluntary health agencies and spontaneous popular movements. The ideal health administrator will attempt to make every citizen of the State feel that he is a partner in the enterprise of public health and an integral part of the health machine.

How can a man acquire the qualifications necessary for a successful health administrator? Provided he has certain fundamental inherent qualities, he may acquire the necessary training in two ways—by experience alone, or by training in a school of public health plus experience. The first, by experience alone, is a long, hard road—hard on the student and hard on the public, who must suffer for his mistakes. The second is the ideal method, a proper training in a public-health school with a proper curriculum for the purpose, supplemented by practical experience during his course and after his graduation.

Our ideal health administrators of the future should be men of such caliber that they will rank in statesmanship with the relatively small number of really great leaders in each State. Men of this type have been developed in State and city administration, and their leadership and prestige is such that they secure teamwork and compliance with any given program with the maximum of prompt results and the minimum of friction. We must find a way of producing in greater numbers and much more quickly the type of health administrator who has become a national figure through the slow school of experience.

There is a very general impression that the administrator is successful because of what is commonly called personality. The opinion is equally prevalent that this co-called personality is inborn and can not be acquired. I do not subscribe to this view. Many of the qualities which are grouped under the rather indefinite label "personality" can be taught. Men are often brusque from imitation of a superior who seems to be a successful health officer. Such a health officer considers his brusque, uncompromising attitude toward the public as an evidence of strength of character when it is really

nothing but a pose. The young student of public health working under such a chief is very likely to imitate his example. Conversely, he can be taught to imitate a very different type quite as easily. Character is molded largely by our imitative faculty. Many faults of character can be curbed, controlled, or eliminated and good qualities developed by taking advantage of the imitative faculty of the young and furnishing in our teaching the proper models for imitation.

To give the training necessary to produce the type of public health administrator indicated above will necessitate special public health schools or very radical changes in the curricula of our existing schools. In addition to the many special subjects which must be taught, the greatest stress must be placed on teaching and demonstrating public health administration. This is a subject without a textbook and the number of teachers with practical experience and the other necessary qualifications is limited. Such men must be added to the faculty of any institution which expects to graduate men qualified as public-health administrators.

To summarize, I hope I have made it clear that the successful health administrator of the future, in addition to his professional training, must be a business man and a statesman, and that proficiency in these two phases can be acquired by proper courses of training in our schools. The qualities of a business man will inspire confidence in the legislative body which makes the appropriations, and the statesmanlike qualities will enable him to utilize to the best advantage all the official, unofficial, and voluntary agencies engaged in public health activity.

WHAT KIND OF MEN WILL BE NEEDED FOR RESEARCH?

Dr. A. M. Stimson, *Surgeon, Assistant Director Hygienic Laboratory, United States Public Health Service.*

We have talked a great deal here about education and have taken up two out of three possible features. We have spoken of the person who is to be taught and of the person who is to teach. The next thing is naturally what are we going to teach. If we teach only what we know at the present time we will not succeed in eradicating disease at anything like the rate at which we would like to see it eradicated. We have got to have more information all the time. If you analyze public-health practice at the present time, you will find that there are a great many diseases which we attempt to prevent by methods which would not stand very strict analysis. They are not really fundamentally scientific. Many of the methods which are in common usage are really rule of thumb methods. We must have more accurate means at our disposal and the only way we can get these means is by research.

On the entire program the word research occurs but once. That is probably the proper proportion, because already we have so much material at our disposal to be taught to prospective health officers that we can spend quite a few years in using that up before we need the new material that is to come forward. The information is considerably ahead of what the public has absorbed or applied. There is no doubt about that. Still, I do not like to be the sole representative on the program of this particular branch of the subject, and I hope that those who discuss later on will expand and improve upon what I have to say.

Professor Winslow has given us a classification of health activities and health workers which I am perfectly willing to accept and I think it probably superior to any I could evolve. But from the standpoint of research I have attempted to group those who are to engage in research in coming years under three general headings. There are not any good names which are exactly descriptive of these groups, but for practical purposes and for the purposes of this meeting I suggest the term epidemiologist for the first group. By that I mean those who study the mass phenomena of disease. They use special methods which are only at the present time being formulated. They use statistical methods to a large extent; they deal with sociological and economic phenomena and their data reach all the way from the details of pathology up to the very broad considerations of sociology.

The second group of research workers I will describe as the clinical investigators, and by that I mean those persons who in the presence of the sick person study disease and try to learn the methods of its development and of its control.

The third group I would suggest are the laboratory investigators. I do not mean that the laboratory investigators are merely those who work in the laboratory, but I mean those who employ the methods of experimental research under laboratory conditions, whether it be in the laboratory or as applied to some problem which is to be done outside of the laboratory, but is essentially an experimental research.

Now, the tentative program which was handed me asked for a discussion of the qualities of research workers, and of the ways in which medical schools and schools of public health may develop men with these qualities. *What qualities will be needed in coming research workers?* As I see it, they will need those qualities which have characterized successful research workers in the past. I am not a psychologist and I can not define these qualities in the terms which ought to be used. But in ordinary parlance the qualities needed in a research worker are: (1) A passion for that sort of knowledge which can be experimentally verified; (2) an imagination

which is sufficient to frame fruitful hypotheses, not bizarre, crazy hypotheses which will waste lots of time, but a controlled imagination which seeks for and formulates hypotheses which are likely to be fruitful; (3) inventiveness, a sufficient inventiveness to think of ways of working out those problems which they have framed; (4) an industry which is not to be turned aside by failure; (5) the quality of scientific honesty, which is probably the rarest of all the qualities which I have enumerated here. It is a frame of mind which is not satisfied with half truths even if they are of immediate practical use and which places the ultimate truth far above any consideration of personal advantage or of what is immediately desirable.

Now, these are the qualities of research workers which have led to success in the past. I think there is another one which is unquestionably demanded and that is the spirit of generous cooperation with other workers in similar lines. In the past we have had great geniuses who have sprung up and single handed have solved great problems and given us methods which have enabled us to accomplish a great deal. But in the future we can not expect very much of this. The research worker of the future must work in cooperation with other workers. Only by focusing the efforts of men who look upon the same problems from different angles are we to expect great advances in the future. Now and then we will have a great genius who will do things all by himself, but if we are going to organize work of this kind we must bring together men who work upon the same problem from different angles and are willing to cooperate.

Now, as to the training which these groups will need: The epidemiologist, I think, should have a broad training in general pathology. He need not necessarily have a full medical course, but he should have enough knowledge of general pathology so that the essential features of any disease which he is to investigate will be apparent to him, and he will not fall into the serious errors which those who have no training in pathology are sure to make. Again, as we look at this in the broad we find that social conditions and economic conditions are at the basis of very many of our problems. Consequently the epidemiologists (or men in this group) should have training in economics and sociology, and lastly they should have training in statistical methods.

Now, the clinical investigators: It would seem that the ordinary medical course ought to suffice to produce clinical investigators. As a matter of fact it does not seem to work out that way. Granted a man with all the natural qualities I have mentioned for research workers, it is to be doubted whether the ordinary medical course fosters and cherishes those qualities to such an extent that when a man comes out at the other end of the horn he is still potentially a

research worker. This may be due merely to the immense bulk of actual detail information that has to be learned during the medical course. On the other hand, is it not possible that the method of teaching is such that it fails to develop those qualities which I have mentioned as belonging to research workers?

Now as to laboratory investigators: It is not essential that they should have gone to a medical school or to a public-health school. We must not think of research connected with public health as being particularly medical. Quite as much may come to us from laboratories or from workers who have nothing to do with medicine. The fundamental sciences of physics, chemistry, and biology will recruit fully as many valuable workers as the medical school or the public health school. It is the function of those who wish to develop and get the most out of research workers to bring together these men who have studied along different lines upon the particular problem upon which we are working and in that way solve it.

Ways by which medical schools and schools of public health may develop men with the needed qualities: The question can not fairly be discussed without entering the realm of pedagogy in which competence may justly be questioned. The user may know exactly what kind of material he needs without seeing clearly how the producer is to furnish it. He can only offer suggestions which may or may not prove practicable.

What are needed are men whose peculiar natural qualifications have been cherished and developed during the time when they have been accumulating the specific information essential in their subsequent work.

It would appear therefore that education should develop the imaginative, inventive, and reasoning qualities at the same time that it feeds the memory with ascertained facts.

The mass of facts to be assimilated in the medical course is enormous, and yet their mastery is probably essential to the production of the qualified practitioner. It is a question, however, whether the so-called medical specialities could not with profit be reserved largely for postgraduate study, thus relieving the pressure of the medical course and making possible the more general employment of the inductive as opposed to the didactic method of teaching. It is believed, moreover, that more insistence should be placed upon a thorough grounding in the primary physical sciences as an entrance requirement for the medical school.

The medical schools, however, will contribute in large part to only one of the groups of investigators—the clinical group.

The school of public health is a comparatively recent development, which offers great promise of ultimately providing the kind of men who will be needed in some of the departments of public-

health research. They already include the study of certain essential medical subjects. In so far as the imparting of information is concerned, an extension of the courses to include certain sociological subjects and an intensification along certain laboratory lines would apparently suffice for the production of competent workers in the epidemiologist and laboratory investigator groups respectively. But this is only to be hoped for provided the teaching is such as to conserve and develop the native qualities which have been described.

The medical schools and the public health schools can not hope to do more than prepare men for some of the departments of research which will be required, and indeed will perhaps play no essential part in the training of certain specialists. These men, fired with the desire for excellence in some special line of study, will continue to select courses at different institutions which progressively contribute to reaching the goal which they have chosen. It is to be hoped that they will early discover that in order to get the most out of themselves, to contribute the maximum to the cause, it will be necessary for them at least to understand the aims of others who approach the same problems from different angles, and to subdue their individual aspirations to the extent of generous cooperation.

DISCUSSION.

Dr. Vernon Kellogg:

I am not competent to say anything about the special relations of the public-health workers to research, so I shall give my moment to a word or two about research in its more general relations.

The goal of our progress, of our human social evolution, can be defined in certain terms determined by ideals which come from our racial consciousness. That may seen rather indefinite, but actually I think all of us will agree that most human beings have a common consciousness of certain ideals for the future of the human race—what it shall become, what it shall do. But idealistic as our aims may be, we must be realistic in our methods of achieving these aims. To satisfy these conditions we must have scientific knowledge, which is an accumulation of facts, and an organization of these facts so that they may be effectively used.

It has been my privilege within the last few months, as your chairman suggested, to see at first hand the horrible scenes of the Russian catastrophe. Those scenes are brought about largely because of lack of scientific knowledge. The rulers of Soviet Russia lack knowledge. It is not simply that there is a lack of food. There is lack of everything to help care for the people in the interior of Russia. Such lack of sanitary conditions as exists there is hardly imaginable to us over here.

Scientific knowledge, then, we must have if we are to realize these ideals, and if we are to have scientific knowledge we must have research. Research is the special privilege of genius, but it is open also to a great many of the well-meaning persons interested in human progress. Any man of good intelligence and of good training can venture to try to find out new things in science, and that is all that research is.

The new field of the public health—what an extensive field for a man looking for new knowledge! And what an opportunity for a beneficent application of this new knowledge! You have before you an opportunity to do something for the human race that many men and women a little older did not have, even with all the good will in the world. They did not have the opportunity that you have because there was less in their time of the accumulation of scientific knowledge which now exists and can be used in benefiting human health and strength.

And so as the representative of an institution that is primarily interested in research I wish you Godspeed in the accomplishment of immediate good work by making use of what is known and by pushing forward beyond the horizon into new regions of knowledge which will make it possible for you to do more good deeds in the future.

Dr. William H. Park:

I did not even know that Doctor Vaughan knew I was here, and was having a very enjoyable time listening to others. I was naturally, as a laboratory man, much interested in Doctor Stimson's talk and I simply felt that every word he said was what I should like to have said. When I entered into public health work it was through the suggestion of Doctor Biggs and I learned from him what was brought out by Doctor Stimson, that in the public health laboratory we have to keep thinking of those problems which might give us some definite information. I remember at the very first, before I had had any experience, we wondered whether the problems would hold out. As time went on, of course, we found that the problems increased.

I liked very much Doctor Stimson's suggestion of scientific honesty. It is so easy in laboratory work with just a little bit done to think that we see the future and can already publish some very valuable results. It is very hard to wait until these results have been added to and added to and to be sure we have something which is really an advance in public health and not something which is one sided and to which objections may come up which make it of no use.

Doctor Biggs has brought up, although I do not agree with him, that public health laboratories are the most important functions of a public health administration. The laboratories have certain sane, useful functions. They bring laboratory methods into public health

work and add now and then some new points. The laboratory brings the medical profession in touch with the health authorities. If the physician is receiving calls from the laboratory a cooperative spirit is developed between the health authorities and physicians which could probably be obtained in no other way.

IV. HOW MAY MORE AND BETTER SANITARIANS BE RECRUITED?

REASONS GIVEN BY MEDICAL STUDENTS FOR NOT ENTERING SCHOOLS OF PUBLIC HEALTH AND PUBLIC HEALTH WORK.

EDWIN O. JORDAN, Ph. D., *Professor of Bacteriology, University of Chicago.*

Brief questionnaires were distributed to the medical students in two universities where public health schools are already established (Harvard and Johns Hopkins), and in two where no definitely organized public health schools exist at present (California and Chicago). The questions were designed to bring out the student's reasons for entering a medical school rather than a school of public health and the reasons, if any, why public health work seemed unattractive. Four hundred and sixty-one replies were received. One hundred and three students, or between one-fourth and one-fifth of the whole number, stated that they had at some time considered more or less seriously taking up public health work. A few of these (Chicago 3, California 5) asserted that they were studying medicine because a public health school was not available, but a much larger number (32) declared that they considered a preliminary medical training essential to the proper prosecution of public health work.

The 358 medical students who stated that they had never been attracted by and had not seriously considered entering public health work gave as their reasons:

(A) Insufficient knowledge of the field (23 per cent).
(B) Desire for personal contact with patients (18 per cent).
(C) Politics (15 per cent).
(D) Inadequate remuneration (9 per cent).
(E) Lack of independence (9 per cent).

Of the 103 students who stated that they had at some time considered entering public-health work, about one-third (32) were still undecided; 4 or 5 were still intending to take up public health work, but all agreed that a medical training or at all events a medical degree was essential. The other two-thirds had abandoned all intention of a public health career very largely for the reasons already cited. Politics (C) was a determining or important factor in 28 per cent, inadequate remuneration (D) in 23 per cent, lack of independence (E) in 17, lack of personal contact (B) in 14. Other difficulties or objections mentioned were the limited field of public health, the large amount of routine work, the restrictions placed on personal initiative, the narrow choice of location or the entire lack of choice in the

national service, and (in California and Chicago) the lack of suitable opportunities for study.

Representative answers from both groups will illustrate the students' point of view.

(A) Insufficient knowledge of the field (23 per cent).

"Public health is new and only within recent years has there been much discussion of it. As yet the public has not grasped its importance. I have decided on medicine or surgery because of the uncertainty as to just what public health work is and what it shall include in its scope."

"Schools of public health are new and public health work is comparatively unknown to most persons. This is certainly an important reason why others, as well as I, have not undertaken to prepare themselves for this work."

"I have never thought of men being trained especially for the work, but think medical students should be furnished with information about the matter."

"I have known nothing about public health work. I should have considered it, probably seriously, if I had known anything about it and might have entered it, if it had been brought to my attention. I never heard of a public health school, although I am a B. A. of Yale and an M. A. of Columbia."

"I have never considered the matter of public-health work and do not know enough about it to comment on the desirability or undesirability of said work. Would welcome information on the matter."

"I have never heard of public health as a profession in itself."

"I have no information about public-health work that would bring the matter up for discussion."

"There is no well-recognized school of public health in the United States." (Twenty-eight students in the Universities of Chicago and California declared that they had never heard of any school devoted to public health.)

(B) Desire for personal contact with patients (18 per cent).

"Medicine—general practice—gives the most opportunity to enjoy personality and gratify psychological curiosity."

"I prefer the treatment of and contact with individuals to work with large groups or whole communities. I find the application of anatomy, physiology, and pathology in study and treatment of disease in individuals much more interesting than study of epidemiology and public health work in general."

"Personal contact with patients appeals more than dealing with the community as a whole, though the opportunity for service may be as great in one as in the other."

(C) Politics (15 per cent).

"Public health work is in the hands of politicians rather than medical men who are actuated by idealistic motives."

"I do not wish to be dependent on political pull for a living."

"Under the present régime remuneration and position to be obtained depend not on ability, but upon the patronage of a 'higher up.'"

"As politics are at present conducted, the uncertainty of one's position as a public official or employee is very great. If this uncertainty is remedied in the future, public health work will appeal to the medical student much more than at present."

"Promotion is too often the result of 'pull' rather than merit."

"Public health work as I have seen it seemed to be political rather than scientific."

"Public welfare and health are indeed ideals, but depending on politicians for a job is another matter."

"Politics play too large a part not only in obtaining jobs, but in prosecuting any project."

"I consider preventive medicine a most desirable field. The fact that it is tied up with politics makes it undesirable as far as I am concerned."

(D) Inadequate remuneration (9 per cent).

"The remuneration for a man who has spent nine or more years in preparation is inadequate in public health."

"Discouraging expenditure of money and time necessary for adequate training in public health."

"While the financial aspect has never been a factor in prompting me to study medicine, I do not believe that the remuneration in public-health work is, in most instances, adequate when the preparation and work is considered."

"The compensation in medical practice bears some relation to your ability."

"Only persons financially independent can think of making the outlay in time and money necessary for a high-class medical training, add to that training in public health work and then receive the average salary that is paid one so trained."

"The remuneration is not sufficient to repay men who have had to spend the time and money to obtain a bachelor's degree (B. S. or A. B.) previous to their entry into medical school and the expenses of such a school as Johns Hopkins Medical School."

(E) Lack of independence (9 per cent).

"One's success in clinical work depends more on one's work than is the case in public health work; that is, one obtains more immediate returns in clinical work, and more proportional to one's efforts."

"It is my impression that a diplomat or a politician would succeed better than a person who perhaps is better fitted actually, but may possibly lack personality."

"There is always a suspicion of dulling the initiative in any Government position—saw too many Regular Army medical men during the war."

"There is no swivel chair dictation (in medical practice)."

"I prefer independence rather than the hierarchy of the Public Health Service; in other words, I endured the life (as private) in the Army as a war-time duty and would not look forward to a lifetime of always recognizing a superior officer and being forced to "drive" subordinates. Note that the above reasons are all based on personal preference, i. e., I am not the type of person who would like public health work. I think that the Public Health Service offers (as far as my slight knowledge of it goes) an ideal career for the right type of man."

"I do not wish to work for a salary."

Closely connected with such objections is the frequently expressed dislike for routine, clerical, and administrative work. Army experiences are often referred to.

"Any type of close organization gives a chance for subordinates—which savors of the Army."

"The odiousness of rank."

"Experience in Army makes me feel there are many small annoyances in working for a large organization, e. g., red tape, etc."

"Would not consider any civil service."

"After being in the Army, I didn't want to work for the Government."

"I feel public health work is too much like the Army."

A good many students have expressed their belief that public health work is simply a "branch of medicine," a part of the duty of the practicing physician. There is an obvious tinge of resentment in some of the answers.

"Because I consider medicine a well-established and recognized profession from which one can to the best advantage promote and aid the newer and less well-established work of public health. I consider public health fully as much the concern of the doctors, educators, social service workers, ministers, and public officials as any other of their professional or social duties."

"I have little or no interest in the merely technical or superficial types of public health work which a man can engage in without a modern thorough medical training."

"Because I want to make my contribution to personal and public health from the standpoint and in the capacity of an active practitioner."

"My interest in laboratory work and public education is collateral to my interest in the practice of the healing art. I believe that, for myself at least, a first-hand knowledge of disease and its cause and treatment is the best starting point for work in disease prevention."

"Public health is at present a branch science of medicine. The medical student receives nearly all of the training that a public health student receives and much more. In an ideal State the medical man should be a public official and public health workers should be medical men who have specialized in public health work."

"My impression has been that public health work was a part of a doctor's profession. Therefore I felt that public health work would just be a part of my work."

"I believe a good doctor can do as much for the benefit of public health in an indirect manner as he could in actual public health work."

"The medical man can serve his fellow men directly, at any place and at any time, without the aid of extraneous help."

"I have a pretty clear idea as to the nature of services I shall be expected to render in medicine, and I have always thought of public health posts as being filled by persons chosen among successful practicing physicians."

"An M. D. with a little special training can adequately fit himself for public health work if he does not wish to practice medicine. The activities of a C. P. H. or a D. P. H. or a Ph. D. are limited to restricted fields and their knowledge of disease is insufficient."

"Medicine offers an opportunity to do public health work and at the same time earn a living."

The esteem in which public health work and workers are held by some medical students is not of the highest.

"There is no school of public health, as such, that approaches a Class "A" medical school in quality of technical training."

"Public health work in schools is not given with the same serious elaborateness as medical work is given."

"Never heard of a school of public health that I would be willing to graduate from."

"The medical profession does not itself take public health and preventive medicine seriously. This is just as true at Harvard as elsewhere."

"I know very little about public health work. I have been prejudiced against it, however, due to the fact that in the very few cases which I have observed the men engaged in the work are not good medical men. These cases have been in smaller cities and towns and the salaries have been low which has probably been the reason why the better men in these communities have not taken it up."

"Have looked upon public health work as something which I might take up if I failed in my ambition, as I have known others to do."

"The type of men preparing for this profession."

"No physician with the ability to practice medicine, it seems to me, would want to go into public health, where the services can be competently performed by any good bacteriologist or laboratory technician, who with the help of a small office force can get out a volume of vital statistics per annum."

"The service contains men who are there because they are unable to earn a livelihood outside, rather than for the love of the work."

A number of students explained that they had originally intended to take up public health work but had become interested in medicine.

