FILE NAME: New York State & NY Times (NY)

DATE: 1951

DOC#: NY009

DOCUMENT DESCRIPTION: Journal Article - Report on Industrial Hygiene in the Western Zone of Germany [Author - Dr. Tabershaw of NY]

REPORT ON INDUSTRIAL HYGIENE IN THE WESTERN ZONE OF GERMANY

IRVING R. TABERSHAW, M.D.
NEW YORK

PURPOSE

THIS SURVEY attempts to evaluate present day industrial hygiene practices in the Western Zone of Germany. It had been noted by American public health officials that German practices in this field (five years after the war) were lacking or rudimentary or had regressed to the point of ineffectiveness. This was especially true if viewed in the light of the modern concept of industrial hygiene as a field of public health which embraces the prevention of disease and injury as well as the maintenance and improvement of workers' health.

PROCEDURE

Officials in the health and labor departments of all government units were interviewed. Discussions were also held with those quasiofficial and nonofficial agencies which have an interest in some phase of industrial hygiene. A number of research laboratories were inspected, and educational programs of a few of the leading universities were examined. A representative number of plants, including those in the Ruhr, were visited and industrial medical practices reviewed. Several conferences and meetings on industrial hygiene problems were attended, and a number of round table discussions were held in several cities.

INTRODUCTION

The practice of industrial hygiene in Germany is important inasmuch as that country was one of the leading industrial nations of Europe and is rapidly regaining its former status. Table 1 indicates the total number employed in Western Germany for the second half-year of 1949. Since all workers must be insured in an accident insurance company (*Berufsgenossenschaft*), these figures were chosen as being most inclusive. Accident insurance companies are organized in four large groups either by industry or on a geographic basis.

Industrial accidents are common and occupational disease, particularly silicosis, is of serious significance in the Ruhr and in the porcelain industry. It was unofficially stated in regard to the coal mines that the indemnity paid for occupational disease in 1949 was higher than the indemnity for accidents.

Dr. Tabershaw is associate professor of industrial hygiene at Columbia University School of Public Health, and medical director in the Eastern Division of the Liberty Mutual Insurance Company, New York.

Table 2 gives some data for the year 1949 which indicate the magnitude of the problem.

Table 3 compares the industrial accidental death and injury rates for the United States and Germany.

There is no question that industrial deaths and accidents are more frequent in Germany than in the United States. However, differences in reporting, in grouping of industry, in classification of workers, etc., make exact comparison difficult.

TABLE 1.—*Total Number Employed (Western Zone)*

Accident Insurance Group	Number Insured (2d Half 1949)
Industrial enterprises	7,564,577
Government enterprises	2,210,430
Agriculture and forestry	8,100,796
Executive employment (including railroads)	1,578,631
Total	20,252,434

TABLE 2.—*Comparison of Numbers Indemnified for Accidents and Occupational Disease*

Total number insured (1949)	18,881,737
Number undergoing accidents (total)	1,118,949
Number undergoing occupational disease (total)	30,771
Number compensated for accidents	
Death	7,021
Total disablement	1,133
Partial disablement	68,791
Number compensated for occupational disease	
Death	368
Total disablement	403
Partial disablement	7,818

TABLE 3.—*Comparison of Industrial Accident Rates of Germany and the United States (1949)*

	Germany	United States
Accidental deaths (per 100,000)	36	26
Accidental injuries (per 100,000)	5,921	2,250

Probably the most reliable figure for comparative purposes is the number of industrial deaths. This shows a substantially higher rate for Germany. Industrial accidents are also more frequent and will probably increase as German industrial production increases.

Owing to the predominance of the mining, chemical and porcelain industries in the German economy, occupational disease is of greater significance than in the United States. Comparative data on this type of disease are not reliable, since there is no universal mandatory reporting of industrial disease in the United States. The backlog of cases of partial and total industrial disablement is enormous and represents a severe drain on the German economy at present and will undoubtedly increase in the future. No data on the total industrial accident premium could be

obtained, but at least 415 million marks were expended in 1949 in indemnity and medical expenses by the accident insurance companies. It is worth noting that only about 0.02 per cent of the amount expended was for accident prevention.

LEGISLATIVE AND HISTORICAL BACKGROUND

The present practices in industrial hygiene in Germany can be directly attributed to the development of health insurance (*Krankenkasse*) and workmen's compensation (*Berufsgenossenschaft*). The health insurance system was established in 1883 and was followed two years later by passage of the workmen's compensation laws, which compelled employers to insure all their workers against accidental injuries and illnesses arising out of employment. The first law governing medical control of lead industries was enacted in 1905. Since that time at irregular intervals other hazardous substances and processes have been added to the list. These laws require physical examinations before entry to determine suitability for employment, physical examinations of exposed workers at stated intervals, and sanitary regulations within the plant. To supervise the enforcement of these medical regulations and to determine the diagnosis and causal relation of an alleged occupational disease, physicians were appointed in the Labor Ministry (*Arbeitsministerium*).

