

Trends in Public Health*

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THE chance of a meeting of the Western Branch of the American Public Health Association in Denver gives to a novice in the field the privilege of paying tribute to one of the most experienced public health officers. If I understand John J. Sippy's contribution, it was based fundamentally on his unshakable conviction of the importance of preventive medicine to the community, the state, and the country, a conviction so strong that no allure of important positions could ever draw him away from the actual practice of public health in the local area. The result, it seems to me, is that a spirit survives him in his state expressing itself in progressive and imaginative work in his chosen field.

I will use three examples. We are beginning elsewhere to recognize the significance of housing to public health but some years ago the subject was discussed at a meeting of the Western Branch in California. Also, just now, California is taking the leadership in two nationally important fields, stream pollution and air pollution. Since a stream pollution bill failed to pass the Colorado Legislature in 1950, a new committee, under the leadership of William McGlone, undertook to make an entirely fresh start. This committee first studied intensively all the recent regional reports and found that the work of the California Commission and the successful legislation of that state in 1949 was by far the most helpful to us.

The California Commission first clarified the problem by sharp definitions. They specified "contamination" to mean an impairment of the quality of the waters of the state which creates an actual hazard to public health; while to "pollution" they gave the following comprehensive and significant meaning, that it includes impairment that adversely and unreasonably affects waters of domestic, industrial, agricultural, navigational, recreational, or other beneficial use; while "nuisance" they defined as a damage to any community by odors or unsightliness resulting from unreasonable practices in the disposal of wastes.

Under the new California laws the state was divided into nine regions and a state Water Pollution Board was established, made up of the directors of the appropriate governmental agencies plus the directors of the nine regional boards. Of the principles of the legislation, the coordination of all agencies for the prevention and control of pollution of the streams both from municipal and industrial wastes was of first importance. The program involved decentralization, with a case-by-case local study of problems of pollution; it included elimination of the rigidity of classification and gave to what we might call the consumer, that is municipalities and industries, the advantage of a knowledge of standards of discharge requirements set up for each area after thorough study. The program stressed both a knowledge of industrial water use as well as the production of industrial waste; it stressed also the maintenance of underground waters as well as the protection of surface waters.

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In the studies made on stream pollution by public health groups in states not highly industrialized the emphasis has been predominately on sewage disposal. Even with our limited industrialization in Colorado we have learned the overwhelming significance of this factor. We have but three large established industries in the state involved in stream pollution; beet sugar processing, the steel industry, and mining. All three of these groups have been working actively with the committee. From the beet sugar industry we have learned that their operation, though seasonal, pollutes the streams for that period more than the total population of the area. Moreover, the industry is experimenting effectively on a method of reducing their pollution potential. Stressing the significance of "coöperation" (the keystone of the California laws) it is our belief that unless health departments work together with industry on stream pollution the problem cannot be ameliorated.

Concerning air pollution, my information comes from an article in a popular science journal, one that we could not well spare, namely the *Scientific American*. In the May, 1952, issue the first article is on smog, telling of experiments going on in Los Angeles. Here indeed is an example of a major problem which industrialization has brought to us. The burning of fuels, even when they are liquid and gaseous, discharges into the air all sorts of organic gases and vapors—methane, acetylene, aldehydes, phenols, ketones, ammonia, and alcohols. In Los Angeles some two million automobiles, buses, and trucks burn every day nearly four million gallons of gasoline and oil releasing nearly four billion cubic feet of exhaust. In addition to this there are vast outpourings from many types of industrial processing plants. Moreover the wind is seldom strong enough to dissipate this polluted air. Los Angeles, with the aid of chemists from Stanford University, has

formulated research to seek the substance in the air responsible for irritation of eyes, whether it is any one of these primary substances released to the air or some entirely new compound synthesized out of them in the air. Does one need a better example of imaginative work in public health?