"I was graduated in 1916 with the degree of S. B. in biology and public health, and entered medical school with the intention of following that phase of medicine. Either medicine or surgery seems now more attractive than public health work, because they offer very interesting careers, doing a great deal of good and giving a more suitable financial return for the investment of time spent in training than does public-health work. This preference is definite in spite of a decided liking for, and some training and experience in, administrative and educative work, and a keen appreciation of public health ideals. The financial income is usually small. Many positions depend upon political preferment. The assignments in the Government service are often arbitrary and may be disagreeable. Independent action is curtailed. The commanding officer, if the Public Health Service is like the Army, may be a crank, an autocrat, or a man selfish and without consideration for deserts of his subordinates. The opportunity for educating children may be less than one would desire."

"I intended to go into bacteriology, but Doctor ——— advised an M. D. first. I took his advice, but now no longer care to specialize in bacteriology."

There is little difference in the nature of the replies from the four institutions. Students at Harvard have laid perhaps more stress on lack of independence, dislike of administrative or laboratory work, and inadequate remuneration; at Johns Hopkins on the baleful influence of politics; and at California and Chicago on their belief that public health work is nothing but a branch of medicine and should be kept to the practicing physician.

First-year medical students, as might be espected, express a somewhat more general interest in public health work than students in the later years; otherwise there is not much difference except that students in the upper classes use a more emphatic or a more scornful tone in their rejection of a public health career.

Some of the manifest conclusions from the reading of the 461 questionnaires are (1) that many medical students, particularly those distant from the neighborhood of public health schools, are insufficiently informed concerning the nature and opportunities of public health work, and (2) that those students who are at all attracted by public health work are mainly deterred from entering the field by fear of political interference, inadequate remuneration, and distasteful living and working conditions.

HOW CAN THE CAREER OF THE SANITARIAN BE MADE MORE ATTRACTIVE?

Dr. JOHN A. FERRELL, *Director for the United States, International Health Board.*

The future of public health in the United States will be merely a reflection of the combined personalities and abilities of the men and women who engage in the work. If the ranks of the workers are recruited with persons of the right type in sufficient numbers the future welfare of the service on an enlarged and more effective basis will be assured. Persons who can bring the greatest degree of success to the cause while recognizing the exceptional opportunities the field offers for rendering public service will hesitate nevertheless to enter it as a vocation unless the conditions under which they are to serve are made reasonably attractive in comparison with those existing in other professional fields. They will inquire if the public may be expected to regard efficient health officers as professional rather than political appointees; if their activities and tenure of office will be protected from harmful political influences; if their compensation—present and prospective—will be adequate; if the growth of the work may be expected to provide employment for sanitarians in increasing numbers; if opportunities will exist for those who are especially qualified to achieve distinction in administrative, investigative, educational or other branches of the service.

The scientists, educators, and executives who are here for the purpose of formulating a program for the advancement of public health in this country should consider especially the question: What can be done to make the career of the health officer more attractive? His working conditions should be established on a basis which will appeal to those best qualified to successfully develop and apply public-health measures.

The definite steps which suggest themselves all involve the education of the public, of our legislative bodies, and of many of the teaching and practicing members of the medical profession. I shall attempt to discuss a few phases of the educational work which should receive attention.

1. *Preventive medicine should be recognized as a distinct profession.* This fact is now insisted upon by authorities in medical and public health education. Steps should be taken to make it common knowledge, and develop an understanding that the health officer, even if a physician, should have special training for his work.

Students in our medical schools have been taught much that is essential for the health officer to know. Unfortunately, as a rule they have been trained to view disease and disability only from the point of view of the individual patient, rather than from that of the community, and to render service after rather than before disease develops. Their training without consuming a great amount of additional time might have included the underlying principles of

disease prevention and control from the standpoint of both the community and the individual and thus have prepared them to discharge more creditably the professional and civic responsibilities which they encounter on entering practice.

The physicians prepare practically all birth, death, and morbidity statistics that afford guidance to health authorities and serve as measuring rods of progress in the prevention of sickness and death. They are appointed to serve on boards of health, and communities look to them for counsel in public-health matters.

Moreover, physicians are frequently called upon to serve as health officers. In such cases, if the physician has failed to study diseases from the standpoint of prevention and the community's welfare, and is unfamiliar with elementary principles which the medical courses might have provided, he is unable to discharge his task creditably and the arrangement is detrimental to scientific medicine and to the cause of public health. Such a situation gives rise to confusion, controversy, a loss of public confidence, and the resultant developments which delay the progress of preventive medicine, and discourage young men and young women of the best type from selecting the work as a vocation.

The public is being educated to appreciate the virtues of preventive medicine. Many healthy individuals now go to their physicians for periodic examinations and advice with a view to keeping well. Moreover, the educated public may be depended upon to accord leadership in public-health activities where it belongs. Authorities in medical education are alive to the situation, and the more progressive medical schools are establishing creditable courses in hygiene and public health, so that the medical student in connection with his regular undergraduate studies will learn to give consideration when serving his patient to preventive as well as to curative measures, and keep in mind the best interests of his community.

Another gratifying development of recent years has been the establishment of institutions prepared to offer thorough instruction in all subjects upon which is founded the science of public health in its broader aspects. The courses offered include those subjects relating to public health which may be taught in the best medical, engineering, and other schools, and also other subjects, such as epidemiology, vital statistics, and public-health administration, that until recently were not taught in any school. The courses are organized and presented entirely from the standpoint of hygiene and preventive medicine.

The teachers and students in the undergraduate courses of medical schools would be stimulated to direct their interest more and more to thorough training in the elementary principles of hygiene and public health if the health authorities would take the steps necessary to

have every licensing board give a real examination on public-health subjects. Provision might be made for having a trained sanitarian serve as a member of each licensing board. Moreover, candidates for public-health positions should be required to give evidence that they are fitted for the responsibilities they desire to assume.

These measures should be supplemented by the effective education of the public to understand that only trained sanitarians should be engaged as health officers. When appointments to such positions are limited to those who have had special training in schools of public health or in the school of experience—preferably both—the public will soon come to recognize that its protection from disease and preventable disability is a task for experts and it will be ready to support any legislation designed to make the field attractive to men and women of the highest grade.

2. *The people should be acquainted with the striking achievements of preventive medicine.* This may be accomplished, among other means, by courses in the public schools, through newspapers and popular magazines, and by the use of lectures, lantern slides, and moving-picture films. Emphasis in all this educational effort should be laid on the fact that the results were not obtained by haphazard methods, but because the underlying principles of disease control were understood by those in charge, each successive step being suggested by scientific reasoning.

Whenever concrete examples of striking accomplishment may be pointed to, no opportunity should be lost to drive the lesson home to the people. Facts and figures showing an actual reduction of sickness and death rates mean more to them than any amount of theorizing, and no pains should be spared to secure accurate records that will form the basis of such convincing demonstrations. Thus, to be able to say that in one town in Tennessee the cost of malaria in doctors' bills, medicine, and lost wages was $3,558 during 1919 as compared with only $165 in 1920, following the installation of anti-mosquito measures; that there was a reduction in the number of cases of dysentery from 498 to 58 following the inauguration of health work in Troup County, Ga.; or that typhoid fever declined from 147 cases in 1917 to 15 cases in 1920 as a result of health effort in Monroe County, Miss., is to lay before the people facts that they are keen to grasp and whose import they are quick to appreciate. It can then be pointed out that the demonstration made in similar units such as counties, townships, or the wards in cities can be applied equally effectively over almost the whole of a State or Nation, as has been done in North Carolina, for instance, where, in nine counties, the average deaths from typhoid fever per hundred thousand decreased from 35.3 to 7.8 following the carrying out of intensive health activities.

When the public is thoroughly informed as to the benefits attending the successful application of preventive medicine, and realizes the extent of the training that is requisite for such application, there is no question but that it will insist upon conditions of public-health service being made at least as attractive as in corresponding professions such as law, medicine, or engineering. It will realize that the work will attract the best type of young men and young women when, and only when, the field is free from harmful political influence, and when there is reasonable prospect that appointment, compensation, and tenure will be based upon merit alone.

Although there has been rapid progress during recent years in establishing health work on a sound and attractive basis, much yet remains to be done. In this connection the developments in the field of education have suggestive value. In the colleges and universities of most States, and in most municipalities also, there are nonpartisan boards in charge of educational activities. These boards have a rotating membership, and to them is intrusted the task of filling important positions, consideration of policies, adjusting salary scales, and similar functions. If the members of the boards are selected because of ability and breadth of vision they are likely to be better qualified than are the rank and file of elective officers to choose competent executives and teachers.

With such a board at the helm there is less danger that the changing fortunes of political parties will cause competent workers to lose their positions or be neglected in the matter of promotion, recognition, and other features relating to the attractiveness of the vocation. Where corresponding boards have been organized and placed in charge of public-health administration, the work has been stabilized and the conditions under which sanitarians serve are much more satisfactory than in localities in which there is danger of wrecking the health machine every time a new administration assumes the reins of government.

3. *Health work should be made efficient.* In health work as in any other field, unless efficient service be rendered, it is not reasonable to expect that funds will continue to be supplied or that satisfactory conditions of service will continue to be maintained. To secure these ends the taxpayers must be convinced that every dollar they set aside for health work is being wisely and effectively expended in programs that yield a satisfactory return.

If the health officer is to command the support of professional men (particularly members of the medical profession), his scientific procedure must be sound; if business men are to respect him his efforts must be productive and his methods neither wasteful nor extravagant. Where convincing demonstrations have been conducted, the

public has shown a willingness to give the health officer generous backing in carrying out his policies.

4. *The opportunities for research and investigation should be multiplied.* To the exceptional student, endowed with qualities which characterize the pathfinder in various fields of knowledge, the attractiveness of a particular field as a career is proportionate to the possibilities existing for enlarging the horizon of knowledge by discoveries and the possibilities for increasing the effectiveness of existing methods of practical application.

Scientific medicine itself is comparatively new, and its application along preventive lines is even newer. Although significant progress has been made and our present knowledge is comprehensive, exceptional opportunities still exist for fruitful investigation.

Some of the public-health agencies are affording qualified students opportunities to engage in laboratory research and field investigations. Many health officers and students possess the personal and scientific qualifications essential for such work and would gladly engage in it if such a course were financially practicable for them. The cause of public health can be served most constructively if in such cases scholarships or fellowships are provided. A beginning has already been made in this direction, but the funds available to date are totally inadequate to meet the needs of the present situation.

Summary.—To summarize, the following are some of the steps which may if carried out make the career of public health more attractive:

1. By effective educational measures, bring the public at large to a full realization that preventive medicine is a distinct professional field, for which special and thorough training and experience are essential; and that at present our medical schools fail to supply all the training requisite for effective work in this field.

2. By means of convincing demonstrations and thorough education of the public, develop public-health service into a strictly professional vocation, free from harmful political influences, to the end that merit alone will regulate appointments, assignments, tenure, compensation, promotions, public recognition, old age and service disability retirement, and other factors that will tend to increase the attractiveness of careers in this field.

3. Increase the efficiency of public-health measures for which funds have been provided, and exhibit the results widely in a convincing manner, to the end that the public will insist upon the enlargement of its investment in this field, and demand, on a more generous compensation scale, the employment of increasing numbers of competent workers.

4. Multiply for qualified persons the opportunities to participate in broadening the horizon of our knowledge of preventive medicine and its effective application.

DISCUSSION.

Dr. Frank J. Goodnow:

I really do not know why I should be here to speak on this subject. I must confess I feel as though I had gotten into the wrong pew. I was educated as a lawyer and from the point of view of the question under discussion I am merely a layman. The only education along medical and public-health lines I have had is rather desultory, consisting in having for the last few years presided over the deliberations of the faculties of our schools of medicine and hygiene and public health. Under these conditions, I would not have volunteered—the honor which I am enjoying has been thrust upon me by the Surgeon General.

I am very much interested in what has been said here to-day, and I quite agree with what has been said during the last papers which I suppose I am expected to particularly discuss—that is, the necessity of making the profession of public health rather more attractive than it is at the present time, through securing permanency of tenure and possibly through the raising of compensation, though I imagine we must expect for a long time to come, as in the teaching field, that those who come into the public health service will be attracted by their love of the work, and their appreciation of the opportunity they may have, rather than by the hope of any great financial return.

But in order that any of these things shall be realized, it seems to me that a different attitude has got to be assumed with regard to public health than has been assumed by most of those that have spoken to-day. In fact, I think it is rather remarkable that there has hardly been a reference to the fact that public health is a branch of general public administration. There has been a lot said about selling public health to the public. You don't sell anything to anyone who hasn't any choice as to taking what you give him. Public health is after all public administration and police administration. It fundamentally has back of it the power of the State. The exercise of police powers will usually arouse a certain amount of opposition because its effect is necessarily to limit individual freedom, indeed, not only to limit individual freedom but as well to impose pecuniary burdens upon the property owner. Until, therefore, we appreciate that public health administration is a part of public administration generally and that it presents much the same problems which public administration generally presents, I doubt very much whether we shall be able to get the people of the country to treat it any differently than it has been treated up to the present time.

We have had a frank statement by students in medical schools of their estimate of public-health administration. This estimate is not a favorable one and would appear to be a straw which shows the way the wind is blowing. The question that has arisen in my mind

during this discussion is how are you going to get the public to have a different attitude toward public-health administration from what they have often had in the past. It seems to me there are four things that must be done.

In the first place, the public-health administration must be well organized from the point of view of administrative efficiency. At the present time the public-health officer does not discharge all of those functions of government which have to do with the public health. Certainly he doesn't discharge all functions that have to do with public health and safety. Living in New York City for a time, I found there were five distinct authorities that property owners had to deal with which had something to do with public health or public safety. There was, first, the department of public health; second, the tenement house department; in the third place, the building department; in the fourth place, the fire department; and in the fifth place, the labor department at Albany. The property owners receive communications from these various departments, some of which are sometimes contradictory. They tell a story of a man who received word from one department he must tear down his house and from another department that he must repair his house. He wrote and asked which he must do first. Public-health administration should be treated as a part of the general administrative system and organized efficiently so as not to confuse and exasperate the individual with whom it comes in contact.

In the second place, I have gathered the impression—it may be wrong—that the public-health administrators in this country have in the past made many serious mistakes. For example, for a long time the most effective remedy against yellow fever was supposed to be what was sometimes called the "shotgun" quarantine. I have obtained the impression that the shotgun quarantine was not so much the thing to have adopted in order to stop yellow fever as was the doing away of a particular mosquito that carried that disease. But a great economic burden was imposed upon the country as a result of a mistake on the part of the public-health administration. I have obtained another impression. Very commonly throughout the country we have insisted, largely at the behest of the public-health administration, on a very expensive system of plumbing, on the theory that sewer gas is deleterious to the human system. Now I gather—I may be wrong—that the present idea is that sewer gas is on the whole harmless and that germs are not carried by it. These two illustrations have occurred to me indicating that we need to use very great care in the determination of the actual concrete measures that will have to be enforced at great expense to the individual. Until you get the public convinced that these measures are abso-

lutely necessary it is difficult to develop the proper public opinion with regard to public-health administration.

In the third place—and here what I say, I want to say with extreme caution—I think that the character of the public-health officer, particularly that of the officer of lowest rank who comes into direct contact with the public, is a matter which should receive attention; the character of all officers who discharge police functions is a matter of supreme importance. I had a personal experience which I have never forgotten. I had charge of a building in a large city in this country which was used for purposes of manufacturing. I received word from a department which was discharging public-health functions, not technically a public-health department, informing me that the air in that building was so vitiated that a very expensive ventilating system must be put in. I went down to see the person representing the board and asked him what the evidence of this condition was. He told me that he had jars in which they put the air and had tested it, that the jars were in the department, and that I could not test them myself or have them tested in any way. He handed me at the same time the names of two ventilating contractors to deal with. I went away from that office with the idea that everything was not as it should be.

I do not make the claim that there is graft in our public-health administration, but with the enormous powers which the authorities having to do with public health and safety possess, there is a great opportunity for graft, and no system can be successful as a police administration unless great care is taken to insure the character of the individuals who are in it. Until that is done, no matter how well educated they are, the public is not going to have any more confidence in public-health administration than it has in police administration generally, and will not be willing to accord to public-health officers the position which they should have if they are to do the best work.

In the fourth place, a solution must be made of the problem which comes up in connection with all police administration, viz, how to reconcile the demands for social protection and the demands for the protection of individual rights and personal freedom. My studies along public-health lines, if I can say I have made any studies along those lines, have been with regard to the administrative side, and to my mind we have not yet in this country solved satisfactorily that particular problem. Either we give too great recognition to private rights or, on the other hand, we give too great recognition to social needs. It is a problem that hardly could be asked of the physician to solve. It is a problem which the lawyer has not solved up to the present time. The Commonwealth Fund in New York has made an appropriation for a systematic study of administrative procedure

with the hope that some solution may be found. I trust that success will attend this investigation.

Now, these are the thoughts which have come to my mind as I have sat here. I may be wrong in some of the statements which I have made. If I am, it has been due to the fact that I have not had the advantage of a medical or public-health education. But I feel very strongly that a large part of this problem can be solved only after we have solved the administrative side of it. Notwithstanding that Doctor Freeman said the health officer is not a policeman, as I see it he is fundamentally a policeman, and as long as he is he has got to be treated as a part of the general administrative system.

Dr. L. L. Lumsden:

I think that all of us who have had much practical contact with our public-health problems should feel encouraged with the general trend of discussion that has taken place here to-day. I think one of the important principles which has been accepted and which every one of us should endeavor to spread after we have left this conference is that public-health service is a work in itself; that it is not a branch of medicine, or engineering, or biology, or chemistry, or law, or any other science or profession, but a field of service in itself demanding for its effective development the very best the Nation has. If we will exploit that idea, we may do much to overcome the as yet rather natural misunderstandings about the meaning of public-health service.

The answers from medical students to the questions which Professor Jordan sent them impress me as very significant. Since those several hundred students, who are considerably above the average young man or young women in education and intelligence, have such remarkable misconceptions about the nature of and the opportunities furnished by the field of public-health service, it should not be surprising to us that public-health work receives no better support than it does from our citizens generally and their representatives in legislative bodies. If a concrete suggestion may be injected into this abstract discussion, I suggest that a committee of this conference prepare and have sent to those medical students a statement presenting succinctly what public-health service means. Such a presentation might have in time a far-reaching influence for good.

Another concrete suggestion which I wish to submit is action by this conference directed toward the discontinuance of the use of the term "preventive medicine." I never hear that term without feeling something of a shock. It is misleading, inept, and literally ridiculous. It has no more justification than would "preventive engineering," "preventive bacteriology," "preventive law," "pre-

ventive carpentering," "preventive farming," or "preventive cooking." Sulphuric acid lemonade to prevent lead poisoning or quinine to prevent malaria might properly be called preventive medicine; but the installation of a water-purification plant or a sanitary sewerage system or the institution of quarantine measures to prevent the spread of infection can not be brought within the proper meaning of the term without a remarkably wild stretch of a biased imagination. The term was born of and helps foster part-time pseudo-health service by practitioners of "curative medicine" who in many instances are untrained and otherwise unqualified to administer what public-health service now means. I am convinced that a well-directed educational campaign for the abolishment of the term "preventive medicine" as a synonym of public health work would remove some of the prejudice against public health work.

In regard to the qualifications of health officers: There is no gift, no talent, no training, no experience which one may have which may not be of use sometime to one while serving as an administrative health officer. The health officer is not only a teacher, a propagandist, but he is also an administrative officer with distinct police functions. I think the most important single qualification of a health officer is not what one may get at a public-health school or any other kind of school but a gift which can come only from God, and that is a capacity to convey information to people generally in a way which will carry conviction; which may be called in a general sense the power of salesmanship. We can do much for the public health service of the future by encouraging those who have this gift to take training for public health service and discouraging those who have it not from undertaking training for a career in the public health field.

What can we do to make the field of public health more attractive to those suited for it, and with a chance to obtain proper training for the work? Among the things which I think most important are:

1. To advertise the nature of the work and the opportunities for a successful, happy career in this field, so that it may make an appeal as other arts, sciences, or businesses do. The public-health field has not been duly advertised. It is comparatively new. In our extensive rural districts, comprising about 50 per cent of our population (and they should comprise more), there was no health service approaching adequacy under the direction of a whole-time local health officer until 1911. Since then reasonably effective health service under the direction of whole-time local health officers has been established in about 160 counties, or comparable districts, comprising about 8.3 per cent of our total rural population. That is not rapid progress, but it is progress. I can conceive of no field in which there could be greater need or more opportunity for useful

service to our fellow kind than is furnished in the field of local rural health service. We might exploit more than we have been doing the work of our pioneer county health officers. Inspiration for great stories like unto those told by Ian Maclaren about the country doctor might be found in the work of the county health officer.

2. To convey to the health worker an appreciation of the value of the service being rendered. I find frequently among local health officers who are doing wonderfully good work a lack of consciousness of the value of the results being obtained from their work. Within the last few weeks I have visited several counties in which the death rate per 1,000 had been reduced from two to five points as a result of the activities under the direction of whole-time county health officers, and the health officers themselves somewhat low spirited because they did not realize what they had been doing and were doing for their counties, their State, and their Nation.

3. To convey in every way possible to the citizenry of this country some idea of the value of health service so that the people may become willing for their health workers to be given at least a living wage and perhaps even a monetary compensation comparable to earnings in other fields of very much less importance to the general welfare. If you, who are the leaders of public thought about public health work, spread the idea that the maximum salary to a well-qualified local health officer should be only $1,500 to $3,000 a year, you will help send into other careers young men and young women who would make good health officials but who can not or will not consider spending years of time and thousands of dollars in money in training for a career which will not provide along with the necessities a few of the comforts of life.

4. Spread the idea that one in the public-health field may perform the highest patriotic service. When we entered the World War we had but a nucleus of an Army. But the American spirit was thoroughly aroused and every one of us who was any good was willing to give anything and everything to help. We did not have time to send our young men to West Point or Annapolis or other schools for prolonged intensive military training. We had to do the best we could with what we had and do it quickly. Within a few months we put into the field a great Army which even the enemy had to admit was rather effective. If the American spirit should become thoroughly aroused to the importance of attacking the common enemy, preventable diseases, which is always within our gates, we would do things for disease prevention and health promotion such as have never been done on this globe. Though there is now in certain groups here and there an apparent reaction from our remarkable display of patriotism during the war, I believe it is apparent and not real. I believe there is in the heart of every American a love of country which can be

appealed to effectively at all times of national crisis and even in times of peace. And I believe that if we of this conference will spread the idea that the public health field furnishes one of the very best opportunities for patriotic service, we will help to activate the interest of our young men and young women in public health work as a career.