These state industrial physicians (*Landesgewerbeärzte*) dominate the entire administrative and legal structure for controlling health conditions within the plant. Other agencies and groups who may have attempted to add new concepts regarding the health needs of the workers were forced to defer to the *Landesgewerbearzt*. Since the law narrowed the interest of these physicians to carrying out its regulations, the broader public health aspects of this field have been neglected. The interpretation of the functions of the state industrial physician and of the Labor Ministry is comparable to that of the administration of our workmen's compensation laws. While this is related to the broad field of industrial hygiene, it is essentially a medicolegal-social problem and represents only a fragment of the total factors which play a part in worker health.

OFFICIAL AGENCIES

Ministry of Labor

The Ministry of Labor is the government agency basically concerned with worker health and working conditions, e. g., hours of work, employment of women, employment of minors, etc. Its present organization is essentially the same as that which existed before and during the war. Direct responsibility for controlling accidents and occupational disease hazards is vested in two sections (medical and engineering) which are administratively separate but function cooperatively.

Medical Affairs Branch.—The Medical Affairs Branch in Bonn consists of an *Arbeitsministerium* for Medical Affairs (Professor Bauer and a staff of three medical assistants). The major functions of this group are to create new legislation, to supervise and assist the state industrial physicians (*Landesgewerbeärzte*) in carrying out the law and to act as the federal administrative body on all matters relating to the medical aspects of the labor laws. Its functions are purely administrative, and no scientific research or educational facilities, equipment or staff, exist in this department.

A similar system exists in each state (*Land*); i. e., the Labor Department is responsible for the control of accidents and health hazards. Responsibility for medical affairs is vested in the *Landesgewerbeärzte*, one or more of whom are appointed for each *Land* with the approval of the *Arbeitsministerium*. The functions of the *Landesgewerbeärzte* may be summarized as follows:

1. To review every case of alleged occupational disease and to decide on the causality and the degree of disability (*Gutachten*).

In this connection his decision is usually final, but in doubtful situations the case may be referred to the home insurance office (*Oberversicherungsamt*). Since all disabled workers receive initial medical care and indemnity from either the health insurance company (*Krankenkasse*) or the accident insurance company (*Berufsgenossenschaft*), the determination of whether an illness is occupational in origin is mostly a matter of concern between the *Krankenkasse* and the *Berufsgenossenschaft* as to who pays. In long term disability, however, it may be important to the worker whether his case is or is not considered occupational in origin. In the former instance he receives more money and for longer periods than in the *Krankenkasse* system. Determining the degree of disability in percentage and deciding when a case may be considered severe (*schwer*) occupies most of the time of the state industrial physician.

2. To act as consultant on occupational disease problems to physicians, engineers, management and labor.

The *Landesgewerbearzt* also acts as medical advisor to the regional labor offices in his *Land*.

3. To enforce the medical regulations pertaining to the list of recognized occupational disease hazards (the list contains 27 occupational diseases—see Appendix I).

In this connection the state industrial physician visits factories, assists in appointing plant physicians, reviews the records and in general assumes responsibility for the prevention of occupational disease.

4. To advise and cooperate with the Engineering Branch in applying preventive measures for known hazards, substances or processes.

It was noted that:

1. The *Landesgewerbearzt* has neither the time nor the staff nor the equipment to visit factories, make inspections or do investigative work on any new or unproved hazard.

2. Occupational disease hazards are for the most part brought to his attention through the reporting of alleged or proved cases of occupational disease. The law requires all physicians suspecting the presence of an occupational disease to report it to either the health insurance company (*Krankenkasse*) or the accident insurance company (*Berufsgenossenschaft*), with a copy of his report going to the state industrial physician.

3. The state industrial physician has no clinical facilities for examining patients but must depend on the reports of other physicians. Most of his decisions are arrived at only by evaluating reports and not by personally examining the patients. There are several notable exceptions to this in that Professor Koelsch in Munich

and Dr. Nuck in Hannover have clinical facilities (*Institute für Arbeitsmedizin*) where doubtful cases can be studied. Dr. Carow in *Land* Bremen and Dr. Siebert in Berlin have at their disposal the clinical facilities of the Health Department. Dr. Siebert is also in charge of an occupational disease clinic in one of the hospitals administered by the Health Department.

4. None of the state industrial physicians (*Landesgewerbeärzte*) have police powers but can enter any plant at any time without prior notice to inspect any process. State police powers can be called on by obtaining a court order through the state prosecutor in cases where owners failed to comply with regulations.

5. In the absence of any technical facilities for determining doubtful exposures, reliance is placed on the truth of statements made by the management as to toxicity and quantities of materials used.

6. In doubtful cases the state industrial physician can request special examinations, which are paid for by the accident insurance company.

7. In cases of inadequate or incorrect treatment the patient can be forced to accept special consultant service through the accident insurance company.

8. None of the state industrial physicians have any concept that their functions embrace interest in nonoccupational disease, in the total health of the worker or in furthering general public health.

Engineering Branch (*Technische Abteilung*).—In the Labor Ministry at Bonn and in each *Land* the engineering phases of accident and occupational disease control are a function of the Engineering Branch (*Technische Abteilung-Gewerbeaufsichtsamt*). This branch works in close cooperation with the *Landesgewerbearzt* but is administratively separate.

The following facts are noteworthy:

1. All members are graduate engineers whose basic function is the enforcement of the regulations and ordinances pertaining to hazardous conditions in plants.