This page was written before the May issue of the *American Journal of Public Health* appeared with the very important paper on "Medical Research and Control in Air Pollution" by Gordon P. Larson, Director, Air Pollution Control District, County of Los Angeles. Here is the report of three and one-half years of intensive study of this problem. He reported that their group of scientists have found that the present known results of smog—reduced visibility, eye and throat irritation, damage to crops, and nuisance problems—arise from more than fifty different substances released into the air. They have found some of these chemical compounds and have developed microchemical technics for determining the concentration of many of them. They give a most interesting appraisal of the feasible goals of such a study and, although the work is just beginning, they have definite practical results indicating that an industrialized nation is already deeply in debt to the California research workers on this problem.

Turning to the old established public health practices, let us consider the conquering of the infectious diseases of childhood, at least so far accomplished that the lengthened span of life now opens up to us the problems of chronic disease. As we come face to face with this problem, may it not be well to consider carefully all the forces that have brought us so far in dealing with the acute infectious diseases. As the cornerstone of the subject, let us ask, how much has it been a coöperative adventure? Of overwhelming importance, the foundation on which everything else

rested was research. The discovery of bacteria as the cause of infectious disease, by Pasteur and Koch, opened up the era of modern medicine by introducing the idea of "cause" of disease. The study of what research accomplished is too well known to need more than passing mention—first, through the development of that most fascinating of biological sciences, immunology, and second, through what I shall call methods for "bypassing disease" through all phases of sanitation. An interesting example is the final conquering of yellow fever, first through this method of "bypassing" by eliminating the specific mosquito and finally by the discovery of the cause of the disease in the yellow fever virus, and then by the application of successful appropriate immunological methods. When one considers research, medical schools and research institutes become the basic elements in the cooperative endeavor. There the research is carried on and students are trained in medicine both for research and in the spirit of research; new discoveries are made and their application thoroughly tested.

In the practical application of knowledge two forces have carried the load—the public health service with its emphasis on prevention and the practising physicians. I want to stress especially two groups of clinicians—the obstetricians who instituted prenatal care 35 years ago with outstanding results for prevention, and the remarkable work of the pediatricians. They have carried preventive measures effectively into the practice of medicine. Pediatricians have so stressed the concept of prevention, that working from the knowledge of immunization and from what is known concerning growth, 54 per cent of their time is spent on well child care. They are, of course, a relatively small group, located for the most part in cities, but their influence has been immense. In general, physicians in private practice

carry from 80 to 85 per cent of the care of children while the public health services care for the rest. The public health services do more than care for immunizations and well baby clinics for the indigent group since they are responsible for the prevention of epidemics for the entire community. They keep the records, analyze the vital statistics, and stand in a position of leadership to the practising physicians by constantly informing them of the status of each disease. In the present state of world tension every health department and, indeed, every physician must be alert to detect any unusual occurrence of infectious disease, and for the health departments this includes diseases of both animals and plants which affect the food supply, since it is clear that health is one of the prime factors in the strength of the nation.

The full realization that the conquering of infectious disease has been a cooperative endeavor should make us aware of the great importance of lessening tensions between medical schools, the organized health services, and the practising physicians. The entire medical profession should work as a coordinated whole each recognizing the share of the load carried by the others. In the program for health for the last seventy years, including the first half of this century, more than the medical profession has been involved; indeed we must include all the ancillary medical services plus the specific lay and medical organizations such as the National Tuberculosis Association which have concerned themselves with educating the public about disease.

With these points in mind, including both the importance and the extent of cooperation, we turn to the subject of chronic disease. In 1946 four national organizations, the American Hospital Association, the American Medical Association, the American Public Health Association, and the American Public

Welfare Association undertook a concerted attack on chronic disease and formulated their problem in saying "It is now conservatively estimated that about 25 million persons, more than one-sixth of the population, have a chronic disease" (*J.A.M.A.* 135:343-347, 1947). Then in 1948 at a National Health Assembly held in Washington it was determined to form a permanent Commission on Chronic Illness which held its first meeting in Chicago in 1949 under the chairmanship of Leonard W. Mayo. The report of this first meeting is a document of basic importance.