Morning Session, March 15, 1922.

REMARKS BY THE PRESIDING OFFICER.

Dr. Hugh Cabot, *Dean Medical School, University of Michigan.*

The program, as it has been arranged, clearly seems to follow a sequence which, I think, is very logical. We have had something of the history of the questions we are discussing and learned a great deal from a group of experts, who pointed out a great many desirable changes and developments. Coming down to brass tacks, we have some people who are particularly well equipped to say what may be done to develop the situation of which we have heard.

Obviously the simple description of desires and the necessities of a situation do not get us very far. The important thing is for us to say what beginnings can be made, what possibilities there are of laying a foundation for the desirable things which have been suggested. After all, these efforts must be made through the established lines of communication, through the machinery which now exists. It is probably not desirable to set up new machinery; it is certainly not likely to be possible, and it, therefore, comes down to a question of what uses can be made of existing machinery and how those charged with the broad questions of education are going to take up this task.

The first speaker to-day is one of a group who must face this as one of many problems of education and a problem of education which spreads widely through the community. President Angell has had a very broad training; he has very broad views. His relation with many teaching institutions makes him particularly well equipped to say in what way the universities may approach this problem, and what we may expect from them in the way of assistance.

V. HOW SHALL THE SANITARIANS OF THE FUTURE BE TRAINED?

WHAT MAY THE UNIVERSITIES OF THE UNITED STATES DO THROUGH THEIR VARIOUS COLLEGES TO MEET THE NEED FOR MORE AND BETTER TRAINED SANITARIANS?

Dr. James R. Angell, *President Yale University.*

I find myself a good deal handicapped by not having had the privilege of attending the previous sessions, in which you have been developing the general lines of that which the program provides. I am, therefore, quite unaware as to the points on which I will be repeating what you have already canvassed.

In analyzing the topic in my own mind as assigned to me by Doctor Cumming, it seemed to me the answer was so simple that it did not justify my coming or any other layman coming to present a statement at all. For if you ask what the universities can do to further the public-health training program, in a sense, they can do everything; in a sense, from them the resources must be drawn for the actual carrying out of the larger part of this task. The only aspect to my knowledge they can not do, they can not handle, is what may be called the field service end of it, where, for the most part, all they can do is to furnish some guidance and some suggestions. Necessarily they must look for field discipline to other agencies.

In addition, there is the question of the arrangement of the actual curricula in terms of which you shall undertake the training of these men who are going into the general service of public health. That is a question to be decided not by laymen, like myself, but by you men who are in the business, who are more directly responsible for the conduct of it, and our part rather as university administrators, as laymen, is to try to assist you in carrying out a program which you on the whole decide as wise. It is chiefly as part of the general interested public—for this is after all a matter of fundamental public interest—that we who are administrators are put in the position of being asked to sit in with you at the beginning of the development of any plan, from our point of view, representing one particular group of the public which may be properly heard.

I have felt that my task this morning is of a rather perfunctory character—to say a number of rather obvious things, which, if they have any value at all, will offer points of attack, points of critical comment, perhaps some crystallizing of some of these issues, nothing more. I do not propose to discuss in any detail the question which I find in my contact with public-health work and also with educational officials who are engaged in this type of work, is of most immediate interest to them, namely, the question as to which of the several possible programs which are now before us in this country for the training of sanitarians shall be ultimately followed. I feel, on the whole, it is wise that we do not stipulate any definite plan that may be followed at this time.

Obviously, before any final statement can be made regarding the possible contributions of our American universities to the training of sanitarians, there must be some general agreement as to the qualifications which such individuals should possess. At present there appears to be a wide variation of practice, due no doubt to the relatively recent development of the profession, but also in part to the seemingly diverse views which are entertained by those now in the field. Meantime there are several general considerations which are

relevant to the situation and upon certain of these I shall venture to comment.

Possibly not the least of the services which universities can render is to be found in a broader emphasis on their part upon the character and extent of the demand for men in public-health work and the attractions which the career holds out to those imbued with a desire to render genuine public service in a calling which requires rigorous professional attainment. There is reason to believe that at present university men are quite inadequately informed regarding the opportunities open to sanitarians and public-health workers. As a result, relatively fewer students give serious consideration to this calling in choosing a career than might well be the case. Medical students, to be sure, are apt to have some knowledge of this field, but as a general rule their information is fragmentary and oftentimes far from correct. This fact, together with a frequently unsympathetic attitude on the part of their instructors and a belief that the financial and professional rewards are unsatisfactory, serves to discourage any possible disposition on their part seriously to consider this calling. It is a common shortcoming of our American colleges and universities, which many of them are attempting to overcome, that they give their students so meager and so unreliable guidance regarding the choice of a vocation. The failure to do this in the case of the work of the sanitarian is therefore but one instance of a general defect which can, however, as regards this special field, be rapidly overcome by a moderate amount of judicious effort.

Perhaps the most urgent immediate need is a fairly sharp definition of the standards to be upheld in public-health work, both as regards the personal qualifications of those who should be permitted to enter upon it and as concerns the professional training to be required. If clean-cut standards and qualifications can be established (although such an outcome will undoubtedly take time) it may confidently be expected that medical men in particular and the thoughtful public in general will come to accord a position of respect and confidence to this relatively new profession which at present it does not uniformly enjoy. If the universities can contribute in any way to this result, either by molding public opinion or by creating the best conditions for the training of the sanitarian, it is an obligation which they will undoubtedly gladly assume. Indeed, not a few have already given the most serious attention to the problem and, as is well known, we have in a number of institutions excellent beginnings which promise much for the future.

In institutions which can properly undertake to establish departments for public-health work, or in those which already have such, the question of the specific courses and facilities which can be put at the disposal of such a department is likely in large measure to settle

itself. But even in such cases there will certainly be a substantial demand for cooperation on the part of other departments which calls for a definite attempt on the part of the university administration to create a sympathetic and intelligent understanding of the problem of the sanitarian. In institutions where a department of public health is not within the range of possibility, it should still be practicable to afford considerable portions of the necessary training by utilizing such courses as are pertinent to the equipment of the public-health worker. It may be assumed that in the latter case such training would be of a preliminary character, comparable to that received in the premedical sciences by medical students and that the final training would be received in an institution specially devoted to public-health work. A systematic effort to draw the attention of the smaller colleges of the country to this field of work and to the possibility that they should contribute some helpful portions of the required training would doubtless produce results of a significant kind.

It is a familiar experience in the development of professional schools connected with universities that the former are apt to be dissatisfied with the courses offered by the general service departments and that they desire to build up their own special courses to meet their peculiar needs. Engineering schools are apt to wish in this fashion to conduct their own chemistry and physics and sometimes their own modern language instruction, rather than to take that which is given for general purposes by the colleges of arts and science. This is a tendency readily understood and perhaps in many cases justifiable, but it frequently leads to a multiplication and duplication of instruction and equipment which require convincing justification. The creation of any new profession is likely to raise demands for a form of training which cuts across a number of the other already existing professional fields. In the present instance we have obviously a convergence of interests now represented in medicine, in engineering, in civil administration, and in certain fields of pure and applied science, to mention no others, which compels us carefully to study the wisest methods of utilizing extant resources and the best form of organization under which to proceed. The relatively new program required for the training of our sanitarians raises this question of coordination all along the academic line. Shall the bacteriology, for example, which is by common consent an essential part of the training of any such student, be the bacteriology given as an independent science in some institutions, shall it be that offered to the ordinary medical student, or shall it be particularly adapted to the real or supposed needs of the public-health worker? Other instances need not be cited, but many will suggest themselves. The issue affects the extent and character of the cooperation which other

departments can be reasonably asked to make in advance of such a condition of things as may ultimately be developed where a school or department of public health will have within its own personnel command of all the special courses which it desires.

Confining attention for the moment to the problem of the health officer, or the public-health expert, and disregarding the case of the nurse, I gather that the general desiderata upon which there is material agreement would run somewhat as follows: A good general education involving at least two years of collegiate training, with reasonable familiarity with literature, including a reading knowledge of one or two foreign languages, some acquaintance with at least American history, a rudimentary knowledge of mathematics and similarly of biology, psychology, chemistry, and physics. Any additional training in government, economics, sociology, law, the earth sciences, architecture, and the humanities would all be to the good. Superposed upon such a foundation there would be presumably physiology, anatomy, including histology, biochemistry, bacteriology, pathology, pharmacy, hygiene, sanitation, preventive medicine, and vital statistics. Where the medical degree has to be secured as part of the training, there would be the usual clinical subjects in medicine, surgery, pediatrics, etc.

In the preceding requirements, it is clear that relatively little modification of ordinary college curricula would be required in according men going into public-health work such general training as may wisely be given during the first two college years. The subject not generally presented, which might perhaps most wisely be added, would be a conspectus course of the social sciences, both theoretical and applied, which early in the training would give a man the essential social outlook and the conceptions of social organization and administration which distinguish so sharply the necessary training for this field of work from that of the physician as now generally conceived. Not less than the so-called social worker, whose field is that of general philanthropy and the remedial social activities which characterize so definitely our modern occidental civilization, does the worker in public health require this definite knowledge of social phenomena and the point of view which goes with it. To be sure the insistence upon this conception of the profession and upon this attitude of mind should never be relaxed from the beginning to the end of the professional course, and undoubtedly at sundry points in the later training specific and detailed information should be given which would illuminate and enrich the general equipment of the candidate. But it seems to me at least quite important that this outlook should be introduced at an early point in the training.

Doubtless it will be said that relatively few men will have decided upon their entrance on this career at so early a date as is suggested by

the comments of the previous paragraph. Probably this assertion is correct, but it does not detract from the validity of the suggestion for men who do decide at an early stage of their training and it emphasizes a consideration which I believe to be of prime consequence, regardless of the particular stage in the individual's development at which he makes his choice of this calling.

When one comes to the group of premedical sciences which most exponents of public-health training seem to regard as essential, one meets the question already raised regarding the extent to which the form in which these sciences are now presented for other purposes should be modified to meet the needs of the sanitarian. Physiology, histology, bacteriology, hygiene, sanitation, and a few similar topics are frequently presented as parts of a general collegiate or university training and, as such, are taught from the point of view of pure science. All of them are also taught, together with human anatomy, pathology, pharmacy, and other similar topics, as part of the premedical course, and in this case from the point of view of medicine conceived generally in the interests of the practitioner to be, but sometimes with appreciable emphasis upon the scientific and research aspects of medicine itself. If one were not subject to the exigencies of time, it would probably be generally agreed that such subjects as bacteriology and physiology should be taught as fundamentally as possible from the point of view of the science as a whole and the thorough mastery of its essential principles. But with the crowding of the curricula, which characterizes all professional training, and particularly medicine, it is a familiar experience that pressure is brought to bear to present primarily those aspects of the science which are thought to have most direct significance for the subsequent professional work. In the measure in which this tendency is justified, we may expect to find the sanitarian urging that these subjects be presented in such form as to represent the greatest utility for the public-health worker and the least expenditure of his time, compatible with his attainment of a reliable mastery of that portion of the field peculiarly important for him. The demand for this modification is likely to be as definite in the case where the science is taught as part of the premedical curriculum as it is where it is taught from a less specialized point of view. In either case, unless the work in public health is set up as an independent school or department with its own staff to carry these courses, the cooperation of the departments actually in charge of such work must necessarily be gained if students of public health are to have their supposedly peculiar needs met by modifications of the course of study. In such adjustments the central university administration is generally powerless to do more than bring together the high contracting parties under reasonably favor-

able conditions for conference. The outcome rests upon many circumstances which need not be detailed at this moment.

It is probably needless for the outsider to hold up at this point a warning hand and to direct attention to the dangers which lie this way. Good rule of thumb workers can be produced by short-cut methods. Fundamental scientists with real grip upon their field of work are not produced in this manner, and whatever compromises may be necessary in the interest of abbreviating the cost and the time of professional training must never be allowed to extend to such a point as to menace the essential value of the service rendered. Particularly is this true in a field where it is so necessary to gain and retain public confidence and where ignorance masquerading as trained science may work such serious damage.

Speaking as a psychologist rather than as a university executive, I should think it wise to direct the attention of men responsible for the training of the public-health career to the considerable practical significance of certain phases of modern psychology. With much of what passes for psychology in the public mind I have only unmitigated contempt, and I am particularly impatient of some of the unscientific extravaganzas which have connected themselves with the name of Freud. This is not to deny certain real contributions made by Freud and his followers to our knowledge of the organization of human character. But, on the other hand, there is a considerable body of thoroughly solid technique connected with the field of applied psychology which can be made of distinct significance in connection with the public-health program, particularly as this can be linked up with the work of the public schools and certain aspects of the problems of industry. Some familiarity, both theoretical and practical, with the methods of identifying subnormal mental stock, some familiarity with the technique of the classification of personnel, in its relation to both educational and industrial processes will, I am sure, prove itself of substantial value. Similarly, there would no doubt be frequent occasions in which a rudimentary knowledge of psychiatry would prove of value, but how far one can go into specialized fields of this kind necessarily depends upon the available time and the educational facilities at hand.

It is probably presumptuous for the mere layman to express any but the most tentative opinion regarding the relation of this entire program of public-health training to the present curricula of the medical schools, with which, needless to say, the relations must be more intimate than with any other single division of the university. The several plans which have been proposed doubtless all have merit. For my own part, I do not venture at this time to enter upon any evaluation of the several programs known to me, but I do venture to assert that in my judgment there are good reasons for urging that

the professional sanitarian or public-health officer should hold a medical degree. I do not by this expression mean to commit myself to the proposal that the sanitarian shall pursue from beginning to end exactly the same course which would be followed by the man expecting to make the private practice of medicine his life work. I believe, however, that the practical advantages which accrue from the possession of the M. D. degree by the sanitarian are to-day at least highly important and such as quite outweigh the disadvantages which may be urged against it. Assuming therefore that the training given en route to the medical degree is not identical in all particulars with that given to the regular physician, there will obviously be need at this point for some cooperation on the part of medical faculties, but such cooperation ought not to be very difficult to secure, in view of the slow but definite growth in plasticity in the later stages of the medical curriculum. Viewing the situation as a whole, it would appear that the great body of the training material required for meeting the demands of any of the ideals now entertained for public health workers could be met by the larger universities which have engineering schools and medical schools. Not a little of the training now offered is directly and immediately available and most of the rest could be obtained by reasonable and moderate changes in the present courses of study offered. In a few instances there will be the need of introducing outright new work and from beginning to end there will be the necessity of informing the entire program with the professional spirit of public service. Even though the sanitarian go into the employ of a private corporation, the work required can not be successfully accomplished in any spirit except that of a large regard for the general public welfare. Carried on in such a spirit, surely there are few professions open to the young men of to-day that hold out more of stimulation and inspiration to bring to the service of the community the best powers of trained intelligence and modern science.

A PROPOSED CURRICULUM FOR A SCHOOL OF PUBLIC HEALTH.

GEORGE C. WHIPPLE, *Professor of Sanitary Engineering, Harvard Engineering School.*

In a paper published in the International Journal of Public Health last year I outlined in detail a one-year program of studies which to me seemed suitable for the instruction of a doctor of medicine who desired to become a health officer. It was based largely on present English and American practice and was intended to arouse the interest of the universities of the world in public-health education. Since its publication dozens of letters received from universities in Europe, South America, Asia, and Africa have shown that everywhere the subject of public health education is attracting attention. Our present problem is not the general one of setting forth the sub-

ject from a world-wide standpoint but that of outlining a curriculum suitable for an American school of public health.

In the first place, we must consider what the purpose of such a school should be. My conception is that it should be a branch of a university parallel with the medical school and the engineering school and closely affiliated with both, just as health itself is concerned with the human body and with its environment. Its primary function should be to give men opportunity to pursue such studies as will fit them to become executive or administrative health officials in the public service of city, State, or Nation. A second function should be to train men for special branches of the public-health service for bacteriology, for water analysis, for food analysis, for epidemiology, and to cooperate with the engineering school in training sanitary engineers and with the school of education in training teachers of health. In other words, there should be two types of program for two types of service which correspond, in a way, with the line and the staff of the Army. The line officers—that is, the executives—need the more general studies; the staff officers, the specialists, need the more detailed studies in a single field.

I shall not attempt here to discuss a proper curriculum for the specialist. I assume that each school of health will develop special lines of study in its own way and that each professor will in fact teach his specialty in his own way. It is best that no standardization be attempted in these matters. The field of the specialist should be full and free. One school will do one thing, another school will do another thing, as men and means and opportunities permit. The staff officers of our public health service need all the originality they can muster, for it is largely through them that the arts must advance. But the line officers in the public health service need a broader and more uniform training in the interest of cooperative effort and in order that uniformity of administration may result in better enforcement of public health laws and regulations.

My idea of the qualification of a health officer is a man learned in the medical sciences who has had special training or experience in public-health administration. Personally I do not believe that the degree of M. D. is necessary if he has received a properly administered degree of Dr. P. H., but I recognize certain practical advantages of having both degrees and believe that for the present we should go ahead on that basis. The Dr. P. H. needs something which the M. D. does not need and which he usually does not have—the ability to view a community as a whole, to visualize community health from statistical data, to think in terms of the mass instead of the individual, to estimate quantitatively the effect of environmental conditions, and to appraise the benefits to be derived from expenditures of money for public-health purposes—in short, a health officer

should have what may be called medical statesmanship. And a school of public health should give this point of view to its students. If it does not do so it is bound to be a failure. It is not enough to get together a program of studies on the special subjects with which the health officer is likely to deal; it is not enough to provide eminent specialists to give lectures in different fields. Unless the spirit which pervades a school of public health is different from that which exists and which should exist in a medical school, it will prove to be a useless addition to our educational institutions. Physicians should be trained for personal, individual service; health officers should be trained for community service. Whatever studies are taught in a school of public health—and of course there must be specialties—it is of paramount importance that the dominating men in the faculty should be medical statesmen, sanitary statesmen, public-health statesmen, or whatever we choose to call them. Unless special efforts are made to secure men of this type, I have grave fears that the new schools of public health will either become mere attachments to medical schools or collections of specialists jealous for their own branches of science. To my mind, therefore, the spirit of the school and the controlling desires of its dominating instructors are far more important than any program of studies and should receive first attention. And it seems to me that the studies pursued in a school of public health should be so chosen and apportioned as to time that the students will acquire this spirit of community health.

The apportionment of time for different subjects should also depend upon the difficulty of learning them and not upon their relative importance in after-practice. The academic history and habit of mind of the expected class of students must be given consideration. Eight years' experience in teaching sanitary engineering and vital statistics to medical and nonmedical students has shown that, even after allowing for certain age differences, the men who have chosen medicine for their profession have greater difficulty in using figures even in simple ways and greater difficulty in grasping mathematical principles than the others. Students have repeatedly said to me, "Vital statistics is the hardest study I have." And it is much the same with sanitary engineering; it is hard for men who do not have a geometrical sense to visualize engineering works from maps and plans. The reason is obvious—they have a different type of mind and they have not had the requisite preliminary training. The same thought may be extended to laboratory work. If the students are doctors of medicine several years removed from their medical school, their ability to use the balance and the microscope and to conduct the ordinary laboratory manipulations will be found to have almost vanished. It is for this reason that in a suggested curriculum I

have allotted what might otherwise seem a disproportionate amount of time to statistics, sanitation, and laboratory courses. Granted that many of the things taught in hygiene, preventive medicine, and epidemiology are of more practical importance, they are much easier for the medical graduate to grasp. If, however, a curriculum is being made up for nonmedical students, the same principle holds and greater time should be given to hygiene and preventive medicine than to sanitary engineering and statistics.

The curriculum need not cover the whole field of public health in a detailed way, but the program should be so arranged that each student comes in contact with those members of the faculty who represent the leading subjects of importance. It seems to me that this personal contact is far more important than the scheduled subject. Let me illustrate. In the School of Public Health of Harvard University and the Massachusetts Institute of Technology, we were particular to have each student take at least one course with Professor Sedgwick. It made little difference whether it was epidemiology, or personal hygiene, or something else. It was Sedgwick that we wanted the students to know. Sedgwick was a man who was more interested in his students than he was in the science which he taught. Such a teacher is the greatest asset which any school can have and every school needs at least one such man.

The students' program should not all be prescribed. Some time—at least a tenth of it and preferably more—should be left for him to spend as he pleases, in extra study or in some field in which he has a personal interest.

Yesterday, after listening to many suggestions to include this and that special subject in the course of study to be pursued by students in the school of public health our minds became confused. In my opinion it is not at all necessary for students to study all of these things. There are 52 cards in the pack, but only 4 suits. It is not necessary to study every card, but they should become acquainted with every suit. A year's course or a two or three years' course should mark the beginning, not the end, of the student's education. In 1917 when I was in Tokyo on my way to Russia I stopped at a small shop, curious as to the wares displayed. A little Japanese boy came out and spoke to me in fairly good English. I asked him where he learned to speak English and he naively replied, "We have books in Japan." We have books, too, in America—books on this many-sided problem of public health, and the health officer must educate himself by continued study and, what is more effective, by experience. All that any school can give a student is motive power, a map, and a desire to travel; he must make the journey himself.

In my paper on "The Education of Health Officers" I suggested a model program for a one-year course for medical graduates, which, with some modifications, I offer as a basis of discussion.

The idea has been to found the program upon five leading subjects, each of which is carried through the year—hygiene, sanitation, preventive medicine, statistics, and public-health administration. Realizing the lack of accepted definitions and much overlapping of terms, a somewhat detailed list of topics was given for each subject. Of course, these would not fit any one school and the list is far too long for a single year's program. It was intended to be illustrative of the scope of the topics.

The hygiene of the human body should be kept in sight throughout the year, first the theoretical and afterwards the practical side.

The sanitation of human environment should be kept in sight throughout the year, studied first through chemistry and biology and then through sanitary engineering.

The important rôle of the microorganisms should be kept in sight throughout the year. Bacteriology would naturally be taken up first and then developed into the broadening science of preventive medicine, including parasitology.

