RECENT DEVELOPMENTS IN INDUSTRIAL HYGIENE

HENRY FIELD SMYTH, M.D., FELLOW A.P.H.A.
Laboratory of Hygiene, University of Pennsylvania, Philadelphia, Pa.

ALL OF THE ADVANCES in industrial hygiene cannot be detailed in so short a paper, and little would be gained by offering a mere index of the instructive papers presented in this field.

We must then confine our remarks largely to activities in our own country, omitting of necessity much that is of great interest even here, and attempt to show by a few selected illustrations the trends of present day efforts and the newer and better methods of attack on industrial health problems. It is also desired to refer to the activities and aims of the Industrial Hygiene Section of the Association and point out how it may and does affiliate with other sections.

Various agencies are at work in the field of industrial health and are contributing towards the advancement and spread of knowledge on these lines. A few of our leading medical schools have for some years been offering courses in or related to industrial hygiene, usually in connection with public health training. This year sees the addition of at least one recruit to these ranks in the creation of an assistant professorship of industrial hygiene in the newly organized Public Health Institute at Columbia University. In the institutions above referred to, industrial health problems are offering more and more attractive fields for special research by staff and graduate students. This type of work offers very great promise of advancement in our knowledge, particularly when undertaken not by single workers on isolated problems, but by groups of workers representing various lines of university activities bearing on and related to different phases of larger problems. Many industrial health problems may be viewed from various angles, as, clinical medicine, pathology, chemistry, physics, engineering, and hygiene, and their proper and complete solution lies only in collaboration and study by representatives from all of these departments, and at times from others. The best illustration of the value of such co-operative, well-directed effort is seen in the recent lead poisoning studies conducted in the Harvard Public Health School by Aub, Fairhall, Minot, and others, and now published in monograph form. "This type of university attack on an industrial hygiene problem produces results far in advance of anything we ordinarily obtain through other agencies. It has a deliberation and finish about it which means a great deal."

This country has recently made two very important contributions to the literature of industrial hygiene, both by members of this section. Kober and Hayhurst's work, Industrial Health, is a distinct advance on the previous work of Kober and Hanson, and is invaluable to teachers and investigators. Dr. Alice Hamilton's Industrial Poisons in the United States, just published, is another mine of information for those interested in industrial hygiene and medicine, though she herself is forced to admit that most of the reliable information we have on this subject is not American in origin and does not always fit conditions here.

* Read at the First General Session of the American Public Health Association at the Fifty-fourth Annual Meeting at St. Louis, Mo., October 19, 1925.
One of our state medical journals is recognizing the growing importance of industrial medicine and hygiene by the inauguration of a department devoted to these subjects. The Atlantic Medical Journal, published jointly by the State Societies of Pennsylvania and Delaware; began a department in the October issue of this year.

Among government agencies, the U. S. Public Health Service and the Bureau of Mines are both actively interested in industrial hygiene problems. The former agency has been particularly active in the collection of industrial morbidity statistics. This work, which was begun in the Public Health Service in an extremely small way about 10 years ago, has increased until at the present time they receive morbidity records of approximately 150,000 persons engaged in many types of industries. These records have not only been extremely valuable in giving some information as to the character and the amount of sickness in our industrial population, but they are beginning to point out the bad spots in industry, where a special effort may be made towards the reduction of avoidable sickness. In each instance where a report has been rendered to industry, the report has been received and given careful study by the plant officials.

The Bureau of Mines Laboratories in Pittsburgh has been conducting some very excellent and most interesting studies in ventilation, particularly as to the effects of high temperatures and humidities on comfort, and the plotting of "equal comfort zones" of temperatures and humidities. Methods for the detection of carbon monoxide in blood and air developed in their laboratories are a great aid in the rapid and easy detection of this toxic gas.

In our state governments industrial hygiene is in some cases considered the province of departments of labor, in others of health departments where it should rightfully belong, but more often it is the problem of no one in particular, except the small but growing number of larger industries that care more or less for the health of their own employees. No state health department is as active as it should be in protecting the health of the workers at work, and the same may be said of most state labor departments.

The New York State Department of Labor is a notable exception to this, however, having recently created or reorganized a division of industrial hygiene under Dr. Leland Cofer which seems to be giving an excellent account of itself. It has just completed nearly a year's intensive study of the hazard of lead poisoning in the various industries of the state, and is trying to inaugurate a sort of exchange system of facts and opinions in connection with industrial diseases and accident prevention. Dr. Cofer feels that it has made considerable progress in informing the medical profession of the state and the employees and employers of the industrial hygiene conditions in the state, not only as found by the department investigators, but as learned from these very same doctors.

Pennsylvania has for several years produced nothing constructive in the way of industrial hygiene studies, but is now engaged in an intensive study of the hazards of spray painting, a rapidly developing method for the application of protective and decorative coatings of many kinds, such as paints, varnishes, enamels, lacquers, cement and fire clays. In addition to the loading of the atmosphere with lead and other pigments, turpentine and linseed oil, many newer interior flat finish paints and quick drying lacquers and varnishes contain benzole, amyl acetate, and other, less generally known, more or less volatile solvents likely to prove toxic. This investigation in Pennsylvania is being conducted by a staff including a labor department medical inspector, two chemical engineers and a doctor of public health, and its work will be reviewed and criticized by an advisory committee representing the Public Health Service, science, industrial medicine, labor and industry.
Its report will form the basis of regulations governing the use of all spray painting outfits in the state. Complementing these field studies in Pennsylvania, one of the large insurance companies of the United States is planning a series of laboratory tests on the effects of the vapors of the newer, less fully understood solvents now used in many nitrocellulose and other lacquers. This linking of the research laboratory with the field work program adds greatly to the value of each. These groups of workers will keep in touch with each other and collaborate as far as possible.