2. Routine plant visits are made as staff and time permit. Reports of serious injuries and accidents are usually followed up immediately.

3. The engineers do not specialize on types of hazards, e. g., fire, accidents, etc., but are assigned to specific industries, e. g., metals, ceramics, etc. In small areas like Bremen and Berlin they are assigned to districts and cover all types of establishments within their areas.

4. Their work is entirely administrative. They have no technical or scientific facilities or equipment.

5. They have the same power of entry of factories as the state industrial physician and exercise police powers through the state prosecutor in the same way in cases where managements fail to comply.

6. Technical advice is obtained from the *Technische Ueberwachungsverein*. This organization which has semiofficial status (it functions as the scientific and technical branch of an official government agency—the *Arbeitsministerium*) is established, paid for and controlled by employer groups (*Arbeitgeberverbände*).

It is worth commenting that:

1. The Engineering Branch is essentially interested in enforcing legal ordinances. It does not offer any technical assistance to establishments which are visited but acts essentially as policemen with engineering degrees.

2. Interest in safety education is very superficial—many of the engineers stated it was outside their "field of competence." In only one area (Berlin) did the Engineering Branch publish and distribute safety educational material. In this case the cost of printing was defrayed by the accident insurance company (*Berufsgenossenschaft*). In other *Länder* safety education is done only by the *Berufsgenossenschaft*, which directs most of its material at the apprentices (aged 14 to 17) in the various trades.

3. No national or local voluntary safety organization exists (except for a technical group—*Verein Deutscher Revisions Ingenieure*—all employees of the *Berufsgenossenschaften*). Officials (*Beamte*) of the Labor Ministry meet once a year to discuss administrative matters, but the average engineer has no opportunity for postgraduate training or exchange of ideas.

Ministry of Interior

The Health Department is located in the Ministry of Interior. Neither in the *Bund* (i. e., the Western Zone) nor in the *Länder* are there any divisions of industrial hygiene, since industrial health is considered a function of the Labor Ministry. However, health officials are supposed to cooperate (*mitwirken*) with the state industrial physician (*Landesgewerbearzt*), to report industrial hazards, if known, and to assume responsibility for neighborhood health when an industry is alleged to be a nuisance or a danger to the community.

All the health officers of the *Länder* deplore the fact that industrial hygiene is not part of their functions. They all insist nevertheless that in view of the long background of industrial medicine in the Labor Ministry it would be impossible to relocate it in the Health Department of the Ministry of Interior. Suggestions had been made to bring the *Landesgewerbearzt* into the Health Department, e. g., in Hessen, but the matter was not pressed. In Bremen and Berlin, because of their small size, the *Landesgewerbearzt* is under the administrative direction of the health officer but his functions in no way differ from those of a *Landesgewerbearzt* located in the Labor Ministry.

Accident Insurance Companies

Workmen's compensation insurance in an accident insurance company must be carried for all gainfully employed. Accident insurance companies (*Berufsgenossenschaften*) are organized in four large associations.

1. Industrial Accident Insurance Association (*Gewerbliche Berufsgenossenschaft*) representing 35 different groups of industries. All firms in each industrial group, e. g., textile, are insured in one insurance company.

2. Agricultural Insurance Association (*Landwirtschaftliche Berufsgenossenschaft*). Each of these companies is organized in a geographic area. There are 10 such carriers.

3. Community Accident Insurance Association (*Gemeinde-Unfall-Versicherungs-Verbände*). Each of these is organized for a state or for a county and covers the employees in government and community enterprises which do not fall in the industrial and agricultural groups.

4. Executive Accident Insurance Association. An association organized for each *Land* and for the German postoffice and railroads.

All insurance carriers are supervised by the Labor Ministry, which has jurisdiction of administration and appeals. In the various *Länder* there are senior insurance offices (*Oberversicherungsämter*) which hear appeals.

Separate accident insurance companies exist for the mining industry (*Bergbau-Berufsgenossenschaft*).

Employers pay the entire cost of accident insurance, which is estimated to be about 2 per cent of wages on the average.

Accident insurance benefits include indemnity for loss of wages, medical benefits and death benefits for widows and dependents. (Details are not given in this report.)

Accident insurance companies do not maintain their own hospitals but they control the conditions under which medical services are given. Cases of special trauma and occupational diseases are referred to specialists in hospitals designated by the insurance companies. In cases in which the injury or the illness is minor, it appears that the companies permit patients to be treated by their own physicians.

No published statement could be obtained indicating the total premiums paid for this type of insurance, nor could figures be obtained on the percentage of moneys collected which is paid out for prevention. On information from various sources it was estimated that about 0.02 per cent of moneys expended is for prevention.

The major responsibility for the prevention of industrial illness and accident rests with the insurance companies. However, their main function is to collect premiums and to administer these funds properly according to law. While prevention is theoretically rewarding, to the individual plant there is no financial incentive to make serious efforts or expenditures for prevention, since premiums are based on the type of industry rather than on individual plant experience. (There are some exceptions; e. g., individual rating plans are said to exist in the electrotechnical industry). A plant has to be exceptionally bad to be penalized for accident hazards and, conversely, receives no reduction in premium for a good experience.