The use of statistics and other methods of visualizing and detecting the permeation of diseases through a community should be kept in sight throughout the year, and this naturally involves vital statistics first and later the much broader principles of epidemiology.

Finally the principles of public-health administration should be kept in sight through the year—law, legislation, and administrative methods.

In explanation of the percentage allotment of time, I may say that the low figure of 10 per cent given to hygiene in the first term was due to the fact that medical graduates are presumably familiar with the subject and need only to have their knowledge reviewed and brought up to date; while the high figure of 25 per cent given to it in the second term was because of the rapidly developing applications of hygiene in the modern health movement. Bacteriology and sanitary chemistry and biology were each given 25 per cent because they are essentially laboratory courses and require much time. Perhaps, however, this time ought to be lessened and more time given to vital statistics, for I am sure that the students will take more time for this subject whether it is given to them or not.

As to the arrangement of work, it is my idea that the best results can be accomplished by having those courses which involve a good deal of laboratory work conducted on the intensive plan—that is, several hours a day and every day of the week for a part of the term. The other courses which involve lectures and much reading

should be spread through the year. Perhaps the following might prove satisfactory:

Proposed arrangement of studies for a one-year program.

	Per cent.
First term:	
Laboratory courses—	
Bacteriology	25
Sanitary chemistry and biology	25
Lectures chiefly—	
Vital statistics	20
Hygiene	10
Law and legislation	10
Elective	10
Second term:	
Laboratory courses—	
Applied hygiene	25
Epidemiology	25
Lectures chiefly—	
Preventive medicine	20
Sanitary engineering	10
Public-health administration	10
Elective	10

According to this plan the student would spend half of each day in the laboratory and have two prescribed lectures each day. In the first term he would study bacteriology three hours a day for two months and after that devote the same amount of time to sanitary chemistry and biology. Meantime he would have throughout the first term six hours of vital statistics, three hours of hygiene, and three hours of public-health law each week. In the second term he would devote half of each day for two months to laboratory work in hygiene and then to epidemiology and have six hours of preventive medicine, three hours of sanitary engineering, and three hours of public-health administration each week. Obviously, practical considerations in each school will require some modification of this arrangement.

I believe strongly in giving the student some practical experience in the field. This may take the form of actual work done under the direction of a health officer, reports of visits to sanitary works and institutions of various kinds, the making of a sanitary survey, or research work. Students need to get the right perspective of things, and they need to do something original. The making of a sanitary survey is an excellent means of rounding out their course. In making a survey, they are conducting a sort of community clinic. They come to see the relation of things. But it is my opinion that this should be done after their year's work and not during the term. A survey can be made best on the intensive plan. To attempt it during term time cuts into other studies in an unwarrantable way. It tends to make students work overtime and thus lose the benefits of necessary

leisure on Sundays and holidays, which is quite as important to students as to other human beings. Whatever programs we arrange, let us not crowd the students to distraction. Whatever course of study we lay out, let it not be a race course. A school of health may well act as an example to other schools in this matter.

If the course for the Dr. P. H. is arranged to cover two years instead of one, the second year should be devoted to studies in special fields and to original work. The sanitary survey may well be put into this second year. I have not attempted to outline a curriculum for this second year, but I believe that the student should have much latitude in his choice of studies, but be required to take advanced work in some one field. When students finish this work they naturally hope to be recommended for some appointment; hence in their second year they should have the opportunity to demonstrate to their instructors that they can do some little thing well. While the first year of the curriculum should be devoted largely to the acquisition of knowledge, the second year should be given up largely to the strengthening of ability, or, to use Ruskin's phrases, the first term should be lighted by the Lamp of Knowledge, the second term by the Lamp of Power.

In the preceding outline I have had in mind a program suitable for a course in public health, using the words in what may be called an official sense. These words are now used so broadly that their exact meaning is becoming obscure. We used to have "Boards of health;" now we have "Departments of public health." Does this mean an expansion or a limitation of activities in the interest of health? Personally, I do not like to see this word "public" slipping into our conversation unless it means something. Sometimes we say public activities when we mean collective activities; sometimes we say public-health education when we mean popular instruction. Personally I do not like this new use of the word "sanitarian." It seems to me that some of these terms need definition in the interest of clear thinking. When we plan for our new schools, do we have in mind schools of health, schools of public health, or schools for health officials? Johns Hopkins has its School of Hygiene and Public Health, thus recognizing the personal as well as the official aspects. The Harvard Technology School started out as a school for training officials and was called a School for Health Officers. Because of a popular idea that health officers meant "policemen" and because affiliation was made with the department of industrial hygiene of the medical school, the name of the school was changed to School of Public Health. I wonder if the time has not come for us to broaden still more and use merely the fine old Anglo-Saxon word health. Why should not our schools become known as schools of health?

It is because I recognize the complexity of education requirements that I have not attempted to formulate curricula for other than official lines of health work. These, however, should be provided. But until our health activities—public and semipublic, collective and individual, professional and voluntary—are more sharply differentiated and better organized it is well-nigh impossible to arrange programs suitable for large groups of students. Liberal provision should therefore be made for students interested in industrial hygiene, school hygiene, popular health education, physical education, and the like; also, of course, for the specialist in any one of the many fields of official public-health work and for research. It seems to me, however, that every specialist should be required to take several of the major courses in the curriculum suggested in order that he may have a broad outlook on the whole problem of health as it is viewed to-day.

There is one side of public-health work to which the program of this conference has given scant attention, and yet many of the speakers have listed it as a subject of major importance, i. e., sanitary engineering. This subject can be taught best in an engineering school, in an engineering atmosphere amidst drafting tables and maps and plans; in a laboratory where chemistry and bacteriology and microscopy are brought together and used as tools for a common purpose; and in the field where students can see the size and the operations of sanitary works. A proper study of engineering brings in the cost factor, and that is something that health officers need to know. We all look with admiration upon the triumphant work of General Gorgas in ridding Panama of its yellow fever by controlling mosquito growth, but if the Tropics are to be made permanently habitable to the white race, engineers must find ways of securing sanitation at lower cost than at Panama. It is an old saying that "the first step costs," but it is equally true that the aftersteps should cost less. If a health officer is to become a statesman he needs not only the intensive study of the laboratory but the extensive vision of the engineer. He should be taught how to penetrate the secrets of nature in their relation to human hygiene and also, what is of equal importance, how to utilize this knowledge to secure a sanitary environment which shall help to maintain the health and comfort of all the people.

DISCUSSION.

Dr. Victor C. Vaughan:

If the next generation progresses in sanitation as rapidly, thoroughly, and as effectively as the last generation has done, we should be satisfied. Thirty or forty years ago the death rate in this country was about 25. Twenty years ago the death rate in New York City was between 19 and 20. To-day it is between 12 and 13. There has been a reduction in the death rate in the registration area of this

country within the last generation of about 7. In 100,000,000 people that means the saving of about 700,000 lives annually. It is the belief of competent sanitarians that it is possible to reduce the death rate to a minimum of about 7. This is going pretty low. I doubt whether the generation of expert health officials that we are going to make will surpass in results the progress that has been made in the past.

How has this progress been made? It has been made by the education of the people. The death rate of a people is a very fair index of its average good sense. And we are not going to progress as we have in the past unless we educate the people, unless the people are concerned in these matters. A great deal has been said decrying the connection between politics and public-health officers. Now I know that we should call it psychology and not call it politics, but every health officer is a political officer, a community officer, a policeman, as it were, and he must satisfy the people, and it is easy to satisfy an educated people and not easy to satisfy an uneducated or ignorant people.

You will pardon me if I refer to some experiences that I had in public-health matters in the seventies, before Koch discovered the bacillus of tuberculosis. The Michigan State Board of Health began to teach, by means of conventions throughout the State, that tuberculosis was an infectious disease. They began that in 1870, and in 1887 we presented to the Legislature of Michigan a request for an appropriation of $100,000 for a State hygienic laboratory. This was managed not by the doctors of the State, no; the doctors of the State were not interested. It was managed not by the university of the State; the university of the State opposed it. It was managed by the Michigan Business Men's Association. The legislature passed the appropriation, which was vetoed by the governor and passed over the governor's veto. The State laboratory of hygiene was established, and it was stated in the bill which established this laboratory that its purposes were threefold. First, and most important, research into the causation of disease; second, the investigation of infectious disease, or diseases in general in the State of Michigan; and, third, the teaching of students along hygiene and public-health lines. So thoroughly were the people of Michigan impressed with the value of scientific work that when an outbreak of typhoid fever appeared anywhere in the State, water was sent to the laboratory for analysis, and the report was accepted as final. In the nineties a private company at Ironwood, Mich., sent to the laboratory a sample of drinking water taken from the water supply of the city. There had begun to appear cases of typhoid fever. It was reported that the water was contaminated. Two weeks passed, the epidemic had grown, hundreds were ill, when the health officer of the city sent a sample. A telegram to him said: "Two weeks ago this water was reported to the

superintendent of ——— company as contaminated." The people of Ironwood went after the officer with a rope, and he has never been seen in Michigan since. I tell you, you can get up feeling concerning health matters as well as political matters.

Now, Mr. Surgeon General, this conference which you have called here is capable of doing great work, and I am sure that it will do great work. On the other hand, it is capable of doing great harm, and you will pardon me if I speak very plainly concerning this. If we are going to standardize public health courses in this country, lay down cast-iron rules that a man must do this and a man must do that before he can occupy a position as health officer, then we are doing harm. I hope there is no such sentiment.

Another thing. There are representatives here from the various universities of the United States. Each university thinks that because Johns Hopkins and Harvard have received large appropriations for schools of public health that it also should have a school of public health. Now, every university and every college in this land is already fitted to make men competent to do work along some of these lines. As Doctor Whipple has just said, sanitary engineering, for instance, is taught better in engineering schools than it would be in public-health schools. Bacteriology is well taught in practically all the first-class medical schools in this country, and so on. When you say that a man must know so and so in order to be a successful health officer, think for a moment what are the duties of a health officer. We had this stated to us yesterday. The health officer himself or through his assistants uses all the discoveries in science which can be of benefit in the prevention of disease. No school can teach all these things. No school, however well endowed, however numerous its faculty, can teach all these things. Every first-class university in this country can teach some of them.

So let me beg of you, the representatives of the universities who have come here to this meeting, do not feel that you must go back home and launch a full-fledged public-health department. It is unnecessary, and besides, there should be reciprocity. If the student at the University of Illinois gets his engineering training, and then wants some other special line of work, let him go to Johns Hopkins or Harvard or somewhere else. For 30 years I have endeavored to get permission for medical students to migrate, go here and go there, and all my attempts along that line have been failures. Chauvinism, provincialism in medical teaching—let us not have it in public-health instruction. Let these schools that have been so ably endowed, so abundantly endowed, accept the work that has been done somewhere else.

This conference can standardize the courses in public health. You may say to-day that every health officer must have a medical degree.

That would have great influence, but it would not be legal, it would not be binding upon anybody. And before you do such a thing, remember that a Louis Pasteur could not be a health officer in any village in the United States if such were the law. Many men who have contributed largely to public health have not been medical men. After having been dean of a medical school for 30 years, I hold that the atmosphere of the medical school to-day is antagonistic to preventive medicine. That may seem a strange statement, but it is true. The medical graduate is not fitted to examine the man who comes to him and says, "I don't know that there is anything the matter with me, but I want you to go to work and find out." The student is only educated to take care of the one who comes and says, "I have dyspepsia, heart disease, or something of that kind." The teacher of bacteriology in our medical schools as a rule teaches bacteriology not from the standpoint of preventive medicine, but from the standpoint of the pathologist, and so on. He treats the subject as a clinician, not as one who would teach prevention of disease.

Let me beg of you then that the representatives of university or college present here go back and announce what work along this line each can do and do well. Do not strain a point in order to build up a full-fledged school of public health. For a number of years, at least, the schools that have been so abundantly, so magnificently endowed (and I am sure that we all rejoice in that), supplemented by the other schools which will furnish instruction along certain lines, will be able to supply all the health officers we need in this country.

We are dealing with a comparatively young profession. Let me beg of this conference not to bind its feet. It will walk better if you do not. Do not cripple it in swaddling clothes, but let it grow; do not chain it down to certain definite lines, to cast-iron rules, but let it evolve in a natural and normal way.

Dr. Annie Goodrich:

I would like to commence, as Doctor Winslow set the example by ending, with a text: "To learn the secrets of any science we go to the expert specialists, even though they may be eccentric persons, not to the commonplace pupils. We combine what they tell us with the rest of our wisdom and form our final judgments independently." It is impossible for me even in the brief moments that are given me to present the subject except briefly.

I would begin by reviewing some of the trends of the times. In the first place we ought to consider the trend of the times in industry and secondly in education, and then consider this great problem of public health. As I see it, the people are demanding that the men of the street have the educational advantages not only of the schools

but of the institutions of higher education. They are expressing themselves through the intellectuals of the labor party. One continuous thought runs through their writings, that if you are going to have people functioning effectively in the community—and they should function, every one—they should have that creative impulse and interest in what they are doing that energizes them. I might quote from William James, "Knowledge of life is one thing, but the effective occupations of life with their dynamic forces, are another."

There is another movement of great significance—the cooperative movement. It is demonstrated far better in foreign countries than it is in this, but it shows that the people are intelligent; it shows that they are able to do their own great pieces of work. We only have to go back to 1844 to a little group of weavers, almost illiterate, and think of their wheat fields in Canada, their tea plantations in China, their millions of money which they have accumulated.

Let us consider for a moment this question of education. I come, of course, as you noticed; from the Teachers College at Columbia, and those of us who have association with this university are constantly watching the progress of what is called preventive medicine. We have constantly brought before us the works of men who are demonstrating the fact that "Knowledge is power."

Now with these two points of view continually before us, added to the fact that one of the four essentials in education is health, conducing to economic efficiency, it is impossible for me not to think in the terms of the men in the street, and how best we can make this change which is going to affect the whole world. I can not, for instance, for a moment see that any person concerned in the field of health can separate himself or herself from any other person concerned in the field of health. I can not conceive that we should have a practitioner who is interested in the prevention of disease and another practitioner interested in the incidence of disease not cooperating. It seems to me that the persons who function in health should attack the immediate situation of abnormal conditions and while doing so should function in the prevention of that disease, to bring about a future normal situation. As far as health is concerned, I have a number of outstanding pictures in my mind. One is that great congregation of mental patients in our 15 State hospitals in New York. When I was inspector of nurses' training schools, which I was for four years, it was one of the greatest revelations of my life to find that where they had registered schools of nursing 15 were related to the State hospitals for the insane, and that the population in these hospitals was 35,000 out of something a little over 50,000 of the whole number. Yet hundreds and hundreds of nurses had been sent out, and a number of physicians also, who had known nothing of the question of

mental diseases. I have not included, above all, that most tragic spot in the islands in the East River—Randall's Island—where we have not only the adult mental and physical cripples, but a great body of little children that are crippled.

Now, I want to speak for the education of those persons who are going to have the most immediate, first-hand opportunity of changing this situation, and concerning the group of women who may function either as nurses or nutrition workers, or as hygienists of any kind, if you like. I can not see any program of health education which does not at once open the doors of higher institutions to those who are prepared to function, not as an overhead, but absolutely and intimately. If you ask me where we are going to get those persons who have that higher education, my reply would be this: That it is predicted by so reliable a paper as the New York Times that in a very short time the number of girls in colleges will equal the number of men. There has been a 156 per cent increase in the last 26 years in the number of young women going to college. The number of girls graduating from the high schools already exceeds three times the number of boys. The greatly increasing group of young women going into the colleges are destined to spend four years at academic work which does not lead them to any effective occupation in life. I protest that these young people should be prepared in the first two years of college life for such a field as we are mentioning to-day. Certainly they should not be wasting their time getting knowledge if they are not going to be put to some effective use. All of the subjects which have been mentioned here, it seems to me, at least many of them, should be part of the curriculum of those young women.

I want to give you one or two things here that I would particularly stress—the nutrition worker and the nurse. We ought to direct hundreds of college women into this field. The reasons are several. Let me just give you a little problem. Two per cent of the persons in the community are constantly sick. If one visited every single case of sickness and the duration of each case was two weeks, do you realize that one would get into contact with 52,000 cases in a 100,000 population in a year? I am aware that I am not considering the incidence of repetition, but every time that person went into a family, that trained person would have the opportunity of giving directions for those members of the family who were healthy, in order that they might continue so.

There has been a great error in our education of nurses. We have mistaken the means for the end. The end, as far as the patient or mother who sends for that nurse is concerned, is the technical procedure of the nurse. But that is not or should not be her end. Her hands have been trained so that her mind is free from her technical

procedures. Nothing is better evidence of that than the way she can go from one communicable disease to another without carrying it. Her antiseptic conscience gives her entrée into that home. That nurse has the function of a teacher. If she has been given teaching methods she must teach the people with whom she comes into contact the causes of disease and how disease may be avoided. In this case she is more than a teacher—she is the most important connecting link between the expert specialist on the outside and the family on the inside. She should be able to interpret the message of the expert specialist.

Let me give you an illustration of what has been happening; it is very dramatic but absolutely true. I know of a city block with a population of between 1,500 and 1,800. It has 41 tenements in which not one has a bathtub. There have been over 50 welfare workers in that block in 30 years. Has that block improved? Far from it. There are 41 buildings and not a bathtub in one. What about the mental, moral, and physical condition of these people? We are not yet solving this situation. We are not getting the kind of people enlisted who have the knowledge that will reveal to us the trouble. They should work with these people and teach them to change their own situation. Until these people know their own power, know they can better their tenement conditions, until they have learned the lesson of health, we shall not have any change. We might as well pour our money into a quicksand. Until we teach these people by precept and practice, we are not going to get much of a change.

What do I believe concretely? I believe that there should not be less than two years in a college for the nurse or nutrition worker. I believe all these people should come out speaking the same language. Their common denominator is health, and I believe wherever a nurse connects with a nutrition worker, with a physician, with a dental hygienist or a dentist, that there are certain fundamental things which they should have in common, in order that there may be the least possible waste. I believe the hospital is one of the most important laboratories in which to teach a nurse. The congregation of cases makes it possible to give her in three months an experience that would take her years to get. The trouble is that we segregate our cases in the hospital. We forget they have any past or future, and simply treat a local condition. But if we consider that the hospital is but one piece of machinery—that the dispensary, and all the scientific equipment, rounded up with a group of workers, all have a common denominator—we can put over something in a few weeks or months—something that has never been dreamed of.

Dr. Alexander C. Abbott:

Doctor Whipple has offered objection to certain terminology. I should like to contribute mine, so as to make the picture complete. Unless my conception of this matter is erroneous, public health is the object for which we are striving and public hygiene is the science through which we hope to gain the object. I would suggest, therefore, that the term "public hygiene" be employed for the science instead of public health, as is now customary.

I am pleased to hear President Angell lay such stress as he has upon the fact that the facilities of many of our universities for training in public hygiene have not been utilized. I represent a school that took up this question of coordinating different departments into what might fairly be regarded as competent instruction in public hygiene as far back as 1906. I had no such plethoric treasury as the $500 to which Doctor Whipple has made mention. When the proposition was made to the authorities of the University of Pennsylvania I was authorized to proceed with the plan, providing it could be done without cost. It fell to my lot to coordinate different departments in the university that up to that time had been, very naturally, developing with no consideration of this possible relation to questions of public hygiene.

It is with some amusement that I now recall my discouraging experiences. All sorts of objections were offered by such departments as did not want additional work or did not want the scientific subjects applied to a practical problem. It was necessary to make clear that it was not proposed to train specialists, but rather to give such training as would show the bearing of the subject to the whole problem and create a sympathetic and intelligent interest. It took about two years to get full cooperation. The result of it all is that we have arranged a fairly coordinate course, which from year to year is improving. We are now giving—and have been giving since 1909—the doctor's degree to those persons who successfully pursue this group of studies.

I do not regard this plan as the best one. It is the best that we could adopt at that time. Also it is a plan that can be considered by a very much larger group of smaller colleges than are now considering it. I do not think that we should set so high a standard for this work as would discourage the smaller colleges to undertake coordination of available departments and do something in this field.

The disadvantage of the coordinating plan, as I see it, is that you create almost no atmosphere. I do not believe that it is possible to create that very desirable atmosphere in which work of this kind will thrive best, unless the subjects are in much more intimate touch than is possible where you are coordinating outlying departments under one roof, if possible. I have no criticism to make of the kind of indi-

vidual teaching that is being given in those outlying departments. It is excellent, but its bearing on the subject of public hygiene is not sufficiently direct. It is a little detached and I believe the result would be infinitely better if the groups were more intimately in contact. But such centralization, desirable as it is, should not be regarded as so essential that nothing can be done without it. Something of very great importance can be done by many schools if they will only do it.

I am glad that this morning we are getting our feet down on Mother Earth, glad also that none of the 380 students who replied to Doctor Jordan's questionnaire were here yesterday. I am quite confident that if they had been present not one of them would have considered going into public hygiene. He would not have known what was to be included, where it was to start, and where it was to end. The boundaries of the field as conceived yesterday were very hazy; everyone seemed to think his own special subject fundamental to success. I feel that the time has come, and hope it will come to-day, when we can at least have a suggestion of a sensible minimum course of instruction that will give to the candidate in this field of work a good idea of what it is all about, some idea of the problem, some instruction that will enable him to become practically familiar with the underlying phases of it, and such a dignified course of study that a university can take the responsibility for certifying that a student who graduates from it is at least favorable material to work on, able when he does go out to give information and to absorb it. He is, of course, no more a "finished product" than is a medical student when he leaves the medical school.

I hope sincerely we shall never see the instruction in public hygiene in the chaos that characterizes the medical curricula of to-day. One thing must be borne in mind in arranging this curriculum. It should contain the essentials but allow time enough for independent development.

Something has been said about the successful health officer. I was a health officer myself for six years. I am not sure that I was a successful one, but in those years one thing impressed itself on my mind every day; that is, it does not make very much difference how much education a man may have in any particular field, unless he knows men, unless he realizes that he is living in a community of human beings, every one of whom, according to our form of government, has a say; unless he is man enough to make them think as he thinks; unless he is able to get the means to carry on his work; he may pose as much as he pleases as a highly scientific health officer, but without these he is a failure. There is something which comes to one with his idioplasm that makes for success. If you do not have it

you are bound to be a failure. That quality which makes for success can not be taught. It may be awakened from dormancy under favorable environment.