Here, as with the acute infections, the foundation has to be research, the foundation that will open up the subject of "cause." This is a problem for the last half of our century. For instance, in the case of cancer, we still do not have enough knowledge of the normal physiology of the cell, of the normal processes of growth and many other factors to set the stage for research in cancer and yet what fascinating progress has already been made in the whole field of general biology with bearings on the cancer problem.

Certain practical results of present studies are interesting. For example, very early in the work of the American Cancer Society emerged the idea of the importance of early diagnosis with the development of cancer prevention clinics. The significance of this, you will remember, was recognized at the meeting of the American Public Health Association in San Francisco in 1951. It is interesting that with all the work on tuberculosis it is only recently that very early cases have been seen, due of course, to the mass x-ray surveys and the studies on nurses. As I remember it, in the early days when we had only a stethoscope and the finding of tubercle bacilli for diagnosis, we never thought of early cases.

It seems to me of great significance that a meeting in 1951, sponsored by

the Commission on Chronic Disease and cosponsored by the U. S. Public Health Service and the National Health Council was on "Steps Toward Prevention of Chronic Disease." The opening sentence of their report was "Can early detection of chronic illness and other preventive measures match the success achieved in controlling acute communicable disease?" The group decided to study only a limited number of diseases—arthritis and rheumatism, blindness, cancer and other malignant growths, deafness, diabetes, diseases of the heart and circulation, syphilis, tuberculosis, and diseases of the nervous system, especially poliomyelitis, multiple sclerosis, cerebral palsy and epilepsy. In connection with chronic disease, they stressed that certain factors are known or believed to be important to cause and control, namely, nutrition, heredity, emotional factors, and occupational factors. They defined primary prevention, which we have called "bypassing a disease," as keeping it from occurring and illustrated the prevention of congenital syphilis by adequate treatment of an infected mother during pregnancy. Secondary prevention they defined as halting the progression of disease after early diagnosis.

It is clear that taking only the limited list of chronic diseases given above, much research is already under way. We may stress the extensive work on cancer, the new advances in the study of arthritis and rheumatism, the outstanding progress in surgery of the heart both for congenital and acquired defects, and on diseases of the nervous system. I want to call to your attention especially some studies made in the Department of Obstetrics and Gynecology of the University of Colorado School of Medicine by Drs. E. Stewart Taylor, Clifton D. Govan, and William C. Scott on oxygen saturation of the blood of the new-born as affected by maternal anesthetic agents.¹⁻² They recognized that if gen-

eral anesthetics are used in normal full-term uncomplicated deliveries for no longer than from ten to twelve minutes at the termination of the second stage they will probably not increase fetal mortality or morbidity. Nevertheless they found that a significantly higher percentage of the infants reached saturations of oxygen above 90 per cent at one hour when regional anesthesia was used than when the general anesthetics were used, and that since maternal general anesthesia, given for relatively short periods at the termination of the second stage of labor, tends to prevent the early attainment of normal blood oxygen saturation levels in a significant proportion of new-born infants, prolonged general anesthesia for delivery should be avoided. This is the kind of research that seems to me to lay a foundation for studies of prevention in connection with injuries to the new-born.

As fast as preventive measures become established, departments of public health must make sure that they are used. For example, does every depart-

ment of public health, in coöperation with the National Society for the Prevention of Blindness, see that every industry in its territory involving danger to the eyes uses known preventive measures?

Probably the most frightening of all of our problems of chronic disease is that of mental illness—frightening because of increasing numbers and the element of weakness which it means to the nation. Here, if we know little of prevention, it is the responsibility of each community to make sure that only those patients for whom we have as yet no adequate methods of treatment are consigned to custodial care.

These are some of the problems of this half century; many of you will see them far advanced.

REFERENCES

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