No insurance company carries out an extensive program of safety education. The Industrial Accident Insurance Association (*Gewerbliche Berufsgenossenschaft*) publishes a monthly bulletin, some literature, posters and pamphlets. Most of the material, however, is for the safety education of apprentices.

No insurance company expressed the slightest interest in the general health of the worker or in sickness-absenteeism as a labor management problem.

NONOFFICIAL AGENCIES

Werkaerztliche Arbeitsgemeinschaft

This organization is the industrial physicians' professional society. It was established in 1948 and holds a meeting once or twice a year. Its purposes are scientific and the furthering of the interests of the industrial physicians. There are approximately 150 members, most of them employed full time in the large chemical, steel, automotive and similar industries. These doctors are not members of the *Krankenkasse* system and most of them do not carry on a private practice.

Before the war the only organization of this kind was limited to the physicians of I. G. Farben. This was discontinued in 1945. The present *Werkärztliche*

Arbeitsgemeinschaft has taken the place of the I. G. Farben organization and is open to membership to any full or part time industrial physician. Very few part time physicians, however, are members of this group.

In establishing the organization in 1948 an agreement was made between the employers, the labor unions and the industrial physicians to serve as the basis for their functions and duties (see Appendix III). By the terms of this agreement the functions of the physicians are limited essentially to (1) physical examination of workers applying for hazardous occupations and (2) first aid for all industrially injured or ill. The need for such an agreement appears to be an aftermath of the war, the industrial physicians apparently not enjoying the confidence of the workers, since many of them misused their profession on behalf of the employers to further the war effort.

Deutsche Gesellschaft für Arbeitsschutz

This organization is the only one in Germany which can be considered a voluntary community group interested in the health and safety of workers. It has been stated that over 100 corporations and 150 individuals are members and represent industry, engineering, medicine, government and labor.

The objectives of the organization are as follows:

1. Publication of a journal on industrial medicine.
2. Publication of monographs on various subjects.
3. Maintenance of a library on industrial safety.
4. Organization of two safety meetings a year.
5. Advice on legislation regarding industrial hazards.
6. Encouragement and subsidies for solution of special problems.
7. Maintenance of a museum of industrial safety.

It was noted that this group has never and does not intend to collect any statistics on accidents and occupational diseases. They have no interest in general safety education but only in specific technical problems. They are currently working under a severe handicap, since their entire library was destroyed. Before the war foreign literature was abstracted, and resumption of this service is planned. Publication of the journal *Zentralblatt für Arbeitsmedizin*, which was discontinued in 1943, will, it is expected, be resumed within a month.

West German Chamber of Physicians

Dr. Oelemann, director of the West German Chamber of Physicians, and several private practitioners were interviewed with regard to their part in the practice of industrial hygiene. Private practitioners are entitled to treat workers who are injured or ill from industrial causes. The industrial physicians are not supposed to treat such patients but are to refer them to their private physicians. In cases of severe injury or illness the patient may be referred by the accident insurance doctor (*Vertrauensarzt*) to a specialist for diagnosis and treatment. The determination as to whether a worker is able to return to work is a function of the private physician. In case the latter disagrees with the industrial physician as to the worker's recovery the *Vertrauensarzt* makes the decision.

It was interesting to note that if a worker's case comes under the health insurance system (*Krankenkasse*) his private physician receives only a stipulated amount (capitation fee). However, if it is an industrial case the private physician is permitted to charge per visit. However, in most instances after the first or the second visit the accident insurance company refers the patient to its own doctors.

Private practitioners have no means of bringing their knowledge of occupational diseases up to date.

PLANT VISITS

Entry into all plants was obtained through the *Landesgewerbearzt*, who in most instances acted as the guide. Commercial establishments and service industries were not visited, as inquiry revealed that they had no medical services of any kind except first aid. Both large and small establishments were inspected, and their medical procedures were examined in detail. The following observations summarize the result of these visits.

1. Full time physicians are employed in relatively few plants, even among those employing thousands of workers. Those that are employed are all in large factories with known occupational hazards, particularly large chemical works, steel mills and automotive plants. The functions of the full time doctors are essentially threefold.

(*a*) They make physical examinations according to regulations specified by the various ordinances controlling occupational disease hazards and apprentice labor.

(*b*) They render first aid for all injuries and refer the seriously injured or ill as directed by the insurance carrier.

(*c*) They administer first aid for minor nonoccupational conditions. It appeared that relatively few workers avail themselves of this service.

This is in accordance with the agreement established between employers, workers and the industrial physicians as noted previously (see Appendix III). Only one of the plants visited (Opel) with full time medical personnel had any interest in going beyond these functions.

2. First aid is usually highly developed, and elaborate dispensaries are staffed and maintained. These include in many instances in-plant roentgen examinations and the use of numerous physiotherapeutic devices, as well as hydrotherapy.

3. There is little evidence that the plant physicians have any functions in regard to the broader aspects of worker health, e. g., health education, nutrition, environmental control, employee-management problems, etc.

4. Administratively, in the large plants the medical departments are located in the social security (personnel departments).