Organized industry itself is taking an active interest in health problems as shown by the 3 progress reports of the Benzoil Committee of the National Safety Council, showing the growing menace of benzoil as a toxic hazard to American industry. This report was one of the incentives leading to the Pennsylvania study referred to above.

The industrial physician himself cannot usually give the time and has not often the facilities or training to investigate health hazards, except possibly in his own industrial plant, or by the questionnaire method. The latter is often unsatisfactory and requires very careful interpretation of incomplete or misleading answers, but may in some cases give much valuable information and shed new light on old problems. The industrial physician, however, is learning more and more the importance of industry as a health factor. One of our leading industrial physicians, a former councillor of this section, writes: "The response of the working man to the efforts of the medical department and his accepting the fact that the doctor in the plant through physical examinations, hygiene, etc., is working for him, helping him to keep fit and on the job, is a distinct and most important advance of recent years."

Industrial medicine in Philadelphia has a very active local organization interested in scientific advances, which recently collaborated with the Philadelphia Health Council in a study of the industrial medical service in the city. They showed that a very small proportion of the city's workers had any degree of health service while at work. As a result of this work the Philadelphia Health Council is offering to groups of 1,000 employes in small industries, as a demonstration, the benefits of a joint health service, including medical examinations and sanitary surveys. This work is in charge of a former member of the U. S. Public Health Service, a man of wide experience in industrial medicine and hygiene.

Industrial physicians of northern New Jersey have recently organized a similar local association which promises to be quite active.

The plant physician, however, cares for not more than 10 per cent of the country's workers, as shown by a committee report at our last annual meeting. The other 90 per cent must be cared for by group clinics and health services, by state labor or health departments, or left to their own devices.

The Conservancy Laboratories of Cincinnati, in addition to routine health service to industry, makes a point of conducting regularly some piece of scientific investigation of an industrial hygiene problem, and one of these studies will be presented at this meeting.

The need of constant vigilance in industrial health protection is shown by the occurrence of two cases of phosphorus necrosis of the jaw last year in a small fireworks factory in Maryland (a condition thought by most of us to be obsolete since the legislation against phosphorus matches), and by an outbreak of an entirely new type of industrial poisoning in a factory making luminous watch dials. This developed as a necrosis of the jaw, clinically resembling phosphorus necrosis, and apparently due to a radioactive substance.

But the most striking illustration was one that in the last year was responsible for a number of sudden deaths of a most disturbing type and which aroused a
nation-wide interest. We refer, of course, to the deaths resulting from the manufacture of tetra-ethyl lead for use as an accelerator and anti-knock compound for gas engines. These cases were acute lead poisoning of the most violent maniacal type and were due to lack of care in developing manufacture, on a large scale, though the company which developed this new compound had done considerable research work before its introduction.

The widespread interest in these cases and the fears of the general intensive use by all classes of people led to the calling of a conference in May, 1925, of scientists from all over the United States in the office of the Surgeon General of the Public Health Service. The calling of such a general conference to consider and advise on an industrial health menace was an entirely new step in industrial hygiene and one calculated to stimulate interest in industrial health work as nothing else has previously done.

The corporation responsible for the development and introduction of ethyl gasoline voluntarily withdrew it from the general market pending a report on a further systematic investigation of its menace to health and as to the possibility of a widespread distribution of inorganic lead salt in the exhaust of motors. This investigation is planned and supervised by a committee of scientists of the highest standing, who were appointed by the Surgeon General, to report to him about January 1, 1926.

This incident has called attention to the fact, already realized by some, that when manufacturing exists which is constantly producing new poisonous substances, we have no machinery for evaluating their dangers until much harm may have already been done.

In closing, let us consider the aims and objects of the Industrial Hygiene Section of this Association. "Government and convention everywhere were and still are devoting time and energies to extending accommodations in the shape of charity services to the disabled, rehabilitation and occasionally compensation, instead of devoting resources to prevention; and health workers were not and many still are not looking upon health of the worker or of the work place as a part of their genuine programs." Most of our industrially employed are in small industries which do not feel that they can afford health service. The laws in most states have placed such activities in labor departments and few of them are functioning efficiently in this respect. This section aims to bring together in a common bond those in labor departments, health departments, industrial medicine, and scientific institutions, who are actively engaged or interested in industrial health work of any kind; to encourage interchange of ideas, mutual helpfulness and the dissemination of information; and to spread the gospel of industrial health. Some of us have been endeavoring wherever it has been possible to stimulate local health officers to a greater interest in industrial health problems, and here and there we feel that we have succeeded.

This section has an active membership numbering many of the foremost workers in these lines in the country and a small but increasing list of enthusiastic Fellows, and we urge all who are vitally interested, or should be so, to join with us and increase our influence. We have several standing committees to keep in touch with advances and stimulate new work in industrial hygiene lines. At this session we are cooperating with the Sanitary Engineering Section in the discussion of engineering problems of industrial hygiene, and with the Public Health Administration Section in the discussion of the proper function of the public health official in industrial hygiene activities and in the consideration of the need of legislation providing for some machinery to prevent the further occurrence of such episodes as that of tetra-ethyl lead—to provide means of control of poisonous substances other than foods entering into interstate commerce, and other problems of similar nature.