THE EDUCATION OF PARTIALLY TRAINED SANITARIANS NOW EMPLOYED.

Dr. ROGER G. PERKINS, *School of Medicine, Western Reserve University.*

The subject assigned to me is the man who now has a job and needs more information. This is not merely a very pressing need of to-day; it is a need which will continue. It has been emphasized by other speakers yesterday and to-day that the progress of getting sufficient teaching facilities to turn out an adequate number of fully trained men is one that will not be finished to-day or to-morrow but will be carried on for an indefinite time. I also feel that no man who is worth his salt and who has obtained a job will ever feel satisfied no matter where he has obtained his training. He will want more training—want to get further advancement. Outside reading will help him to a certain extent. Personal contact will go farther.

The things we have to consider then are, in the first place, who is the partially trained man; second, what are his general broad needs; third, what is being done to cover the needs; and in the fourth place, what can we do to make his opportunity for training better. Most of the talk has been of the health officer of the grade more or less of commissioner. Professor Whipple has referred to the lower grades as of great importance. I have felt that the things we have to keep in mind if we are to run a proper health and hygiene department is that it must be fairly satisfactory all along the line. Anyone who has the experience knows that just as soon as you have weak points in the chain of activities, just so soon is the success of the work interfered with. We can not neglect even the humble technician, because if he does not do his work well, the diagnostician can not do his. We must then consider the sanitarian, including the higher administrative officer, and also a great many posts farther down the line.

As to the particular needs it seems to me that the chief, the head administrator, needs a very broad view of public health. It is impossible—as has been clearly shown by some of the papers which we have already heard—that any health officer should know all that he is supposed to know. But he should have sufficient knowledge of the entire division over which he has control to know whether or not they are doing their work. What they all need is a general health background, but the pictures that we draw will depend upon the individual need of the person for whom we are drawing them.

Since we are trying to work out a new system, we have to look at the pessimistic side first, the difficulties we have to overcome. There

are two very distinct difficulties. The first is the indifference of the individual. There are many men who do not appreciate that they do not know as much as they might know if they knew more, and these men will not come forward and clamor for instruction. That is a matter of general education to which we shall refer later on.

There is also the still greater difficulty of lack of time. This depends in part on the fact that the individual, who has to run an underfinanced and undermanned department, does not feel that he can get away, and in part on the lay administration, which is often unable to see any necessity for study on the part of employees. While this attitude is changing, it still obtains in many places. But even where there is willingness to grant leave of absence there are no funds available for travel and the burden is placed on the official, whose salary may find it hard to bear the strain. In some of the larger cities there are courses which are available and which may be taken by the local man or men without too much strain in time or money, but this is the exception.

It is clear then that it is necessary to develop courses which can be taken by the men who desire them and are able to attend and that a careful balance must be kept between the courses which involve so much time that they are impracticable and courses which are so short or so compressed that they do not give results comparable with the effort.

Inasmuch as a great part of the training must be along lines which require demonstration, the teaching for the most part must be carried on in the larger cities. Exceptions may be made in special cases where there has been the development of an ideal county or rural administration which can be used in a series of special courses such as is being worked out in Ohio. But in general one should have illustrative material in the shape of waterworks, sewage-disposal works, child hygiene activities, and so forth, in order to have the widest series of courses of instruction. Unless a peripatetic staff can be developed as a sort of traveling university, a consummation which would at the best be of doubtful value, it will be necessary to go where a teaching staff which is interested in the matters at hand is available.

On the bases already discussed there are three definite possibilities:

1. Brief institutes of the present type, scattered through many cities and with wide scope of subjects.

2. University courses of longer duration in connection with (*a*) schools of hygiene and (*b*) departments of hygiene and preventive medicine. The scope of subjects covered here will probably be narrower.

3. Correspondence courses.

Each of these has its advantages and disadvantages which may be briefly touched on.

The *institutes* are not dependent on the presence of a university, as they can be manned by a combination of the local health officials and a peripatetic staff similar to that which is functioning at present. They can thus be given at a larger number of places and be more accessible to those needing the work. Inasmuch as the presentation of material in a brief time is necessarily didactic, a greater variety of subjects can be taken up, and a general view of the whole subject of public health can be more or less sketchily given. On the other hand, the type of teacher best suited to such intensive courses will often be hard to find. The concentration itself is a disadvantage, as it is hard for the human mind to absorb more than a limited amount of material in a limited period. There is great lack of time for the demonstrations and visits to installations which are so helpful in study. Moreover, it is hard to get suitable places for the carrying on of the courses, and laboratory teaching is impracticable in the absence of adequate laboratories.

Teaching in a university, whether there is a school of hygiene or merely an active department of hygiene, will admit of the use of a better staff of teachers and a better location on account of university facilities. The courses will be long enough to get results comparable to those in summer schools and other graduate teaching. There will be more demonstration material and more time for the visits above mentioned. On the other hand, there must be a greater limitation in subjects, as even in a six weeks' course with adequate time for the individual subjects there will be none too much time for the essentials of many courses. It is also true that as there are comparatively few universities which offer facilities for this sort of work; there will be comparatively few places where it is available.

Correspondence courses are available for men who can not get away, and a larger number can be reached at less expense. There will also be greater uniformity of teaching, as all the questions can be prepared and examined by the same group. On the other hand, the lack of personal contact and the other well-known disadvantages of correspondence courses make them a last resort or for special purposes.

Fortunately we are not held down to any one of the types, and the most intelligent thing is to utilize all of them under circumstances most favorable for each. Until all posts are filled by qualified men there will continue to be a demand, and even when all full-time posts are filled by such qualified men a limited need will continue, as it is not practicable for the average busy sanitarian to keep up-to-date without the availability of some predigested food.

Speaking from the standpoint of a university teacher, it is the possibility of use of the university which most appeals to me. In

many of the best medical schools, we see annual courses for the benefit of graduate physicians who are in the identical condition spoken of as obtaining among the sanitarians. These run four or six weeks, sometimes longer, are carefully prepared, are noted in the school catalogues, and form a definite part of the curriculum, causing the addition of members to the teaching staffs of the various departments involved. Similar courses in graduate public health could be instituted widely wherever there is a school of hygiene or the equivalent, or where there is a department of hygiene with a proper relation to the local health administration. There should be two groups of these courses, involving on the one hand the more strictly laboratory courses, and on the other hand courses of a didactic or conference type with suitable demonstrations and visits. The essential principle would have to be that the number of courses should be limited to the total that could be handled on a thorough basis, with a reasonable amount of time for each. Courses limited to an hour for each session, and really amounting to not more than 50 minutes, must be merely didactic unless the subject and the class are very limited. If the conference form is to be adopted, this is not enough time, as when a subject is abandoned for the day it can not be readily taken up at the point at which it was left, especially if there have been other subjects studied in the interval. For laboratory periods half a day is none too long, and for some subjects more than twice as much can be accomplished in a whole day as in two separate half days.

The results of the present series of institutes will do much to determine what courses will be most satisfactory, but there are certain ones that will form the backbone of any university system. Among these must be vital statistics, which is not receiving much attention in the institutes; epidemiology, including especially the methods of distribution of our ordinary infectious diseases; sanitary engineering, especially as concerns water supplies and sewage disposal, specific infectious diseases such as gonorrhea and syphilis and tuberculosis; child hygiene; food and milk in their relation to health; and administration, which should include general administration (not forgetting finance), as well as the more specialized forms for subdivisions. In addition there should be public-health laboratory courses, preferably in connection with the municipal laboratory with its large material.

It is obvious that it may not be possible or even wise to attempt to include all these in one session, though on the other hand it will readily be seen that the average seeker after knowledge will prefer the plan of electives to that of complete adoption of the whole series.

But if longer courses of this type are to be successfully developed it will be necessary to stimulate them in two ways: (*a*) By education of the political authorities to the appreciation of their value in the efficiency of the administration, with the natural corollary of agree-

ment to leave of absence; (*b*) by financial assistance to the departments undertaking the work. In postgraduate courses it is the custom to charge a fee to reimburse the teachers for their time, as is also the case in summer courses of all sorts and in extension work. In this connection, however, I do not believe that the end desired would be subserved by direct payment to the teachers. It is the usual policy in the present day medical school to make promotion in position and in salary dependent on published investigations, and calls to other posts are usually influenced by the same index of performance. As long as a man is dependent on this for advancement at home or abroad it is not fair to ask the use of his extra time without compensation. On the other hand, it is clear that an addition in pay will not affect this point directly, but will still entail the same loss of time for investigation. If, however, the department is assisted in its budget by such additions as will take a corresponding part of the routine off his shoulders, routine of a type equally well carried on by subordinates, I believe that most teachers in active departments of hygiene would gladly undertake this work for the advancement of public health. The actual details involving a suitable release from routine would naturally vary in different institutions, and it is only the principle which is brought up here for discussion.

Where no regular courses of this character are available under university control, and also for the group who can not get away for as long a time as a month or six weeks, the institute will continue to fill a want. Analysis of the present schedules and conversations with some of the men who have tried the scheme as students indicate that the time is too short and that the concentration is so great that the final effect is one of confusion. One may admit at once that this confusion may readily be removed by a little additional home reading, but one must also admit that this will probably be carried out by the minority.

It has been noted by prominent teachers that the average length of time during which one can keep attention firmly on a lecture is about 20 minutes. The more detailed and technical the subject, the more difficult it is to hold the attention of the class. Accordingly, the more intensive a course has to be, the more difficult it will be for the average man to get enough out of it. One must also keep in mind that among the men who require this additional teaching the average age is much higher than that of the ordinary student and that the mind is consequently less flexible. It may be urged on the other hand that the channels of the brain along certain lines have been sufficiently worn to make the currents of information flow more readily along them, and in some cases this is true. But in many cases the channels have been worn in the wrong places and the information requires a good

deal of cross channeling before it can get a smooth flow. Experience shows that courses of six to eight weeks in summer schools for scientific or other subjects are necessary to get the subject across. Courses running three or four days or a week are valuable in giving a general summary of the subject in hand but do not admit of sufficient detail. Most memory is visual, and it is the rare person who has a really good auditory memory. Demonstrations take time, but emphasize the facts taught, and aid in making clear the reading matter which is also a part of the visual memorization. For many purposes a certain amount of laboratory work is essential, and of this nothing can be done in a week.

Inasmuch as a great part of the teaching will naturally be carried out by the local health authorities, it is clear that their position differs very much from that of the university teacher. There is nothing that so clarifies one's ideas as having to impart them to others, so that an institute held in connection with a health administration will not only help the students who come to it but will greatly improve the character of the local knowledge.

Where, in addition to the health officials, university men are used in the teaching, there will be the same question of remuneration. It is clear, however, that there is a great difference between giving three or four or five lectures in the course of a week or so and preparing and conducting a course, and the conditions surrounding each type of instruction would have to be considered.

Correspondence courses will probably be most valuable under State control, where the matters most closely relating to the particular affairs of that State may be emphasized, notably the laws, which unfortunately vary so much. At present the enormous amount of detail which falls on the persons preparing and collecting the examinations tends to confine the courses to commissioners. This still leaves untouched the large and important group of subordinates on whose efficiency so much of the success of the commissioners depends.

Use of university facilities for local health departments.—The greater the intimacy between the university department of hygiene and the local health department, the greater will be the mutual benefit unless, as Ferrell suggests, the university teacher becomes so overburdened with administrative routine as to lose efficiency in both directions. But leaving aside the question of time division, which will vary in practicability in different places and with different individuals, there is much that the university can offer in the line of extension work without expense or serious trouble. Most of the universities are located in large cities, where there are many health activities and a fairly large staff with diverse duties. The university feels that it has a right to the use of municipal activities, but often holds a quite different attitude toward the other side of the shield.

This is an obvious loss of opportunity. Take, for instance, the library of the department of hygiene. This is usually kept up to date and from the very exigencies of the subject must be of extraordinarily wide scope. If it is to be of value to the department, some sort of catalogue is essential, and this should be available for and accessible to the health-department workers of all grades which can profit by its use. It will doubtless be answered that when they come they are made welcome, but that they do not come. The answer is that there are few who clamor for education but many who will take it if made easy. If the university has any function as an educational factor in the community, it is its duty not only to offer these facilities but to stimulate their use. We have established this principle in Cleveland with such success that various members of the local health department are detailed on certain days to use the hygiene library and to report on their abstracts. The men working along certain lines in the city have also been stimulated very successfully to cooperate in epidemiological and other investigations with students as well as staff members of the school, resulting in a broader interest and closer application of facts on both sides.

It is our plan to stimulate this further by systematically watching the literature for reading suggestions for the health division, and by inviting them to our staff conferences, at which abstracts of the current literature are read and discussed. It is appreciated that local conditions have marked bearing on the practicability of all this scheme, but I wish to emphasize that if it is possible to work it out in one place it can not be said to be impossible of accomplishment.

Training of technicians.—As noted earlier, a good technician is one of the props of every department in which laboratory work is a large factor. Moreover, trained technicians are few and difficult to find. The average technician, and the better than average ones also, are for the most part accidental in their development. As a result they have a training which is dependent in character on the knowledge and interest of their immediate chiefs, who rarely have any time for the development of a background for them. There are constant requests from persons who desire some such training, and it is practically impossible to offer courses which will cover the ground. A plan is under consideration in Cleveland at present which is based on the principle of apprenticeships. Through the fact that the municipal laboratories are intimately connected with those of the medical school, there is a chance for an experiment. Applicants will be passed around in the school and city divisions, assisting in the various technics, with the idea that they will be of sufficient assistance in the routine which they must necessarily acquire to offset the trouble of the actual technicians and laboratory workers in teaching them,

Whether this will work out or not can not be told, but it appears to us an experiment worth the trying.

Summary.—The problem of the partially trained sanitarian is of immediate importance, and will continue to be a problem for many years.

The possibilities for his instruction lie within the range of correspondence courses, brief institutes, and longer postgraduate courses analogous to those in medicine.

While correspondence courses and institutes have a definite and valuable place, the best results will be obtained from the longer courses of six to eight weeks.

In all cases encouragement is needed in order to obtain adequate leave of absence for those needing the work.

Whenever the university facilities existing in the department of hygiene are made available to the staff of the local health department it will result in mutual benefit.

DISCUSSION.

Dr. Eugene R. Kelley:

I was somewhat puzzled as to the basis on which this program was made up at first, but finally in retrospect one gets the idea. I was to represent these political health officers who have so frequently been mentioned. And here we stand. We are like Topsy, "We just growed." There are hardly any of us who are trained men; that is, technically trained in public-health work.

I hope that no one will get the impression that I am at all antagonistic to the spirit and intent of this meeting, and I think it is a wonderful thing to get such a group together and to discuss common problems and ideals. But there are several matters about which I would like to say a few words.

Doctor Freeman has mentioned the fact that of the health officers in all the States and large cities of the United States 101, or 84.2 per cent, are physicians without public-health training, and that 4 out of 6 men who have had no technical training at all are located in Massachusetts. I am going a step further and expose our whole situation. Doctor Freeman did not approach anywhere near the truth. As a matter of fact, there are 65 cities and towns of over 10,000 population in Massachusetts, approximately 10 per cent of the whole number in the United States, and in only about 5 is there a full-time medical officer, with public-health training. You can see what a hopeless situation we are in in Massachusetts, and according to all the rules of the game we should have no pride in past achievement nor any hope for the future. But that does not tell the whole story. The Massachusetts system provides for a board of health with an executive officer, who is often an untrained man and yet who has

learned a few things about the practical administration of public health. He is appointed under civil-service regulations. Usually he has a few of the best type of medical men on his board—serving without pay. This may be the reason why some things have been accomplished in Massachusetts.

I do not think this is an ideal arrangement, but just the same, any system which can be made to work even though it does not meet the views of the best thinkers deserves consideration; and those of us who are of the common or garden variety of health administrator, if unfortunately we have not had the desirable special training, still we work and live and labor. I suppose we have graduated from the university of hard knocks in public health.

As I am a strong believer in public-health education, just as strong as any of you, I hesitate from seeming to criticize all the time. Nevertheless, propaganda for public-health education can work two ways. I once had the experience of preparing for the most influential newspaper of a State a perfectly splendid article in a tone of righteous indignation, voicing my disapproval of the very benighted and short-sighted attitude of the legislature in not increasing the appropriation for health work. The article was published and I got all the sympathy of the public-spirited people of the State. But not only did I not get an increased appropriation, but I got the former amount cut 50 per cent because the men who were most reflected upon were the men who had the votes. Many times a man comes in with an idea which looks pretty good but involves drastic criticism of present methods. And then I think of that time when I had to take a small young health department and nurse it along so it could grow up again to the place where it was before my ill-advised interview was published. Then I usually decide to refrain from rushing into print. That is the kind of training that you can never get in a school of public health. Probably these lessons are more important than those you can learn in a school of public health.

In the next place, I want to speak a good word for the system of training by apprenticeship. You can take people who have never gone beyond the common schools and employ them as technicians and inspectors and you can gradually impart to them in a series of practical talks and demonstrations the facts they most need to know for this work, and they can be employed in a practical and useful manner by a public-health department.

Moreover, we have, I think, rather overlooked emphasizing the public-health "sense" and have put too much emphasis on the ability of special training to do it all. I feel with Doctor Abbott that there are some inherent qualities that we can not get from schools. Conceding that it is desirable for the general health administrator to have a general medical education and to have a full course

of public health, according to my system of grading there would be only five or six hundred points on a scale of 1,000 that could be credited in this fashion. The four or five hundred points left never would be covered by any of this education; they consist of more or less inherent qualities. These qualities can be encouraged to some degree, but can never be created. We must do all we can to aid in teaching public-health students how to live with people and get along with people.

We need the men and women of special education, and still the enthusiastic man who is untrained may be like those who "rush in where angels fear to tread" and yet win out. Anyone in administrative work will realize this. I can recall instances where I have broken useful ground in a new field that I might not have had courage to enter had I understood all the facts. I agree most heartily that we need the special knowledge. But more than knowledge we need faith—faith in the people and faith in the cause, the faith to try out something that has never been done, but which may be successful to an astonishing degree in promoting health.

A word about short courses. They are one of the things I think we can well use in developing health workers. The correspondence course has its place, but the correspondence course is a last resort—a very sad last resort. I do think we ought to arrange short courses in something the same way that the courses are arranged in agricultural schools for the plain farmer. In these courses an arrangement is made so that if a farmer wants to find out how to raise chickens he goes for two weeks, or if he wants to learn how to care for milk he goes for another two weeks. There are advantages in this method, and it may be used with some of our partially trained men that are already in the public-health field. Doctor Crumbine is going to tell more of the possibilities of this method of training.

There is one other subject that rather puzzles me. That is the question of keeping employees in the health department in a student attitude of mind. Doctor Perkins touched upon this problem. It is one of the hardest problems that comes before anyone responsible for the running of a health department.

Finally I wonder after all just what we are to train men for in these new schools of public health. Personally I must take issue to some extent with my friend Professor Winslow on the remarks he made last evening. I can not look forward with any enthusiasm to the British system as an ideal for which we should strive in this country. I can not look forward with pleasure to the possibility of 25 or 33 per cent of the medical profession being employed by the State. I have not lost faith in my profession. I think it is more or less the fault of those who are interested in preventive medicine that they have not succeeded in interesting the doctors. I deprecate

efforts to get more physicians working for the State. That is the British system. I believe that Sir Arthur Newsholme himself did not feel that it is an unqualified success and that it should supersede our ideas of private medical practice. I hope I have made this point very, very clear.

Dr. S. J. Crumbine:

Owing to the lateness of the hour I am not certain but that I would best serve this conference by announcing that luncheon is served and adjourn. I wish, however, for just a moment to speak concerning the training of the part-time medical health officer, to direct your attention toward our immediate needs. This conference program has been taken up largely with the future education of sanitarians. I must express my disappointment that more emphasis has not been placed upon that other phase of the subject—education of part-time health officers—because there are more of them. The Public Health Service has recognized that need in the establishment of public-health institutes that are now being held throughout the country.

It may be permissible for me to recite briefly the history of Kansas along this line. Eleven years ago we established the first school of health officers, as we called it. It was based upon the very obvious need of uniformity in the enforcement of regulations; but more particularly to develop the idea of modern public-health work as contrasted with the old public-health ideas with which we are familiar.

The first attempt was only fairly successful. Some 25 or 30 part-time health officers—we had no full-time health officers in Kansas at that time—assembled for this week of instruction. As our instructors we had sanitarians who had been developed in the school of experience, Doctor McLaughlin, Doctor Eugene Kelley, Doctor Freeman, and others who had risen to prominence as health officers. We made the attempt in this brief week of instruction to develop the idea of the social responsibility of the practioner of medicine—because they were all practitioners—to develop the new relation between the community and the practitioner and to convey over to him something of the new methods and procedures in public health. About the third year, in order that we might secure a larger attendance of our 115 part-time health officers, we conceived the idea of devoting the forenoon of each day of the week to clinical instruction in medicine—a sort of brief postgraduate course, purely as a lure for attendance. We were certain it would be of advantage to them as health officers. That was very successful, and we have had as high as 105 county health officers registered for the course. It has been held annually through the intervening 11 years.

This course has accomplished much good in this, that it has to a greater or less degree developed the modern idea of public-health work in the mind of the part-time health officer, who has in turn handed it back to the community. We should also keep in mind that the average intelligence of the community concerning public-health affairs is usually conditioned by the public-health intelligence of the local health officer. While your program has been very largely devoted to the development of the highly trained man, it seems to me that we should begin working at the other end of the problem from the grass roots up. Unless we can take these part-time men and educate them in modern ideas of public health and their relations to the community, we have very great difficulty in imposing the highly trained specialists on uneducated communities as health officers. Particularly is this true in the present economic situation. There is scarcely a county in Kansas that has not organized an anti-tax league, and in several of these counties petitions have been circulated by the tax reductionists to dispense with the health organization, purely on account of high taxes.