5. The decision of the physician regarding suitability of employment is final in the case of workers and salaried employees. The standards set for work are at the discretion of the work physician. In view of the overabundance of labor in Germany only the most able-bodied find employment in the large organizations.

6. Record keeping is excellent and accurate, and, for the most part, records are kept confidential in the medical department.

7. In no instance was an industrial hygienist employed. This was true even in large plants like I. G. Farben with multiple and complex chemical hazards. Toxicological problems are handled by the research laboratories of the respective plants.

8. Industrial nurses receive no special training, nor do facilities exist anywhere for such training. Industrial nursing is not recognized as a special field, and there are no national or local organizations of industrial nurses. Most of the plants hire their nurses through a "mother house" (*Mutterhaus*), although in some cases independent nurses are employed. The trade-unions insist on trained help, but the level of training of the staff does not go beyond first aid in most instances.

9. Most of the first aid is carried out by first-aiders (*Sanitäter*) who are especially trained by the Red Cross or who have had army experience.

10. In some of the large plants safety engineers are employed. However, it is only in the occasional plant that there is an organized safety program. In spite of assurances that workers obey all safety regulations, plant inspections reveal that infractions are frequent, e. g., failure to wear safety glasses or protective clothing, etc.

11. Part time physicians are employed only where a known occupational disease hazard occurs. This physician carries out the medical program as prescribed by law but rarely goes beyond this function. He is usually selected by the plant management but must have the approval of the *Landesgewerbearzt*, who supervises the quality of his work and reviews his records.

EDUCATION

Visits were made to several universities to determine the status of undergraduate, graduate and postgraduate education in the field of industrial hygiene.

Before the war industrial hygiene was taught at only a few universities and is presently being taught in the American Zone at the universities of Frankfurt, Munich and Erlangen. Most of the teaching is in the hands of the *Landesgewerbeärzte* who hold the title of professor in some of the universities, notably Professor Koelsch at Munich and Erlangen and Professor Bethke at Mainz and Frankfurt.

The typical curriculum for undergraduate teaching, e. g., that at the University of Frankfurt, is a required course of 1½ hours a week for one semester in the fourth year. This course consists of lectures and field trips and is conducted by one of the assistant professors with no special training in this field. A voluntary course of two hours a week for a semester is given in the fifth and sixth years by Professor Bethke (former *Landesgewerbearzt* of Hessen). All clinical lecturers are supposed to present cases of occupational disease, but there is no coordinated program.

There are no graduate courses in Germany leading to a degree in any phase of industrial medicine. The only postgraduate teaching in the field consisted of a two month course given by Professor Koelsch in Munich six months ago. This course was taken by 35 doctors (mostly *Werkärzte*) and lasted two months. It was the only postgraduate teaching in this field that had taken place in postwar Germany.

It is apparent that only through the efforts of the more aggressive *Landesgewerbeärzte* did some organized teaching in industrial medicine develop. This development seems to be the result of the energy of the individual *Landesgewerbearzt* rather than of the needs of the community. The teaching is limited to occupational diseases, and no lectures on the broader phases of industrial medical administrative practices, preventive medicine, nonoccupational sickness-absenteeism, etc., are given or ever have been.

LIBRARIES

A survey was not made on the status of industrial hygiene literature in the medical and general libraries. However, conversations with several consultant librarians indicated that few books and periodicals on this subject are available in the general libraries.

Every *Landesgewerbearzt* is attempting to rebuild his own library, as most of them have been partially or totally destroyed or lost. *Land* Hessen and *Württemberg-Baden* have practically no literature on this subject. Professor Koelsch has the most complete library, including foreign periodicals, since he was able to retain almost three quarters of his books and papers. Professor Baader in Hamm has a very extensive collection which he moved from Berlin. In Bremen a modest collection, chiefly of German literature, exists, and this is also true at the Robert Koch Institute in Berlin. The *Deutsche Gesellschaft für Arbeitsschutz* stated that its entire library was burnt. The *Staubforschungs-Institut*, at Bonn, and the *Silikose-Forschungs-Institut*, in Bochum, have only a few scattered periodicals.

It was noted that the Germans in 1943 stopped publication of all their journals on industrial hygiene, *Das Zentralblatt für Arbeitsschutz*, *Archiv für Gewerbephysiologie* and *Staub*. The resumption of publication of all these journals is being planned, and this month the first postwar issue of *Staub* appeared. The paucity of foreign literature is not due only to war's destruction, as subscription for American, English and French literature was discontinued about 1935. The latest issue of an American journal was noted in the Robert Koch Institute as of the year 1937.

A number of new books on industrial hygiene have appeared since the war. These are essentially compendiums of medical literature concerning the subject and do not contribute anything new. Among the authors are Koelsch of Munich, Holstein of Berlin (Eastern Zone) and Lutz of Stuttgart. No German book on engineering or chemical analysis practices in industrial hygiene is available.

Material for the health education of industrial workers does not exist anywhere in Germany. It was never created or subscribed for from foreign sources.

RESEARCH LABORATORIES

All the research laboratories interested in industrial hygiene now existing in Western Germany were visited.

Silikose Forschungs-Institut

At Bochum is the *Silikose Forschungs-Institut*, a research laboratory supported by the *Bergbau-Berufsgenossenschaft* and interested only in silicosis. Connected with this institute is a clinical hospital for disabled miners.

The institute is divided into two divisions: chemical and engineering, each operating separately under the director. The laboratory is in a most elementary state, with few facilities, a poor library and inadequate equipment. The work of the engineering division is centered around the testing of the efficacy of dust masks and the development of engineering methods to allay dust. The medical program centers around the evaluation of miners' disabilities and methods of treatment. In addition, the medical division intends to coordinate the program of preemployment and periodic roentgen examination of all miners. This program is being only partially carried out at present.

The work of the engineering section may be compared to the functions of the Bureau of Mines of the United States Department of Commerce. The medical program is in charge of a physician with very limited training in industrial hygiene.

Staubforschungs-Institut

This research laboratory is sponsored and paid for by the industrial insurance association (*Hauptverband der gewerblichen Berufsgenossenschaft*). It was formerly in Berlin and is being rebuilt in Bonn. It is under the direction of a research chemist who is presumably interested in all mineral and toxic dusts but particularly in methods of chemically precipitating dust in the air. The laboratory is in an elementary state with little equipment. There are no field instruments, and the knowledge about atmospheric pollution is elementary. It is the responsible agency for publication of the journal *Staub*.

Robert Koch Institute

The Robert Koch Institute, in Berlin, was the major research institute of Germany and is sponsored and supported by the Health Department. There is a division of industrial hygiene where a physician, an engineer and a chemist work under the direction of a chemical engineer. It was noted that the laboratories were essentially set up for chemical analysis. No experimental work is being carried out on animals. At the present time the major interest is in the percentage of quartz in rubble. The engineer is chiefly interested in heating, light and ventilation but has little knowledge of plant ventilation for reducing industrial poisons. Another section of this institute is devoted to engineering study of air polution. Most of the work done is qualitative in nature.

It is obvious that the state of technical research in industrial hygiene in Germany is elementary. There is lack of facilities, equipment, libraries and experimental animals. With the exception of the Robert Koch Institute there are no officially sponsored research groups, nor are there any privately endowed or university laboratories.

Ruhr

The Ruhr mining industry represents a special problem in the field of industrial hygiene. Over 400,000 workers are employed, and more than half of them work underground. Of interest from an industrial hygiene standpoint are the following observations.

1. The mining industry is organized under a special mining accident insurance company, *Bergbau-Berufsgenossenschaft*. This company supports two hospitals, one in Bochum and one in Gelsenkirchen-Buer, and a silicosis research institute at Bochum.

2. It is estimated that the contributions made to the mining accident insurance company amount to 8.4 per cent of the total wages.

3. All accident prevention is carried out by the accident insurance company, which collects statistics, makes safety inspections and does a certain amount of safety education chiefly among the apprentices. At the present time the company is attempting to establish entrance and periodic physical examinations, which include roentgen examination of the chest. This is being done for the major part of the industry, but the program is not complete.

4. There is a sickness and old age insurance fund—the *Knappschaftskrankenhaus*. Workers' contributions equal 11 per cent of the wages, to which employers add a sum equal to 17.5 per cent of the payrolls. Besides medical benefits there are many others, including those for dependents, widows, invalids and the aged.

5. At some of the mines, in addition to a first aid room, there are clinical facilities with x-ray and physiotherapeutic equipment. Ultraviolet radiation is offered in some mines, and in some instances the dispensaries (*Gesundheitshäuser*) are available to the miners' families. Many of the large mines have a physician on full time basis (22 employ a full time and 19 a part time physician).

6. There is a central office which attempts to provide employment for disabled miners. There is also a great deal of interest in attempting to create small industries where disabled workers, especially those with silicosis, can be employed.

We have noted previously in this report that silicosis is more important than accidents as a cause of disability in miners. There is a tremendous backlog of partially and totally disabled workers, and for this reason recruitment of new workers is increasingly difficult. It was not possible to evaluate the effectiveness of present preventive methods, but in general it appeared that not enough weight is given to control of the dust hazard. Most of the interest in miner welfare still centers about compensation benefits.

COMMENT AND SUMMARY

The practice of industrial hygiene in Germany is different from that in the United States. In the United States industrial hygiene embraces the prevention of industrial accidents and illness as well as the maintenance and improvement of worker health. In Germany it is based on the rendering of expert opinion (*Gutachten*) in cases of occupational disease by the *Landesgewerbearzt*. This function of industrial hygiene is comparable to our workmen's compensation system, which, while important, is only a fragment of the total picture of worker health.

In Germany worker health is synonymous with control of occupational disease, and this control is dependent on a series of laws which regulate the frequency of physical examination. The engineers also enforce a series of regulations, but engineering is entirely separate from medicine, and while they presumably work cooperatively, each group stays within its "field of competence." The engineers have no equipment, laboratories or training to enable them to determine degree of hazard adequately. There are no modern field instruments for engineering evaluation of atmospheric contamination; e. g., a midget impinger could not be found in Germany. There are no codes or ordinances regarding the permissible degrees to which the air of workrooms may be contaminated with known poisons, and the interpretation of "occupational hazard" is purely a qualitative one. Engineers are industrial specialists rather than experts in the control of specific hazards such as occupational diseases, fire, etc. Specialists concerned with such matters do exist but do not actively function as field personnel.