But I want to make this observation, that growing out of this 11 years of instruction we have attempted there have been three county units developed simply because we have been enabled to stimulate the interest of these health officers in a public-health career. They have greatly improved the character of the work, until the community has accepted the full-time health organization. Three of these organizations have been the outcome of these years of work. In not one of these three counties has a petition been circulated for doing away with the full-time health organization. Unfortunately, it is in the other counties on which we have put pressure and in which the State has assisted in putting on a program that the petitions are in circulation.

I insist, therefore, that we give greater attention to developing the idea of working from the grass roots up. We have by reason of these brief schools of instruction uncovered promising material, men who have been interested in public health and who have taken up a public-health career. Many of them have now gone to schools of higher learning and finished their training. Unless we use this slow process of evolution and train the community to the idea of public health, unless we give attention to this part of the program, rather than increasing the pressure from the top down, I fear we shall have a difficult task on our hands. I plead for the part-time medical officer who gained his knowledge in these brief schools of education, inadequate as they may seem to be, to the end that our own people may be educated to modern public-health views.

AFTERNOON SESSION, MARCH 15, 1922.

REMARKS BY THE PRESIDING OFFICER.

DR. FRANK J. GOODNOW, *President Johns Hopkins University.*

I do not know whether to consider it a discrimination or a privilege that certain limitations have been imposed by the program upon the chairman of this session. We are to discuss specific questions which may have developed at the preceding sessions. I have here a list of questions that was handed me by one gentleman, and I should be glad, if any member of the conference wishes to hand in any other questions, to bring them up for discussion.

The first question to which attention was directed is: "How may the school of public health provide for its students experience in practical public health work?" I think from our experience on this subject that we should frame it in another way, and that is: "How can the health departments in which the practical work is done cooperate with the schools of public health in providing opportunities for practical work for the students?" We all, I imagine, consider that this practical work is an absolutely necessary part of the course.

I might say that the intention of those who have been directing this conference is that this round table discussion shall last for about one hour. This is the question which is before you: "How may practical opportunities for field work be provided for the students in public health schools?"

VI. ROUND TABLE.

QUESTION: HOW MAY PRACTICAL OPPORTUNITIES FOR FIELD WORK BE PROVIDED FOR THE STUDENTS IN PUBLIC-HEALTH SCHOOLS?

Dr. Haven Emerson, Cornell School of Hygiene:

May I make a suggestion? If we think of this question in the terms that we would in the practice of medicine, we are really considering how we can teach students of health administration to make diagnoses and to arrive at a proper prescription for a situation and to apply treatment. Unless we are going to duplicate the errors of medical education, we shall have to have at the service of the teaching institution a community to study, to make the diagnoses upon, where students may follow out results of treatment and learn their errors. I should say that it is as indispensable for a school offering a course in public health to have a section of the city and rural community to study for their laboratory, their training ground, and their clinic, as it is for the university medical school to have its hospital to teach diagnosis of the individual sick. So I believe that the universities should at once busy themselves by making affiliation with the health officers of the city and State in which they are located.

Western Reserve University has what is known as the university district, comprising one-eighth of the city of Cleveland. You need at least 100,000 people to have an experiment station to study; you can not indicate or get intelligent results in the incidence of communicable diseases unless you have that number. If a community, as is usually the case, has an insufficient staff of workers it can be supplemented by the students who are attending the schools. They can be of assistance in the field in making periodic examinations, in making immediate diagnosis of suspected communicable disease, and in studying conditions of industries in the districts. It will be possible to contribute from the school to aid the insufficient force of public-health nurses.

This relief might be the contribution of the university. On the other hand, the health officers would be willing, presumably, to see that in that particular district they assign those who are capable of teaching and urging every step incident to technical education. By this capable administration the health department would have the benefit of that particular area for a degree of study and a degree of skill which would be difficult to command from the salaries or appropriations made for most States or cities.

Therefore, I believe that the first move in establishing schools of health is to provide patients for the student to study sickness as it occurs in group relations. The quality of technique employed is as definite as that required in the examination of the individual. I do not think a school ought to offer a course in public-health administration unless it is able to give a field for practice—call it apprenticeship or whatever you wish—a field of practice similar to what the medical student has offered to him in the hospital.

Dr. William Charles White, National Tuberculosis Association:

I want first in discussing this question to say a word of appreciation of the Public Health Service in calling this most notable group of men together. It is the beginning, I think, of a gradual breaking down of the pride of the Service and the beginning of cooperation with a large number of agencies dealing with this public-health question. The Public Health Service is the only legal correlating body in the United States. There must, it seems to me, emanate from it all the correlation and influence which is backed by law in bringing about this cooperation.

If there were any resolutions to be offered by this body, I would suggest this, that the Public Health Service (which is carrying on, as Doctor Vaughan mentioned yesterday, an enormous number of intensive public-health activities of tremendous value to the active students who are now in public-health work in different cities and State organizations) take students, in any number that they see fit, at the

expense of the organization which sends these students; that is, either State or municipal health department or university. The workers would be sent into the active fields of work for intensive study and possibly at least two months' practical training. It is a very common thing in business life for an organization to carry upon the pay roll its likely members and to send them out for intensive study. This assures a much more efficient type of service than they would be able to give by experience gathered within their own organization. It seems to me that not only the United States Public Health Service should do this, but also many of the State organizations like the Massachusetts State Department of Health, which is among the earliest and most efficient in the country, should offer such intensive courses to students who are on the pay rolls of different health activities in this country. It only needs such an offer to attract a large number of paid students.

I was very much impressed with Miss Goodrich's statement this morning that the thing we actually need to gain is some such help now. We have an unlimited field for the present graduates; very probably we could give them a number of practical things which would assist the students (for they are all students) in public health to actually get help to those who are suffering from conditions which need to be corrected at the present time.

I am probably not talking exactly to the point, but the question was brought out in Doctor Jordan's paper—the necessity for a supply of students. Public-health institutes and public-health departments of universities are, of course, not serving their full purpose unless every bench in each school is filled. The overhead charges would demand that. Therefore, it would seem to me possible for the United States Public Health Service, as the proper legal correlating body in the United States, to send through the medical schools and universities lecturers explaining to the students the field of public-health work. No one knows better than General Cumming how hard it is to take on new work now, due to the economic wave running through Congress. But at least this question of health might, if we all join forces, be realized from the economic viewpoint. I feel that a unity of purpose and an effort to help the United States Public Health Service, with the new spirit that is in it, to get the funds necessary to carry out this correlating effort throughout the United States should be at least one of the results of this meeting.

The origin of funds is the National Congress and the various State and municipal legislatures. I would further suggest that request be made to these bodies to have presented to them by the most powerful speakers that can be drafted in the various parts of the country in and out of the universities the program of a correlated system of

public health for the United States, so that in time they will be ready as our knowledge advances to appropriate funds necessary to clear our borders of all devastating illnesses which can be removed from our midst.

Dr. William F. Snow, American Social Hygiene Association:

The Public Health Service has always, so far as my experience goes, held its laboratories and the educational aid of its staff open to the personnel of the health departments and others who could come for short periods of observation or instruction. As long as the health officer or the individual can finance himself, he will find, as I have found, these facilities of the Public Health Service and the Hygienic Laboratory and other Federal departments cordially extended to him.

Some years ago I devoted the presidential address of the State and Provincial Boards of Health to the question of exchange of appointments, feeling that I had a solution for the training of personnel of the State boards by from three to six months' service with another department. Particularly, I tried the plan out with the State of Louisiana, to which State I wished to send my men for experience in tropical diseases. We ran into the difficulty that most of the States can not pay the salary of a man who is outside of the State. The Public Health Service, which was handling plague for us in San Francisco, was very glad to have the opportunity to train men from Louisiana, where they were apprehensive of what might happen if plague broke out, but it was impossible to negotiate the legal side of paying the expenses or salaries even of the persons to be exchanged. Public opinion must change our machinery for paying salaries so that such cooperative plans could be carried out. This question involves the education of public opinion to see the importance of this business principle, and I believe it can be brought about.

Dr. H. R. Carter, United States Public Health Service:

I think I can say a little along the lines on which Doctor White just spoke. From 1914 on, the malarial division of the Public Health Service working in the South has taken as its assistants from State health officers men whom they, the health officers, wish to have trained for malarial work. At the time stated there was no one in the United States who knew anything of field investigations of malaria or field control of malaria except Von Ezdorf, Le Prince, and myself. We first asked the State health officer of Virginia for an intelligent, well-educated man, who could work with us, and who would be paid by us and returned for their use as a malaria control man afterwards. The same proposition was made to North Carolina, South Carolina, Alabama, Tennessee, and, I think, Texas. We have had in all some 12 or 15 men who cost the State nothing to train. They were as useful as any other men to us, intelligent and

educated, and we paid them as sanitary assistants, keeping them from one to three years until they were fairly skilled in field malaria investigations and field malaria control. Most of them have gone back to the States and are handling this problem for the State.

In addition, we furnished, during the last few years, engineers working on railroads at our expense as malaria control men. The railroads, finding the work extremely valuable, placed them on their own pay roll, and thus enabled us to take on new men for training—not a great number, but I think it is fair to say that from 15 to 18 of such men have been trained by Public Health Service men working with us under a salary, with no expense to the State, and have later on gone back to their States and to the railroads. We have trained them, and they are now doing work which they could not have done without that training.

Our malaria field service, then, has been a training school in which men selected by the State health officers have received practical instruction in the field investigation and control of malaria, which they are now using in the service of their States. It is fair to say, counting those men used in malaria work during the war and who still continue in such work, that we have now probably 50 to 60 men, mainly civil engineers, who are fairly well trained to take charge of malaria control work—some of them extremely well trained. And the number is increasing. Nothing that we have done has been more fruitful in advancing the malaria work in the United States.

Dr. G. B. Young, United States Public Health Service:

The possibility of the cooperation of municipal or local health departments in the work of educating health officers has not been sufficiently appreciated. So far as I know, the first real attempt to do anything of the sort was made by Doctor Evans, who as health commissioner of Chicago organized in his department a school of sanitary instruction. There was an incidental return (financial return I mean), because by this incorporation he was enabled to mail publications of the department under the provisions of the law in regard to the publications of educational institutions. But Doctor Evans did not succeed in getting very many people to take an interest. Only a few students attended. Under the subsequent administration the plan was developed quite a good deal and a pamphlet was published by the school, setting forth the courses which were available. These included courses in field work under the bureaus or divisions of communicable diseases, child hygiene, school inspection, sanitation and ventilation, and laboratory courses in connection therewith.

As a matter of personal experience, I was rather surprised to note that many would come for three months and pay their own expenses. We like to think we did them some good.

The schools or courses in public health teach a great many things concerning the control of communicable diseases and the conduct of other health department activities, but teach them almost entirely from the didactic point of view rather than the clinical. The things that schools do not usually give are the practical work of the housing inspector, sanitary inspector, food inspector, milk inspector, building inspector, etc. It is therefore absolutely essential for the man who is studying in public-health schools to have the advantage of instruction in the field. The best way for him to get it is through the larger health departments, not only the municipal, but also the State departments. If the municipal and State departments would get together and provide certain facilities for instruction, agreeing amongst themselves what they could do and how they would divide the work up, and then offer their services to the schools and universities in that particular area, the possibilities for good are practically limitless.

We need men thoroughly trained in the practical technique of field work and in the attitude which they should observe in their relations with the people with whom they come into contact, and these things, especially the latter, can best be learned under the conditions of actual service.

Dr. W. H. Welch, Johns Hopkins University:

It seems to me, Mr. Chairman, that this is a matter of vital importance. The practical work in the field occupies precisely the same relation to the training of students in hygiene as our hospitals do to medical students. The fact that the need for this training was not recognized in medical education for so long a period is one of the great causes of the difficulties which we have had in bringing about the proper relationship between hospitals and medical schools. It has been one of the most difficult things to perfect.

The field work that is to be furnished in public health along the lines just indicated is, of course, very important. At Johns Hopkins we require that there be at least three months' practical training of this kind. I wish to express here our very great appreciation of the cooperation on the part of the municipal, county, and State boards of health, such as the Public Health Laboratory of Doctor Wadsworth and Doctor Biggs, of the New York State Health Department, in taking our students for this period of time. But I do not think this is enough; I think we need a relationship to the practical work in the field, quite comparable to that of a first-class teaching hospital to the medical school. That is, there should be right at the very door of the school of hygiene an area for public-health training (two areas are desirable, urban and rural). Just as you are justified in doing certain things to a hospital to adapt it for teaching the medical students, so

you are justified in supplementing the work supported by the taxpayers. You are justified in establishing certain conditions in order to make it better adapted for the training of students. The ideal arrangement in my judgment would be to have an urban area, say of from fifty to sixty thousand inhabitants, under the administration of the school with the cooperation of the city. I am quite sure they would welcome a rather superior person to have charge of the work in that area—a supervisor. There should be a school for public-health nurses, attached to which there would be a supervisor having charge of a large number of public-health nurses. Just as a teaching hospital is used for the purpose of making certain demonstrations, experiments, studies, and a collection of certain data, which you could not expect the ordinary State or city health administration to spend the taxpayer's money for, so in this area demonstrations and studies would be arranged. We have something of that sort started in a county in Maryland, thanks to the cooperation of General Cumming and the Public-Health Service.

Like everything else, the success of such a venture depends upon the quality and character of the man put in charge. Of the two types which have been discussed here to-day, the mixer and the man who knows, I think the latter is preferable, but there is no reason why you should not have both. Success depends to a large extent upon the quality of the man in charge. The school of hygiene contributes some $6,000 and the National Health Board perhaps $10,000, I am not quite sure. The local agencies are all stirred up—the local Red Cross, the public-health association for the county. There is a wonderful spirit and an aggressive movement. We will be able to demonstrate the effects of good public-health work by the results. There is already a marked reduction in the infant mortality, and a great improvement in the control of typhoid fever. It is being run along lines that are full of suggestions for the practical worker. There is no use making experiments of this kind that are idealistic and impracticable.

Now, Mr. Chairman, I just wish to urge that a first-class school of hygiene should have attached to it and at its door a training area, which is just as necessary for students of hygiene as is the teaching hospital for students in schools of medicine. You can not expect the money that is available for the municipal and State boards of health to be available for all the purposes for which you would use such an area as that. I also feel that where such areas can not be secured elsewhere the university group itself may be used. There is no reason why we should not have in connection with the university medical school a good health department with a relatively small expenditure of funds, an excellent training area, and to have numerous such areas in different parts of the country. I wish to appeal for

the establishment of areas of this kind, which are absolutely an essential part of the practical and thorough scientific training of those who are coming into this field.

Dr. Otto P. Geier, Cincinnati Milling Machine Co.

I feel that this organization might well consider just what value industries might have for the training of health officers. Here we have in a small unit—perhaps five to ten thousand people—almost all the problems of the large city health officers: Food supplies, milk supplies, water supplies, and sewage disposal. In addition, we have the human element, which has been discussed so much and which is often the main difficulty to the health officer. Here you have a group which the leader in charge of industrial health work can study at close range. He sees the problem in all its complexities and yet all its simplicities. I believe that in the training of the health officer it might well be considered necessary that some time be spent in a well-organized industry, where he may see the problem almost in its entirety.

Besides the human equation entering into the industrial work, there is the contact with men and the development of the ability to sell health to the average man. After all, this is a thing that the health officer is going to have the most difficulty to comprehend—how he may get his message of good health and its value as actually applied to appeal to the common man. If we can get this matter of health across to the common average man, then we also clear up that question which Doctor Goodnow spoke of yesterday—the necessity of recognizing that health is, after all, a political problem. We can not impose any highbrow element upon average people.

In conclusion, this training is necessary in order that the average health officer may see his problem in all its entirety and that he may acquire this vision of the whole problem and its interpretation to the common people. As doctors, we forget that we preach from an academic viewpoint too much, and we do not realize what powers lie within the physician to interpret public health to the masses. In Cincinnati in 1906, when we were up against the worst political situation in the country, when George E. Cox held the county in his grasp, with only three or four doctors taking up only one health problem—they not only secured for Cincinnati the foremost health board of its kind in the country but also one which has given us a health department which is efficient. By its help we were successful in getting rid of the incubus, George E. Cox, and his political system.

Let me repeat, do not forget that health officers in industries are a tremendous factor in public-health work and that by placing a large number of health officers in industries in the community a

tremendous force for public health and for the training of public-health officers will be created.

Dr. A. T. McCormack, Kentucky State Board of Health:

We have heard a great deal about what is going to happen at the start but very little about the road and trail and path that leads to the head of the hill. It does not make any difference whether it is in New York, Philadelphia, or Boston, with their great health departments and excellent surroundings, or whether it is out on the prairies, the plains, the mountains, or in the hills, it is the fellow who is at the end of the trail that we have to reach with the lessons of good health and good living, as well as those who are more favorably situated. It is easier to reach him because his head has not been filled with deadwood as have those of us who have had greater educational advantages. We have during our collegiate years gotten to a large extent practically all the knowledge we can ever learn. Some of us while at college devote some time to athletics and so we still have an opportunity to learn. [Laughter.]

I do not for one moment discount the tremendous contribution to the future of our complex civilization made by the great institutions of learning. I believe that to these institutions we can not contribute too much in time, money, energy, or thought. I would not for a moment assume in any sort of way to feel that we are doing nearly enough for them. But at the same time, recognizing the basic health ignorance of our public, we are compelled to provide the kind of health officer who can speak in the vernacular and transmit the things our leaders already know in science.

We want to remember a thing that we have forgotten in medicine—forgotten almost entirely—that the important thing for the fellow who is sick is the art of medicine, not the science. It is a matter of comparatively small importance to the individual what a person may have died of or what he is ill with—that is science; the main thing to him is that the man who is going to be in charge of him shall know what he is likely to have, how to prevent it, and how to cure it. He does not care a continental about the name of the thing which he has. What we need to-day in educating health officers is education in the art of health officering. If we are going to emphasize only one or two things, let us emphasize the question as to whether he can translate his knowledge into action with the individual—translate it into action for those of us who do not know. If he can write big so that he who runs may read, then he has learned the lesson that can be translated to the people. It is indeed a matter of importance that we have this type of man. The greatest research man should be able to talk in the vernacular, so that he can translate his information into action to those with whom he has to deal. This is the most important part of our problem to-day.

In Kentucky we have established a school of public health. I think we were extremely fortunate in the fact that it was established under rather close connection with the State health department. I think it was extremely fortunate that it was organized and managed in the beginning by a graduate nurse who had been trained during that period (by one of the greatest practical nurses, Miss Noyes) when nurses were taught all the science they could get into their system while they were being taught to work with their hands and bodies. Our main objective is to try to make practical talks to our applicants and to make ourselves understood when we do talk. In doing this, arrangements have been made so that health officers, health nurses, sanitary inspectors, technicians, and other health workers can attend.

I think we have talked about terminology more than its importance demands. I do not think it makes much difference what you call workers in the public health field, but my own view is to put into them something that makes people want to hear their story.

QUESTION: WHAT SPECIFIC STEPS MAY BE TAKEN TO BRING BEFORE COLLEGE STUDENTS IN GENERAL AND MEDICAL STUDENTS IN PARTICULAR THE OPPORTUNITIES FOR SERVICE IN PUBLIC-HEALTH WORK?

Dr. George M. Kober, Georgetown University Medical School:

This seems to me a very important question in view of the fact that Professor Jordan's analysis reveals that there is a great deal of ignorance on the part of medical students as to the possibilities of a public-health career. From my viewpoint it ought to be a very simple matter to stimulate interest among students when I recall that the leaders in public health—men like Vaughan, Welch, and Edsall—as deans in medical schools were in a position and undoubtedly did stimulate interest and enthusiasm among students in this subject. I am sure their own precept and example have done very much to attract what I call men with human sympathy into preventive medicine. I am confident that the subject of hygiene was not relegated to inferior rank in their schools. Personally I have always managed to have at least 100 hours for this subject, and have had no difficulty to persuade the professors of chemistry, pathology, and bacteriology to give a good deal of attention to sanitary subjects and prevention. So there is a way to secure attention, and the best way, I think, would be if we could persuade our medical faculties to make their professor of hygiene also the dean of the faculty.

Dr. William Keiller, University of Texas:

As a representative of one of the medical schools in Texas, 24 hours from St. Louis and 36 hours from everywhere else, it seems to me that if we can keep this matter of opportunities in public health—not the Public Health Service alone (which we in Galveston appre-

ciate, especially since we have been visited by plague)—if there could be some means to keep this matter more or less continuously before the minds of students—and, incidentally, faculties—it would be worth while. I have wondered whether it would be possible for the Public Health Service to have printed some sort of pamphlet—a pamphlet with rather attractive outside with a short heading, and, if desired, immediately below that: "Please display this continuously in the library." Such a pamphlet should set forth the opportunities in the Public Health Service, the opportunities in city and State health work, the present schools which give special courses in public health, and so on—important matters for the continuous information of students. Something along the same line could go to nursing institutions or to our academic institutions, where so many young women are taking academic training and are hungering for public service. If this could be kept continually before the minds of the students, I believe it would get a reaction now and then and get students to thinking along those lines and call forth occasionally really good men and women for this class of service.

Dr. Donald W. Davis, College of William and Mary:

Most of the suggestions that have been made for recruiting for the health service have been suggestions which would draw prospective candidates from medicine. Now, as a representative of a college, I want to suggest that we should take into account the losses that are now occurring among those who might be candidates for degrees in medicine or in public health. We all know that the long period which is required for preparation and the great expense of medical work discourage many men who might go into this field. I am not speaking of those who are discouraged by reason of their own ability, but the time and especially the expense discourage many first-rate men.

The field of public health has one great advantage over the field of medicine. A medical man or a man who might become a doctor of medicine is of no use in the line of medicine until he has had at least two years of college work and at least four years of medical school work. Those are minima. On the other hand, is it not true that a man may do creditable work for the time being in public health after he has had at most four, possibly even, as a technician, three years of work, provided his work has been properly arranged? That will result, I think, not in depleting the number going into medicine and completing the medical degree, but rather adding to that, because this is a field which will enable many a man who can not go on with his medical work for the time being to get into some line which will eventually permit him to complete his medical training.

I hope that the way may be opened for men of high promise and ambition but of limited financial resources to go into various public-health services for which premedical and partial medical training may have fitted them; and that these men may be encouraged thereafter to complete their medical and public-health training.