Failure to provide safe and healthful working places is not penalized by any increase of the employer's insurance cost or through workers' grievances. Safety technics are of low standard. There is only one voluntary safety association, and its point of view is extremely narrow. Community participation in safety, e. g., the city safety council, does not exist. In Germany the accident insurance com-

panies are noncompetitive and are organized on an industry basis with semiofficial status. The individual plant is rarely penalized and practically never receives a monetary reward for money spent on safety and preventive medicine.

Labor has a token voice in that it is represented in health councils and in labor-management groups. However, union leaders are limited in their understanding of what can be done. There is no education on the dignity and worth of the individual, no teaching that he has a right to be protected against illness and not only to be cared for after he is made ill, and that proved methods, including engineering technics, are available.

Teaching is limited to a few lectures in a few universities. There is no opportunity for graduate training or for the upgrading of the private practitioner or the industrial physician. Library facilities are at a minimum, and most of what exists is personally owned. Research laboratories have inadequate facilities and inadequate staffs, and these limit their view to a narrow range of problems. There are no federal or state departments which train personnel, stimulate education, provide health material or act as coordinator on industrial health activities.

Such aspects of industrial hygiene as employee morale, sickness-absenteeism, rehabilitation, selective placement, etc., are considered interesting but not basically within the range of industrial hygiene. Industry apparently has never had presented to it the benefits to be derived from positive programs, and conferences on industrial hygiene are generally limited to technical subjects. Community meetings were never, or hardly ever, held where the general public, the professions, industry and labor might participate.

German laboratories and libraries are badly in need of personnel, facilities and equipment. While their present state to some degree is an aftermath of the war and the National Socialist regime, most of the deficiencies in industrial hygiene reflect the traditional thinking of German industry, medicine and labor.

The outstanding need in Germany at the present time is a program of education for industry, workers, community and the professions regarding the value of industrial hygiene practices. They must be educated that preventive medicine is aimed at the preservation of one of the basic rights of the individual, i. e., his health. They must be shown that the cooperative action of many skills is necessary and that individuals and groups must voluntarily initiate, develop and support programs of prevention and education. They must also be shown that preventive medicine is economically beneficial to the industry, the worker and the community. They must be taught that dependence on a health and accident insurance system does not solve the problem of sickness.

The active development of a program of industrial hygiene would make the adult worker aware of his own dignity and worth. It would also ease the burden on the present top-heavy insurance system by reducing the costs of death, sickness-absenteeism and partial and total disability from occupational injuries and illnesses. Industrial hygiene is an excellent medium by which to teach cooperation and understanding through mutual action of the workers, the employers, the physicians and the community as they press toward the acceptable goal of better health for the workers. Lastly, it would make Germany economically more secure by helping workers become more efficient, more productive and happier through better health.

APPENDIX 1

List of Occupational Diseases Which in Social Insurance Are Considered Equivalent with Occupational Accidents. (Additional promulgation of ordinance dated April 27, 1950, Code 1950.)

No.	Occupational Diseases and the Nature of the Industries with Which They are Associated*
	Disease caused by
1	lead or its compounds
2	cadmium or its compounds
3	phosphorus or its compounds
4	mercury or its compounds
5	arsenic or its compounds
6	manganese or its compounds
7	beryllium or its compounds†
8	benzene or its compounds
9	nitro- and amino- compounds of benzene, its homologs and their derivates
10	methanol
11	nitric acid compounds
12	halogenated hydrocarbons
13	carbon disulfide
14	hydrogen sulfide
15	carbon monoxide
16	Diseases of the teeth caused by acids
17	Diseases caused by roentgen rays and radioactive elements
18	Skin cancer or similar precancerous changes of the skin caused by soot, paraffin, tar, anthracene, pitch and similar substances
19	Cancer or other tumors, as well as morbid changes of the urethral mucous membrane, caused by aromatic amines
20	Occupational skin diseases which make change of occupation or the termination of employment necessary
21	Diseases produced by repeated shocks as a result of the use of tools operating with compressed air or similar tools and machines
22	Bone fractures caused by fatigue
23	Diseases caused by working in compressed air
24	Diseases of the joint bursae (bursitis) due to permanent pressure or permanent shock suffered by the affected parts of the body
25	Chronic diseases of the tendons, the tendons and their muscles, the ligaments and the meniscus insertions
26	Paralysis of nerves exposed to pressure
27	Diseases of bones, joints and ligaments caused by fluorine compounds (fluorosis)
28	Dust disease of the lungs (silicosis, silicatosis) diminishing the capacity to breath and impairing the circulation, or associated with pulmonary tuberculosis (active)
29	Asbestosis with diminished capacity to breathe and impaired circulation or associated with cancer of the lungs.

* 1-29: all enterprises.

†With the exception of skin diseases, which rate as occupational disease only so far as they are symptoms of a general illness resulting from the action of noxious substances absorbed into the body or are to be indemnified as per no. 20.