Information as to openings for such men, judiciously spread among the colleges as well as the medical schools, would do much to attract men of good caliber into the field and save valuable recruits to medical and public-health work.

Dr. Charles W. Stiles, United States Public Health Service:

I would like to state that after 31 years in public-health work I consider that the greatest opportunity before the student of or worker in public health is that of making sacrifices; to do good for others. There is no use of any man's entering this field unless he is prepared to make personal sacrifice. No man should enter public-health work with the idea of any grand opportunities before him. They do not exist in this country. There is only one opportunity that does exist, and that is the opportunity of personal sacrifice. If he is not prepared to make this sacrifice he had better keep out, because he is not going to be a success.

Let us recall that the type of public-health officer that is demanded by a locality and that can obtain a job and hold it can be expressed mathematically, namely: Multiply the density of population per square mile by the average per capita wealth. That gives you the money value of your locality. Therefore, it gives you an indication of the amount of money you can expect for your health department. If you have a dense population with a large average per capita wealth, that locality can afford to pay a first-class health officer. If you have a sparse population with a low average per capita wealth the locality can not afford to pay a first-class health officer. That will represent the money that can be put up. If we carry out this simple mathematical problem, we will find that the average county in this country can not afford the type of health officer we have been talking about here. The type of health officer has got to be the man who is willing to make a sacrifice. The one opportunity is to make personal sacrifice and that is the only positive thing we have to look forward to.

Dr. Louis I. Dublin, Metropolitan Life Insurance Co.:

Almost as important as the health officer himself in a constructive public-health program is the development of a strong intelligent public sentiment interested in his plans and cooperating with him in carrying them out successfully. The main difficulty which besets the path of the health officer is the lack of an alert and educated body of citizens who understand what he is driving at and

hold up his hands at every turn. At present, the mass of the people remain inert and indifferent. Making provision for the formation of an enlightened group of citizens organized for effective service would mark a really progressive step in public-health work.

In what portion of the community shall the health officer look for his recruits? There are enrolled in our colleges about 200,000 men and almost as many women and this number is steadily increasing. Hence every year we have a large number of graduates entering community life to become leaders in the professions and in the fields of business, finance, and social service. It is this group of young people whom we must seek to interest in health problems. And in order to do this most efficiently it is important that those directing the training and education of these boys and girls should themselves be roused to the value of health work. In the colleges we can prepare our future health workers for their tasks and, even more important still, we can create an intelligent and articulate public opinion. Much of the present curriculum can be utilized for this purpose. Almost every college for boys and girls has a department of hygiene; a gymnasium; courses in chemistry, biology, bacteriology. But each department and course is to-day independent of the others. There is no attempt to merge all this diverse information into one connected and coherent whole. Moreover, the practical bearings of the various scientific studies are overlooked and the theoretical knowledge is not linked with concrete problems of sanitation, hygiene, etc.

The teachers do not appear to realize the importance of training students to become forces in health work. When this aspect of the teaching problem is called to their attention, however, they become interested in the new point of view and are ready to correlate their courses with this purpose in mind. I had occasion a year ago to look into the question of the education of young women, and I found that while there was a good deal of work along health lines being done in our colleges, the courses were not related one to the other. But I found, also, that it was easy to interest deans and faculties in these matters, and that they were quite ready to cooperate and modify the curriculum.

Here is where the Public Health Service comes in. It should develop a curriculum outlining courses of studies based on the instruction now being given in the colleges and make available to all the universities of the country an outline of this program. These studies covering a period of three or more years would result ultimately in the crystallization of the health movement and the formation of a community group in each city and town proficient in health problems and administration. Graduates of our colleges will then be equipped to function efficiently in any private or public capacity.

as the leaders of Red Cross movements, directors of nursing associations, and in the many other activities of a progressive, social nature. Public opinion thus aroused would serve as an advisory body and be able to support intelligently the work of the health officer. Moreover, you would have a far larger number of boys and girls in the formative period of their lives interested in community well-being, and it would be reasonable to expect that a not inconsiderable proportion of them would wish to enter the field of public-health work as a profession. Proper provision for public-health instruction in our schools and colleges would thus serve in a dual capacity; first, in increasing public interest and support and second, in actually increasing the number of candidates for public-health positions.

Dr. Robert Wilson, Jr., Medical College of the State of South Carolina: Dr. Vaughn has made the remark that the atmosphere of medical colleges as a rule is antagonistic to public health. I fear that he is right. At any rate, my observation has been that health officers often meet opposition instead of sympathy and cooperation among the physicians with whom they have to work. Recognizing this in South Carolina, we have made an effort in our school to correct this situation and for several years past a systematic course not merely in hygiene but in public health has been given by the State health officer, Doctor Hayne, as an essential part of the course in medicine. This course includes the problems of health administration, a general consideration of vital statistics, the legal and the normal obligations of the physician to the community as a custodian of health and disseminator of health knowledge. I believe we are beginning to see some results in the development of a truer conception of his responsibilities by the practitioner and of a better spirit of cooperation. All of our schools can not give the courses in public health which have been suggested here yesterday and to-day, but every one of our schools can do what we are trying to do, and I believe it will be an effective means for aiding health administrators in carrying out their work.

Dr. John M. Dodson, University of Chicago and Rush Medical College: I wish to say something in reference to the education of the medical student preparing for general practice. I believe that the change in the curricula of the medical schools to which Doctor Abbott referred this morning should have as one of its conspicuous changes a much larger emphasis on preventive medicine. While something can be done by the expansion to some extent of the present courses on hygiene, bacteriology, and the like, the real solution lies in a change in the attitude of the clinical teachers all along the line. I would have every clinician presenting to a class of students a case of typhoid fever ask as the first question: "Why did this patient get typhoid

fever?" "Who was responsible?" "How could it have been prevented?" "What should the physician do in the community to avoid this sort of thing?" When a surgeon presents a case of infected wound of the hand from an industrial establishment he should ask: "Why did this man's hand get infected?" In other words, if our clinical curriculum is presented from start to finish with a strong emphasis on the possibilities of prevention we shall be teaching a generation of medical students how enormously greater are the possibilities of prevention than the possibilities of cure, and out of that group there will be little difficulty in getting a sufficient number of men to take up that special phase of preventive medicine—public hygiene.

How is this to be brought about? Only by addressing the medical faculties themselves. I should like to see the health authorities approach the medical faculties of about half a dozen or a dozen of our leading medical schools and discuss this important problem as a preliminary to the reconstruction of their curricula, which is just now impending.

VII. CONCLUDING ADDRESSES.

THE UNIVERSITY OF THE FUTURE—A RECRUITING AND TRAINING CENTER FOR THE PUBLIC-HEALTH PROFESSIONS.

Dr. RAY LYMAN WILBUR, *President Leland Stanford Junior University.*

When I came on to this conference with rather minute instructions given me by my friend the Surgeon General, I had a fairly good idea of what I wanted to say. But I have sat here and heard most of my ideas presented by others until I feel very much as I used to feel on Sunday when we had chicken for dinner. I was the small boy in the family. I saw the drumsticks cut off, the pieces of breast go, and finally, when it came my turn there was nothing left but the neck. To-day I have the neck, as far as the discussion of this problem is concerned.

But, while there is in the neck a good deal of bone, gristle, and a little muscle, there is in it the spinal cord. This applies to the university. The university contains plenty of gristle, but it also furnishes the spinal cord, for through it certainly pass a large number of people who get to the top and they control the body. That is what we are really driving at in this problem to-day—how may we reach the people so that they will be responsive to the great new information which has come to us.

Most of us were really raised in the patent medicine age. I got my early information in hygiene from the Sunday supplement and that kind of thing. I know about what the mental states of a large proportion of our population are in regard to health. We do a good deal

to bring about this condition with our university courses. We put so much of the past and of the antique before our students that they often do not have time for up-to-date matters—matters of real importance. Perhaps this has a certain advantage. There is certainly no great hurry in the college course of to-day. You can take all the time you like. Last summer, driving through one of the California valleys, I passed a man walking along a lonely road carrying a rather worn and dilapidated looking pack. I stopped my automobile and said, "Wouldn't you like to ride?" "No, thank'ee," he said, " I ain't in no hurry—I ain't going nowhere." So every once in a while I get this impression from some college course—they are carrying an old bundle and they are in no hurry because they are not going anywhere.

Take the poor boy or girl who has to go to one of our old-established universities. Most of the things they get are not concerned with such vital and modern things as public health. There is a good deal more talk about the War of the Roses than there is about spontaneous generation or chlorophyll or any of the other things which concern us a great deal. The ordinary student is peculiarly unfitted for grasping public-health problems. I think the university with which I am connected is one of the few which require a course in biology of all students. And yet how can you say any man is educated who doesn't know biology? If you have no understanding of life itself, are you educated for life? If we are going to go forward out of the patent medicine stage, if we are to get away from the large group which we have in every community of those who say there is no such thing as disease, and so on, we must get the scientific facts into the minds of the people. The world is reached by facts now more than by opinions, and the university is a testing place for new thoughts and new facts. Facts must guide our lives if we are to get anywhere.

I have this feeling. We have now, with the child-health programs carried on by various organizations, started to develop a clientele so that 20 years from now there will be something really going on in public health. At any rate, there will not be a few of us who know and a great gap between us and the rest. There will be a lot of grown-ups from those children who understand the facts. We are going to get the same results that this country got from the long, slow process of education on the damaging effects of alcohol. Now, one way or another we gather together in the universities a large percentage of the best minds—boys and girls. We need not be conceited about it, but there is a fair chance that we get more leaders for the future than we get anywhere else. If we can give them a worthwhile education, if we can give them an appreciation of facts versus opinions, then I think we are going to perform a very great function. But the trouble with much of our education is that it does not live.

We must visualize and dramatize public health if we are going to make it effective.

I look on the university as the place where we try to get the most brains of worthwhileness together. And we must begin more than we ever have before to bring those brains in immediate contact with the people outside. We must get professors who can make more outside of the university than they can inside as professors but who choose the academic life. We must conceive our education from an entirely new angle; think of it not in the terms of to-day, but with the idea that we are trying to get people ready for 20 years from to-day. We can not do that by teaching things that were already 40 years old in 1880. We have got to keep education up to date. There isn't anything in the world so up to date as medicine, public health, and biology.

My suggestion, therefore, is that we try to get all of our universities and colleges to study the problem just as we must now study and revamp the medical curricula. They must realize that a cultured man does not necessarily mean a man who is familiar with dead languages. Yet the entrance examinations for many colleges and universities usually demand this. I think a man can get just as satisfactory culture from scientific studies if this work is thoroughly given. We must by strategy get into the college and into the university curriculum more of the real things of life. We must give students a biological conception of life, and when we do that with a certain limited number we have accomplished much. I suggest that you start in on the university presidents. They are a susceptible lot. I am satisfied that if you can try as public-health workers interested in this problem to get your subject with its many fundamental branches into the college curriculum, and at the same time go on with your efforts in the primary schools, you will be able in 20 years from now to present achievements in public health in this country of which we now do not even dream.

PUBLIC HEALTH AND THE FUTURE COMMONWEALTH.

Dr. Lewellys F. Barker, *Johns Hopkins University.*

Participants in this congress are deliberately and courageously turning their faces toward the future; they are attempting to attain a knowledge of coming things; and they are seeking the best means of making provision for approaching needs. The speakers have emphasized anticipation rather than retrospection. As the conference draws toward its close, all must feel that the concentrated beam of light that has been directed forward has given a view of possibilities and of probabilities that is encouraging and inciting to effort.

Science and art would make but sorry progress if their devotees failed to infer the future. Discoveries nowadays are but rarely

made by accident. On the contrary, they depend upon prearranged plans, upon clear definition of problems, upon ideas that have their origin in brooding over facts that have been collected, analyzed, arranged, and compared, and upon reasoning out the consequences of such ideas and testing them for their validity. Thus, and thus only can conclusions be arrived at that justify confident forecasts.

Prophecy to-day is a wholly different thing from what it was before the advent of the scientific method. Applying this method the chemist foretells the discovery of unknown elements and knows beforehand the qualities they must possess; the physicist gains glimpses of energy manifestations long before the technical procedures for demonstrating them have been devised; and the biologist can, by induction, mentally construct genotypes and phonotypes that have never yet existed but are none the less definitely realizable. Obviously public-health workers, also, should, by utilizing the scientific method, participate in prediction, estimate future needs, and visualize methods of meeting those needs.

We live in a rapidly changing world. The future of public health will differ, doubtless, markedly from the past. Knowledge of the past is, of course, necessary for the understanding of the present and is a helpful guide for conjecturing what is before us. Public-health workers are not likely to be unduly influenced by the view of that great industrialist who, it is alleged, declared that "history is bunk." On the contrary, they believe that what is coming must evolve by a natural process out of what has gone before. As the conditions of this evolution are learned and as the causes that are operative are recognized, forecasts of its general trend will become increasingly reliable.

Many in attendance at this conference believe that they can discern certain settled directions of advance, certain inevitable lines along which public-health work in the future must move. They are of the opinion that within a comparatively short time public-health activities will far exceed those of to-day, both in intensity and range. They feel sure that in this country, at least, the environment will speedily be made more wholesome, that the mass of the people will be led up the scale of personal hygiene and efficiency, and that possibly also the germ plasm of Americans may be gradually improved. In a general way, then, the main tasks of public-health workers for the future can be foreseen and certain of the results obtainable can be confidently predicted.

Public-health work should have as its ideal the provision through collective action (1) of conditions that will insure the birth of children with those inherited potentialities of physical and mental growth that are suitable for each successive stage of national and

international development, and (2) of conditions that will promote the growth, the longevity, the physical and mental efficiency, and the social serviceableness of those that are born.

Private practitioners of medicine are most useful in the diagnosis and treatment of disease in single persons and in the advising of individuals and families regarding disease prevention and health promotion, but it has long since been learned that they are wholly unequal to the performance of the tasks imposed by the ideal to which I have referred. The size and the ever-increasing variety of these tasks necessitate the organization and maintenance of public-health services (local, State, national, and international) for the carrying on of the work. Hitherto, such public-health services have occupied themselves chiefly with (*a*) the provision of a more wholesome physical environment ("sanitation") and (*b*) the education of the people in the principles and methods of wholesome living ("personal hygiene"). It is only relatively recently that the public-health services have entered the fields of diagnostic and curative medicine (left formerly entirely to private practice); but experience with public medical and nursing services for maternal and child welfare; for the health of school children; for the early recognition and prompt treatment of certain infectious diseases, especially tuberculosis, gonorrhea, and syphilis; for the diagnosis, treatment, and custodial care of the insane, the feeble-minded, and the delinquent classes; and for the adequate care of the health of the population of those rural districts in which private physicians and nurses are unavailable would indicate that public-health workers will from now on become even more active in diagnostic and curative domains.

Again, the growing conviction that the maintenance of physical and mental health of individuals is definitely related to the industrial, the social, and the economic conditions in which they find themselves would make it seem likely, too, that in the near future the public-health service will be compelled to play a rôle in the invention and application of contrivances that will insure for every person in the Commonwealth standards of living that are not incompatible with the preservation of health or the maintenance of an abounding vitality. The problems that here confront the public-health investigator are not easy of solution. A vast amount of research will be required before the principles can be discovered and before the social and political apparatus can be devised that will dissipate the difficulties.

The eugenic problem, perhaps the most difficult and perplexing of all, has, as yet, been scarcely touched by public-health workers. Sanitary science, bacteriology, epidemiology, personal hygiene, medicine and surgery, modern nursing, and social service are improving the environment, preventing disease or recognizing it early and

arresting it, prolonging life and ameliorating the conditions of life of individuals; but what are they doing to the race? May they not be causing racial deterioration through survival of persons who transmit inferior germ plasm? As environmental improvement keeps alive the biologically "less fit," should we not see to it that arrangements be made for the encouragement of parenthood by the "more fit," for the discouragement of parenthood by the "less fit," and for the prohibition of parenthood by the "notoriously unfit?" Otherwise will not the inborn capacities of man undergo progressive decrease and contribute to racial extinction? If biologists are right about heredity, should we refuse to face the facts? Ought we not rather resolutely to face them, cooperating with nature as we gain knowledge of her laws? These are some of the queries that biologists, and especially eugenists, are propounding. For these interrogators, eugenics would seem to be even more important than euthenics or environmental improvement for consideration by public-health workers in the future Commonwealth.

If the facts that we now possess concerning environmental influences on the one hand and heredity on the other could be systematically applied by public-health workers there would result an enormous push upward both in the health of individuals and in germplasm betterment. And, of course, the main duty of public-health administrators at a given time is to apply systematically for the promotion of health the knowledge that then actually exists. Legal enactments have their place in public-health work and police power must be exercised for maintaining the order that is conducive to public health; but these measures are far less important than others that are available, particularly the extension of educational policies, the improvement of social customs, the promulgation of better ethical standards, and the encouragement of various forms of art by which ideals of physical and moral beauty are determined, for these ideals are of great importance in influencing men and women in mate selection.

The facts should be told to the people in a way that will be understood by them and by persons who can convince them. For the masses heredity and environment are still wrapped in mystery. Public-health workers should be intermediaries between the scientist and the common man. Matters hidden from him or misunderstood by him should be brought to light and carefully explained to him. Germ plasms, fertilization, gestation, infancy, growth, puberty, adolescence, maturity, sex mating, parenthood, economic security, intellectual and emotional satisfaction, senility, disease, and death are among the subjects that require elucidation. The teachings of science must be especially prepared if they are to tempt the appetite and provide nourishment for the common man.

An efficient public-health service would go far toward supplying the information and compelling the convictions that would protect our people from health fads and fancies and from quacks and charlatans. If the average man and woman knew the facts about rheumatism, they would not waste much money on liniments; if they were trained in health habits they would refuse to swallow sawdust to overcome constipation; and they would get along without yeast cakes if they knew the sources of vitamins. It is partly the ignorance and credulity of the layman, partly the apathy and negligence of the medical profession, and partly the cupidity of the exploiter that account for the prevalence of the healing cults, the "pathies," and the nostrum mongers. Their reputed successes, like many of those of the regular practitioner of medicine, depend partly upon suggestion, partly upon the self-limiting nature of many diseases. Their failures and the positive injuries for which they are responsible are but little advertised. The public should know the facts; then only those who are incurably gullible need longer be duped.

In planning their work in the future Commonwealth, public-health workers will require periodically to revise their euthenic and eugenic aims in the light of extending knowledge. At each revision the program should be considered from two points of view—the individual and the racial.

In discussing desirable euthenic goals, for example, at present it would be well to keep in mind that a mere increase of the longevity of a person would scarcely be worth while if to attain it his life was made almost intolerable to him. May there not be a lack of sense of measure in some of our present-day health crusades? If life were to be very rigorously regulated—censored, sterilized, antisepticized, dealcoholized, and asexualized; if we were to be made afraid of life itself in order to live joylessly a little while longer—would the end gained justify the means? Americans have been called the "people of action"; but is action always preceded by sufficient thought and investigation? Are we not sometimes guilty of an almost reckless experimentation in environmental change?

Again, in discussing desirable eugenic goals—and I may say that I am exceedingly skeptical of the possibility of any extensive practical eugenic program until knowledge has been further increased and diffused—it would be well to keep in mind the difficulty in arriving at decisions as to who are "fit," who are "fitter," and who are "fittest" to survive, even though we arrived at a general agreement that certain groups are "manifestly unfit" and should be denied the privilege of parenthood. Is it not desirable as yet, at any rate, to have many different races of man in the world and many varieties and degrees of inborn capacities in the individuals of a single race? Instead of attempting to breed people who are nearly alike, no matter

how superior the type, might it not be wiser to encourage variation and to attempt to preserve as many worthy and pleasing varieties as possible, adapting the circumstances to them when necessary rather than forcing them into an unfavorable milieu? Think how far physics, chemistry, and mechanics would have to advance before machines could be devised that would take the place of the working men and women now engaged in various "inferior" occupations. As knowledge grows and as social life becomes ever more complex, we shall need a greater variety of special aptitudes than ever before. There will be more rather than fewer kinds of services necessary in our social life, and it will be the task of vocational education to discover the particular kind of specialization to which each individual is most suited and to arrange for his proper articulation in the social machinery.

What public health will need more than anything else, however, is a steady increase of knowledge and persistent betterment of technique through scientific research. The only way to cooperate with nature is to discover natural laws and bring our activities into conformity with those laws. Nature is inexorable in the infliction of penalties. Ignorance is, for her, not an extenuating circumstance. You may not know that it is dangerous to take whisky before breakfast, but if you take it long enough and strong enough your liver will become hardened. Many an arthritis has developed from tooth infection about which the patient knew nothing until the X-ray revealed it. Blissfully disregardful as one may be of the qualities of the chromosomes of his own germ cells and those of his spouse, his offspring will inherit certain traits that are inevitably and mathematically distributed. Public-health services must arrange then both for the increase of knowledge useful for its purposes and for the training of the personnel to apply that knowledge.

Universities, Government laboratories, research institutes, and schools of sanitation and hygiene will be more and more called upon for facts that will promote work in public health and for trained men and women to make use of the facts. It is certain, I think, that this conference will later on be found to have done much to increase the interest in public-health functions, to stimulate the investigation of public-health problems, and to enlarge materially the number of men and women desirous of engaging in public-health work.

RECAPITULATION.

Dr. David L. Edsall, *Dean, Medical School and School of Public Health, Harvard University.*

I think in being given the title, so to speak, of recapitulator I have had imposed upon me the discussion of all previous papers. With your permission, Mr. Chairman, since the Surgeon General has asked me to act as chairman of a committee on recommendations,

I will to some degree make reference to the discussions of that committee, and in order to save the time of the conference will make some recommendations from the committee at the end of these remarks.