30 Cancer of the lungs
Establishment producing alkaline chromates and chrome colors

31 Diseases of the lower parts of the respiratory system (trachea and lungs) caused by slag
Slag fertilizer mixing enterprises, and those which store and ship Thomas slag dust—all enterprises

32 Diseases of the lower parts of the respiratory system caused by aluminum and its compounds

33 Schneeberger's lung disease
Ore-mining enterprises in the Erzgebirge, a mountain range on the frontier between Saxony and Bohemia; metallurgical industries; weaving mills

34 Deafness or impairment of hearing (otitis interna) caused by noise

35 Cataract
Enterprises which produce and work up glass, metallurgical enterprises, enterprises of the chemical industry

36 Damages of the cornea caused by benzoquinone
Enterprises which produce and work up glass, metallurgical enterprises, enterprises of the chemical industry

37 Nystagmus of miners
Mining enterprises

38 Worm disease of miners caused by Ancylostoma duodenale or Strongyloides stercoralis (Anguillulla intestinalis)

39 Communicable diseases
Hospitals, including lying-in hospitals, medical and nursing establishments and other institutions, such as health resorts; furthermore, welfare institutions and activities of the "public and free" type; health departments; laboratories occupied with research and experimenting in natural sciences and medicine

40 Leptospiral jaundice, brucellosis (Bang's disease), gangrene of the spleen, and other diseases which can be transmitted from animals to men
Keeping of animals, as well as activities which bring workers into closer or closest contact with animals, animal parts, products or secretions and are likely to lead to disease.

APPENDIX II

Ordinances in Which Control Physicians Are to Be Selected by the State Industrial Physician (*Staatl.Gewerbearzt*)

Date of Ordinance	Subject	Interval
June 16, 1905	Lead mills—Reich Code, p. 545	Monthly
May 6, 1908	Production of batteries	Monthly
Jan. 27, 1920	Lead and its compounds—Reich Code 1920, p. 109	Quarterly
March 26, 1930	Employment of workers under 18 years of age and female workers in rolling mills and ironworks—Govt. Bull. I, 1930, p. 104	Half-yearly
May 27, 1930	Protection against lead poisoning at painting	Half-yearly
May 29, 1935	Working in compressed air—Govt. Bull., p. 725	Yearly
Dec. 23, 1938	Employment of minors in the iron-producing industry —Govt. Bull. I, 1932	Half-yearly
Dec. 23, 1938	Glassworks, Govt. Bull. I, p. 1961	Half-yearly
	Chromolithography powder colors—Govt. Bull., 1923, p. 18	Quarterly
Feb. 7, 1941	X-rays	Half-yearly
May 6, 1949	Benzene—GBVL.Hesse, p. 39	Half-yearly

APPENDIX III

Agreement

Between the Association of the Employers, the German Trade-Unions, and the Association of Industrial Physicians on Industrial Medical Services.

1

The services of the industrial physician are recognized as an important means of strengthening and improving the protection of the work and health of the working population.

2

The Association of the Employers pledges itself to recommend to its members the employment of industrial physicians according to size and kind of plant.

3

The medical services in the plants will be carried out by qualified full time or part time physicians. If the volume of work in one or more plants requires a full time industrial physician, such full time industrial physician should be employed.

4

(*a*) It is the function of the industrial physician to regulate and survey continuously the medical and social conditions in the plant according to its special requirements, to advise the management and the industrial council of the plant on all pertinent questions, and to take care of the employees at work and for the work. His functions further include medical services in urgent cases for employees capable of work, if necessary, in the interest of the plant and its members. The use of these medical services is voluntary.

(*b*) The industrial physician should give first aid and treatment for accidents and occupational diseases occurring in the plant.

5

(*a*) The management in agreement with the industrial council employs and dismisses the industrial physician. The *Landesgewerbearzt* should be consulted in advance.

(*b*) The industrial physician is responsible to the manager of the plant or his substitute; in his professional capacity, however, he is responsible only to his own conscience as physician. In plants with several industrial physicians, one chief physician should be selected, the other industrial physicians working under his direction.

(*c*) The rights and functions of the industrial physician will be determined in a written contract between the management and the industrial physician. The contract should contain regulations regarding salary, vacation, insurance, period of notice and the substitute of the industrial physician. It should further secure the independence of the industrial physician concerning his medical activities.

6

The industrial physician is a licensed physician. With the agreement of the plant, he can also carry on a private practice.

7

A physician approved in Germany can become an industrial physician if, after having passed his state medical examination, he has carried on at least three years' activity (of these at least two years clinically) and has proved his qualifications as an industrial physician as well as adequate medical knowledge and education for these services.

8

(*a*) The expenses for the medical services are met by the plant. If the services are extended to several plants, the plants in question will share the expenses.

(*b*) The staff, facilities and equipment required by the industrial physician for carrying out his functions are to be provided by the plant.

9

The Association of Industrial Physicians pledges itself to establish an agency for industrial physicians which will be concerned with the preparatory education and continuous education of such physicians according to the statutes.

10

For the carrying out of this agreement a working committee will be set up consisting of the Association of Employers, the German Trade-Unions and the Association of the Industrial Physicians.

A. M. A.
ARCHIVES OF
Industrial Hygiene
and
Occupational Medicine

VOLUME 3
1951

PUBLISHERS
AMERICAN MEDICAL ASSOCIATION
CHICAGO 10, ILL.