In the discussion of the question of the education of public-health workers to those of us who are interested in university matters the most important elements are, of course, in the first place, how to secure the right kind of student and, in the second place, how to educate him. I was very much impressed with what Doctor Jordan found in the replies of medical students to his letter. These replies emphasized strongly what we all knew; i. e., that a large proportion of medical students have no idea what a public-health career means. The essence of the difficulty lies, I think, in what Doctor Dodson said; that is, medical-school teachers generally take very little interest in public health. I suppose it is true in most lines of work that teachers are often more conservative as to any changes in their subject than anyone else. Teachers of medicine were mostly trained in medicine when the preventive aspects of medicine were of little importance. I do not believe that we shall get much change in the attitude of the medical student until we can change the attitude of the medical faculties. We need not simply so many more hours assigned to hygiene, but what Doctor Dodson mentioned—that every individual with important teaching to do shall feel that his work is quite as important in relation to the preventive as to the curative aspects.

I would take issue somewhat with my colleague, Doctor Whipple, in one thing he said this morning, that the atmosphere of the medical school is properly different than that of the school of public health. Being in a medical school, whereas he is not, I may fairly take issue in that and say that their atmosphere should not be different. The medical school should appreciate that individual medicine is at present simply the most important arm of public health but not the whole structure. There must be an atmosphere of public health throughout the medical school as well as of individual health. It can be done I am sure.

One thing of interest in this relation has occurred with us this year. We have quite a remarkable group of physiologists who have arranged an advanced elective course for medical students which is fitted in its major parts for the public-health students at the same time—a course of lectures and demonstrations and reading. Here is a group of at least six professors of physiology who will in future be necessarily interested in the public health as well as in the medical aspect of their subject. I think by such means we shall gradually get the interest of the medical faculty. I think we shall not find our students answering wisely questions such as Doctor Jordan asked

until our medical faculties can answer them. But, go back to what President Wilbur said—I had the same thing in mind—one main fault lies in this: Medicine itself and public health have changed wholly as professions in the last few years but our methods of teaching have not changed in their objectives in proportionate degree. We really are appealing, I think, almost solely to the same group of men that we appealed to a generation ago, to men of the same interests, the same tendencies in life. When young men in college are preparing to choose their careers they do not know the opportunities in medicine or public health. The variety and kinds of qualifications and tastes needed were never so great as at the present time. And particularly I think this ignorance of the variety of opportunity is true of college teachers. A large proportion of the students have their decisions as to careers determined, or influenced at least, by advice that they secure from persons in the college faculty, who particularly appeal to them as persons who can advise wisely. I am quite sure from talking with a great many of them that the college professor and instructor who guides these men in the choice of their career usually does not himself know anything of these diverse possibilities that exist in medicine and in public health. I think we have to educate them. We shall perhaps make more rapid progress in educating the men in the general faculty of the universities, for they are more flexible than the medical faculty in that they admit that they know less about it.

We have gradually got into very close contact with our department of physics, which formerly was not at all closely related to medicine. Two men are conjoint members of the physics department and of the medical school organization, though primarily physicists. Several other members of the physics department have said to me they thought they could often wisely advise men now to go into medicine and public health to make fine use of training in pure physics and as a field of advance of physics as a pure science. Our university department of chemistry, which has a large group of important men in it, has grown much interested in medical problems. One of them in particular is deeply interested in the problems of industrial medicine.

I believe this must be a gradual growth, but it is in this way that we shall influence students as to what medicine and public health offer. In other words, we need to get into medicine and public health nowadays men who will go into the problem not only from the humane standpoint—as is made very obvious from the discussion here—but from their interest in government, in administration, in social and economic science, and in the fundamental pure sciences. I think that by concerted effort we can change the sources of supply

and get a very superior supply gradually. I do not think a superior supply can be rapidly secured by any means.

With regard to other problems, such as the question of remuneration, security, tenure of office, and things of that kind, these can only be overcome by patient, systematic effort and public-health education, as is obvious to all.

There are two things as regards the course of education that have been mentioned that we should insist upon because of the experience that medicine has had which is so obvious and so unfortunate. Listening to all of the discussion yesterday and to-day, I believe that if we would teach all that we have heard advised it would require a course of 10 years. Obviously not all these things can be taught. Medicine has suffered seriously from having the course terribly crowded. The effect has been bad on the student, and he has particularly lost his individual initiative. This lack of initiative on the part of the student is due to the fact that we have taken all the initiative away from him by settling his program too much by too schematic a course.

In the medical school I am connected with we recently have felt it necessary to do a major surgical operation and cut out between 25 and 30 per cent of the work we have crowded in, in order to give the student more time as an individual thinker. We must avoid crowded conditions in teaching public health.

As to the other thing—and this is among the recommendations of the committee—we must keep close together the discussion of medical education and the discussion of the educational problems in which this conference is interested. That is to say, the committee makes a recommendation that there be efforts made to have public-health education included as a part of the usual midwinter conference in Chicago, with the deliberate purpose of bringing into contact public-health education and medical education, so that each may influence the other and both develop together. It would be unfortunate were a continued discussion of public-health education to develop separate from a discussion of medical education. The two must develop together.

One other thing to be emphasized in any such discussion is that we ought to avoid the danger which we ran into in medical education of being overregulated by interested organizations. Medicine had to clean its Augean stables and it did it by putting regulations around everyone, good and bad. Gradually it became evident to the persons regulating it that this was dangerous. It has been a constant burden on those making excellent efforts. Very radical changes permitting of real elasticity are, therefore, being made in the program outlined for the curriculum at the Conference on Medical Education. Each medical school will have opportunity to have more individual-

istic development. Don't let us standardize public-health education. Let us try to avoid regulating schools that are teaching public health so that they tend to become stereotyped. In different parts of the country certain different types of things will have to be taught; different types of men will have to be developed in different places. To cripple an infant development of this kind before it has had time to grow would be a mistake. We can avoid being obliged to destroy things subsequently if we don't have too much regulation of the training of public-health officers.

In the discussion that came up in regard to the practical training of public-health officers a number of valuable suggestions were made. There are some other details I would mention. We have arranged a program so that students may take certain carefully arranged courses, of short duration, in industrial medicine, in child hygiene, in tropical medicine, or in university health organization with the idea that these will give them a distinct general knowledge of practical methods in public health. Our university health organization is, for example, in the hands of Dr. Roger Lee, really a community health organization. It can be used as a very striking demonstration of the results that can be accomplished by public-health work where you can work out a more or less ideal plan. Such a thing can be done in many universities. This is not teaching students what they have to meet in the field, but it will teach them certain important methods they can apply in the field.

I am quite sure some of the contacts we have made in industry offer an extraordinary opportunity to see how to handle a small community and, as Doctor Geier says, it gives an opportunity to study the human element, which is of very great importance. These matters are specialized types of training, but some knowledge of them can be made of great general value in the course. The individual's practical experience in a larger way ought to be more prolonged and ought to come after he has had his general training.

This conference was called to discuss both education in public health and the future of sanitarians. I do not need to dwell upon the great variety of contacts that public health must make in order to have the greatest amount of influence. The next to the doctor, his ally, is the nurse. There are others, such as the welfare worker, the teacher, and the press which are well recognized. One of the most important aspects of public health which has been repeatedly mentioned here is the economic side. We must have much exact knowledge of the economics of health such as the economist would accept, knowledge on which he can base actual recommendations for a course of action. We need to make very continued and patient studies in cooperation with expert economists. Scientific economic studies are of the utmost importance in convincing legislators, large

philanthropists, and persons of that kind as to the needs for money, not based upon ideals but upon actual practical facts. Economic facts relating to health must for the most part be brought out by future painstaking research. Most of the talk about the economic importance of health, while probably largely true, has been too loose and ill-defined to be convincing.

We need to get into contact with other professions. Dr. Haven Emerson's brother at the Institute of Technology in Cambridge tells me that he makes his students know the elements of health in relation to architecture. If the health factor in relation to the building of houses, hotels, factories, and the variety of other structures in which human beings spend their time were considered in building, a great deal could be accomplished for health through the architect alone.

The structural engineer and the mechanical engineer have very important relations to health, especially in the building of machines and factories. If men in those professions knew the effect on health of what they were building a great deal could be accomplished. If men who built certain types of machines or factories that I have repeatedly seen had known just one or two points in regard to health or had got hygienic advice before they built, they could have saved much. In one case I recall the engineer could have saved constant labor troubles and in another instance he could have saved some hundreds of thousands of dollars subsequently expended in protecting employees against a peculiar industrial disease hazard. In another case the machines used in one room were built with such disregard of the human factor that there resulted labor troubles and ill health that interfered with the whole progress of the work in an enormous factory. In the future this phase must be taken up in some degree in relation to the progress of public health.

The recommendations of the committee on recommendations are these:

That the Surgeon General be requested and empowered to appoint a committee including—

Dr. C. C. Bass, of New Orleans;
Dr. W. H. Howell, of Baltimore;
Dr. A. J. McLaughlin, U. S. Public Health Service;
Dr. E. O. Jordan, of Chicago;
Dr. M. J. Rosenau, of Boston;
Dr. R. L. Wilbur, of Palo Alto;
Dr. Ennion G. Williams, of Richmond;
Dr. C.-E. A. Winslow, of Yale;

the committee to enlarge itself to 15, and that this committee consider whatever questions it sees fit, and take whatever further action

for future conferences may seem wise in order to continue the activities that this conference has started.

Motion seconded and carried.

Motion made that Dr. Edsall's name be added to that committee.

Motion seconded and carried.

The CHAIRMAN. Any further remarks? Any further recommendations? Or further business before the conference?

Dr. M. P. RAVENEL. I believe that everybody in this conference will agree with me that this conference marks an epoch in public-health history. I wish to make a motion that this conference, made up of representatives of universities and other organizations, thank the Surgeon General and those who had been associated with him in calling this conference and arranging for our comfort while here.

The CHAIRMAN. Motion unanimously carried.

The business of the section having been concluded, I will turn the rest of the meeting over to the Surgeon General.

Surgeon General CUMMING. I wish to express the thanks not only of the Public Health Service, but of all the public-health officials in the country, particularly to the presidents of the several great universities and to the deans of the medical schools who have not been hitherto directly connected with public health, for coming to this conference at a great personal sacrifice. I feel sure that we have planted a tree within the last two days which will bear much fruit.

APPENDIX.

MEMBERS OF THE CONFERENCE.

PRESIDENTS OF UNIVERSITIES.

Angell, James R., Ph. D., LL. D., president, Yale University.
Chandler, J. A. C., LL. D., president, College of William and Mary.
Durkee, J. Stanley, M. D., president, Howard University.
Farrand, Livingston, M. D., president, Cornell University.
Goodnow, Frank J., LL. D., president, Johns Hopkins University.
Rhees, Rush, LL. D., president, University of Rochester.
Trotter, Frank B., LL. D., president, University of West Virginia.
Wilbur, Ray Lyman, M. D., LL. D., president, Stanford University.
Woods, Albert F., D. Agr., president, University of Maryland.

DEANS AND DIRECTORS OF SCHOOLS OF PUBLIC HEALTH, HYGIENE, AND MEDICINE.

Abbott, Alexander C., M. D., director, school of hygiene and public health, University of Pennsylvania.
Allison, Nathaniel, M. D., dean, Washington University school of medicine, St. Louis, Mo.
Bardeen, Charles Russell, M. D., dean, school of medicine, University of Wisconsin.
Cabot, Hugh, M. D., dean, University of Michigan Medical School.
Dodson, John Milton, M. D., dean of medical courses, University of Chicago and Rush Medical College.
Doughty, W. H., jr., M. D., dean, medical department, University of Georgia.
Edsall, David Linn, M. D., dean of the medical school and school of public health, Harvard University.
Gile, John M., M. D., dean, Dartmouth Medical School.
Halsey, John J., secretary, school of medicine, Tulane University of Louisiana, New Orleans, La.
Hart, C. D., associate professor public health, College of William and Mary, Williamsburg, Va.
Keiller, William, acting dean, medical branch, University of Texas, Galveston, Tex.
Kober, George M., M. D., dean, Georgetown University medical school.
Lyon, E. P., M. D., dean, medical school, University of Minnesota.
MacCracken, W. H., M. D., dean, Detroit College of Medicine and Surgery.
McElroy, James B., M. D., president of faculty, college of medicine, University of Tennessee.
Miller, E. C. L., M. D., dean, Medical College of Virginia.
Page, Henry, M. D., dean, college of medicine, University of Cincinnati.
Pearson, W. A., M. D., dean, Hahnemann Medical College.
Robinson, G. Canby, M. D., dean and professor of medicine, Vanderbilt University Medical School.
Rowland, J. M. H., M. D., dean, medical department, University of Maryland.
Schmitt, L. S., M. D., acting dean, University of California Medical School.
Schulte, H. von W., M. D., dean, Creighton University College of Medicine.
Tracy, Martha, M. D., Dr. P. H., dean, Woman's Medical College of Pennsylvania.

Welch, William H., M. D., director, school of hygiene and public health, Johns Hopkins University.
Whipple, George H., M. D., dean of the school of medicine and dentistry, University of Rochester.
Wilson, Robert, jr., M. D., dean, Medical College of the State of South Carolina.
Woody, McIver, M. D., dean, Baylor University College of Medicine.

PROFESSORS OF PUBLIC-HEALTH SUBJECTS AND OTHER EDUCATORS.

Baketel, H. Sheridan, M. D., professor of preventive medicine and hygiene, Long Island College Hospital.
Barker, Lewellys F., M. D., medical department, Johns Hopkins Hospital.
Belt, Richard B., M. D., Baltimore, Md.
Davis, Donald W., professor of biology, College of William and Mary.
Emerson, Haven, M. D., Cornell School of Hygiene, New York.
Freeman, Allen W., M. D., resident lecturer, public-health administration, school of hygiene and public health, Johns Hopkins University.
Garcia, Maj. Leon C., United States Army, professor of military science and tactics, St. Louis University School of Medicine.
Goodrich, Annie, D. Sc., teachers college, Columbia University.
Hayhurst, E. R., M. D., professor of public health, Ohio State University.
Haythorn, Samuel R., M. D., director of hygiene, University of Pittsburgh.
Howell, W. H., M. D., assistant director, school of hygiene and public health, Johns Hopkins University.
Jackson, Algernon T., M. D., professor of public health and hygiene, Howard University School of Medicine.
Jordan, Edwin O., Ph. D., professor of bacteriology, University of Chicago.
Leigh, Robert D., lecturer, Columbia University, New York City.
Mahon, T. McC., instructor in hygiene, University of Pittsburgh.
Meredith, Florence, M. D., professor of hygiene, Woman's Medical College of Pennsylvania, Philadelphia, Pa.
Mitchell, O. W. H., M. D., professor of bacteriology and hygiene, Syracuse University.
McCollum, E. V., M. D., professor of biochemistry, school of hygiene and public health, Johns Hopkins University.
Perkins, Roger G., M. D., professor of hygiene, school of medicine, Western Reserve University.
Park, William H., M. D., professor of bacteriology and hygiene, University and Bellevue Hospital Medical College, New York City.
Ravenel, Mazyck P., professor of bacteriology and preventive medicine, school of medicine, University of Missouri.
Rosenau, Milton J., professor of preventive medicine and hygiene, Harvard Medical School.
Rosenberger, Randle C., M. D., professor of hygiene and bacteriology, Jefferson Medical College, Philadelphia, Pa.
Rushmore, Stephen, M. D., associate professor of gynecology, Tufts College Medical School, Boston ,Mass.
Sears, Dr. Heber J., professor of hygiene and preventive medicine, University of Utah, Salt Lake City, Utah.
Seashore, Carl E., Ph. D., chairman, division of anthropology and psychology, National Research Council, and dean of the graduate college, University of Iowa.
Smith, Richard M., M. D., instructor in pediatrics, Harvard University Medical School, Cambridge, Mass.
Sundwall, John, Ph. D., M. D., director, division of hygiene and public health, University of Michigan, Ann Arbor, Mich.

Torrey, Harry Beal, Ph. D., director of medical research, University of Oregon, Portland, Oreg.
Turner, C. E., assistant professor of biology and public health, Massachusetts Institute of Technology, Boston, Mass.
Walker, Elton D., professor of hydraulic and sanitary engineering, Pennsylvania State College, State College, Pa.
Whitmore, Eugene R., M. D., Dr. P. H., professor of bacteriology and preventive medicine, George Washington University, Washington D. C.
Whipple, George C., S. B., professor of sanitary engineering, Harvard University, Cambridge, Mass.
Williams, Jesse F., M. D., associate professor of physical education, teachers college, Columbia University, New York City.
Winslow, C.-E. A., Dr. P. H., professor of public health, Yale University School of Medicine, New Haven, Conn.
Zinsser, Hans, M. D., professor of bacteriology, Medical School of Columbia University, New York City.

STATE AND CITY HEALTH OFFICERS.

Black, John T., M. D., commissioner of health, Hartford, Conn.
Biggs, Hermann M., M. D., commissioner of health, State of New York, Albany, N. Y.
Crumbine, S. J., M. D., secretary and executive officer, Kansas State Board of Health, Topeka.
Dalton, Charles F., M. D., secretary, Vermont State Board of Health, Burlington.
Durrett, J. J., M. D., superintendent of health, Memphis, Tenn.
Chesley, A. J., M. D., executive health officer, Minnesota State Board of Health, St. Paul.
Fronczak, Francis E., M. D., health commissioner, Buffalo, N. Y.
Goldsbury, Paul W., M. D., secretary, Rural Health and Medical Service, Deerfield, Mass.
Kelley, Eugene R., M. D., State commissioner of public health, Boston, Mass.
Levy, James A., M. D., State health officer, Columbia, S. C.
McCormack, A. T., M. D., State health officer, Louisville, Ky.
Nicoll, Matthias, jr., M. D., deputy commissioner of health, Albany, N. Y.
Olin, Richard M., M. D., commissioner of health, Lansing, Mich.
Snively, Harry H., M. D., director of health, Columbus, Ohio.
Vaughan, Henry F., M. D., commissioner of health, Detroit, Mich.
Wadsworth, Augustus, M. D., division of laboratories, State Department of Health, Albany, N. Y.
Welch, S. W., M. D., State health commissioner, Alabama State Department of Health.
Williams, Ennion G., M. D., State health commissioner, Richmond, Va.

REPRESENTATIVES OF SEMIPUBLIC AND PRIVATE HEALTH ORGANIZATIONS.

Armstrong, D. B., M. D., executive officer, National Health Council.
Brown, Walter H., M. D., director, child health demonstration, National Child Health Council, Mansfield, Ohio.
Dublin, Louis I., Ph. D., statistician, Metropolitan Life Insurance Co.
Ferrell, John A., M. D., Dr. P. H., director for the United States, International Health Board of Rockefeller Foundation.
Frankel, Lee K., Ph. D., third vice president, Metropolitan Life Insurance Co.
Geier, Otto P., M. D., director, employees' service department, Cincinnati Milling Machine Co., Cincinnati, Ohio.
Green, Frederick R., M. D., secretary, council of health and public instruction, American Medical Association.

Hatfield, Charles J., M. D., managing director, National Tuberculosis Association.
Kellogg, Vernon, Ph. D., permanent secretary, National Research Council.
Snow, William F., M. D., general director, American Social Hygiene Association; lecturer, school of hygiene and public health, Johns Hopkins University.
Calver, Homer N., director, health service, American Red Cross, national headquarters.
Vaughan, Victor C., M. D., chairman, division of medical sciences, National Research Council.
Vincent, George E., Ph. D., LL. D., president, Rockefeller Foundation.
Work, Hubert, M. D., president, American Medical Association, Postmaster General of the United States.
Yerkes, Robert M., M. D., chairman, research information service, National Research Council.

REPRESENTATIVES OF VARIOUS FEDERAL AGENCIES.

Butler, Charles S. J., M. D., commanding officer, Naval Medical School.
Davis, William H., M. D., chief statistician, vital statistics, Bureau of the Census.
Bell, W. B., division of economic investigations, Bureau of Biological Survey.
Howard, L. O., M. D., Ph. D., Chief, Bureau of Entomology, Department of Agriculture.
Ireland, M. W., major general, Surgeon General United States Army.
Jones, R. F., M. D., lieutenant commander, in charge division of preventive medicine, Bureau of Medicine and Surgery, Navy Department.
Parker, Valeria H., M. D., executive secretary, Interdepartmental Social Hygiene Board.
Rude, Anna E., M. D., director, division of hygiene, Children's Bureau.
Siler, J. F., M. D., lieutenant colonel, Medical Corps, United States Army.
Small, Willard S., Ph. D., specialist in school hygiene, Bureau of Education.
Stitt, E. R., M. D., rear admiral, Surgeon General United States Navy.
White, William A., M. D., superintendent, St. Elizabeths Hospital.
White, William Charles, M. D., chairman, consultants on hospitals under Secretary of Treasury; chairman, medical research committee, National Tuberculosis Association.

REPRESENTATIVES OF THE UNITED STATES PUBLIC HEALTH SERVICE.

Carter, H. R., M. D., Assistant Surgeon General at large.
Clark, Taliaferro, M. D., surgeon in charge of child hygiene.
Cumming, Hugh S., M. D., Surgeon General.
Draper, W. F., surgeon, rural sanitation, United States Public Health Service, Richmond, Va.
Frost, W. H., M. D., surgeon, professor of epidemiology, Johns Hopkins University School of Medicine.
Goldberger, Joseph, M. D., surgeon in charge of pellagra investigations, Division of Scientific Research.
Kerr, J. W., M. D., Assistant Surgeon General, in charge of Division of Personnel and Accounts.
Lavinder, C. H., M. D., Assistant Surgeon General, in charge of Division of Hospitals and Relief.
Lumsden, L. L., M. D., surgeon in charge of rural sanitation studies.
McCoy, G. W., M. D., surgeon, Director Hygienic Laboratory.
McLaughlin, Allan J., M. D., Assistant Surgeon General, in charge of Division of Domestic Quarantine.
Pierce, C. C., M. D., Assistant Surgeon General, in charge of Division of Venereal Diseases.

Schereschewsky, J. T., M. D., Assistant Surgeon General, in charge of Division of Scientific Research.

Stiles, Charles W., M. D., professor and Chief of the Division of Zoology, Hygienic Laboratory.

Stimson, A. M., M. D., surgeon, Assistant Director Hygienic Laboratory.

Sydenstricker, Edgar, statistician, in charge of statistical research, Division of Scientific Research.

Thompson, L. R., M. D., surgeon, in charge of section of industrial hygiene, Division of Scientific Research.

Young, G. B., M. D., senior surgeon, Marine Hospital No. 21.