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INDUSTRIAL MEDICINE

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REFERENCES TO RECENT LITERATURE ON INDUSTRIAL DISEASES

(A) News Items

- 620 GENERAL MOTORS CORPORATION MEDICAL CONFERENCE. Ind. Med. 7, 469-70 (August 1938).
The Medical Conference of General Motors' Physicians was held at Flint, Mich., May 19 and 20. Most of the papers presented were published in Industrial Medicine for August. Those dealing with air hygiene and general industrial health are abstracted in this bulletin, with the statement that they were presented at this meeting, and with the authors' addresses, so that reprints may be requested. However, we have as yet had no opportunity of learning whether reprints of any particular paper are available. The same applies to the remaining papers presented at the Midwest Conference on Occupational Diseases.
- 621 EXHIBIT OF LEAD HAZARDS. Safety Eng. 76, 51 (August 1938).
An exhibit showing causes of lead poisoning has recently been released by the U. S. Dept. of Labor. The setting is a dusty and corroded lead pot of actual size. Lead gains entrance into the body by three principal means, namely, breathing, swallowing and through the skin; and each is depicted in a miniature setting, viewed through the charging door of the pot. The settings revolve on a vertical axis and consist of actual scenes in miniature. The exhibit is operated by alternating current and is available for use at safety conferences, state fairs, and large expositions and exhibits, and can be borrowed through the Exhibits Office of the U. S. Department of Labor by groups who are willing to pay freight charges.
- 622 THE W. S. KNUDSEN AWARD. Ind. Med. 7, 517 (August 1938).
It was announced at the meeting of the American Association of Industrial Physicians and Surgeons at Chicago in June that William S. Knudsen, President of the General Motors Corporation, will make an award to the industrial physician who, by the time of the next annual meeting, in 1939, shall have been responsible for the most outstanding contribution to industrial medicine. A committee has been appointed to decide on the award.
- 623 COURSE ON INDUSTRIAL HYGIENE. Ind. Med. 7, 111 (August 1938).
The Committee on Graduate Education of the Allegheny County Medical Society announces an intensive course for physicians on industrial hygiene, given in cooperation with the Department of Industrial Hygiene of the University of Pittsburgh, Oct. 24 to 28, inclusive. It will consist of lectures and conferences on prevention, diagnosis and treatment of occupational health hazards, methods of medical and engineering control of such problems, and present day legal aspect of occupational diseases. By way of actual demonstrations of medical supervision in industry, a tour of representative plants will be made. Registration is limited to 45. Full particulars are obtainable from Department of Industrial Hygiene, University of Pittsburgh, Pittsburgh, Pa.

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624 RAILWAY SURGEONS' CONGRESS. Ind. Med. 7, 532 (August 1938).
The 49th Congress of Railway Surgeons will be held at Chicago, Sept. 19 to 21. The papers on the program seem to be mostly out of our direct field but one on "Pneumonia in Industry" by G. F. O'Brien and possibly others may be of interest, and will be abstracted when published.

625 OCCUPATIONAL DISEASE SYMPOSIUM. Ind. Med. 7, 530-1 (August 1938).
The Second Annual Symposium on Occupational Diseases of the Department of Industrial Medicine of the Northwestern University Medical School will be held September 26 and 27, 1938, at Thorne Hall on the Chicago Campus. The program will include papers on various phases of industrial hygiene.

(B) Papers on Dust, Dust Diseases and General Industrial Hygiene

626 A TECHNIQUE FOR USE OF THE IMPINGER METHOD. C. E. Brown and H. H. Schrenk. Bur. of Mines, Inf. Circ. No. 7026 (June 1938). Obtainable free from Division of Information, U. S. Bureau of Mines, Washington, D. C.
This circular describes the technique used by the Bureau of Mines in taking dust samples by the impinger method. Development of the method since it was devised by Greenburg-Smith in 1922 is traced with descriptions and diagrams. The recently developed "midget impinger", now used extensively by the Bureau is described together with the microprojection method of counting. A complete bibliography and list of necessary equipment make the circular a comprehensive and valuable treatment of the subject.

627 THE LUNGS OF COAL, METALLIFEROUS AND SANDSTONE MINERS AND OTHER WORKERS IN NEW SOUTH WALES. CHEMICAL ANALYSIS AND PATHOLOGY. C. Badham and H. B. Taylor. Annual Report, Dept. Public Health, New South Wales, for 1936, pp. 100-43. A fuller abstract in J. Ind. Hyg. & Toxicol., September, 1938, includes analytical methods, which may be consulted in that periodical or will be furnished by this office on request.
The authors' methods for preparation of lung samples and analysis are presented. The authors deplore the lack of uniformity in analytical procedures and suggest that the method of sampling should be subject to international agreement. The results of the examination of 76 lungs are given with details of each case. Most of the lungs were from pneumoconiotics, a few from individuals who died from tuberculosis, and two from persons unexposed to dust. The results were grouped according to condition and industrial history. Among the conclusions reached, the most interesting is that coal dust, as distinct from a minimal amount of free and combined silica it may contain, is capable of producing the fibrotic change seen in some coal miners' lungs. It is also suggested that contrary to generally accepted opinion, the entry of coal dusts and probably other dusts into a lung already affected by pulmonary fibrosis, is small and may be negligible as a cause of increase of existing fibrosis. Another conclusion is that the chief disabling factor in the pulmonary fibrosis of coal miners in New South Wales is emphysema, and it is considered that this is more often secondary to fibrosis than to bronchitis, which appears to be accepted as the incapacitating factor in European and American coal miners.

628 SILICOSIS AND SILICO-TUBERCULOSIS. H. K. Taylor and H. Alexander. Dept. of Radiology, Sea View Hospital, New York City. J. Am. Med. Assoc. 111, 400-8 (July 30, 1938).
All admissions to Sea View Hospital are potentially tuberculous, and a patient would not be referred for admission on a diagnosis of silicosis. However, in 65 patients under observation, of whom 43 had been previously diagnosed as cases

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of pulmonary tuberculosis, 19 as silico-tuberculosis, 3 with no recorded diagnoses, 26 were found on entrance to have silicosis and 39, silico-tuberculosis. Obviously, previous clinical diagnoses were in error. With the exclusion of clinically diagnosed cases of silicosis, the incidence of silico-tuberculosis was 60.6% in this group of 65. From this the authors assume that in a non-selected group the incidence of tuberculosis and silicosis is below 60%. The authors present their analyses of the cases and include a brief history of silicosis, important factors in its production, review of theories regarding the action of silica in the tissues, symptoms and methods of examination. The best and most reliable method of examination, the roentgenographic, is described in detail.

- 629 PATHOLOGY OF LUNGS AND OTHER ORGANS IN SILICOSIS. P. B. Matz. Am. J. Clin. Path. 8, 345-65 (May 1938).
The pathological changes found in 23 autopsies are described, with particular attention to extrapulmonary findings. The cases are classified as silicosis, silicosis with infection, silicosis with tuberculosis, silico-tuberculosis and asbestosis. Of the 14 cases with associated tuberculosis, 8 gave evidence that the tuberculosis and silicosis were separate and distinct diseases. Tuberculosis complicated the incipient as well as the advanced stages of silicosis. The pleura was involved in all cases, usually in the form of chronic adhesive pleuritis. Emphysema occurred in only 8 cases. Chronic lymphadenitis was found in 11 cases, liver disease in 14, splenic disease in 12, cardiac hypertrophy, dilatation or both in 18, and chronic passive congestion due to cardiac failure in 14.
- 630 SILICOSIS AND THE PNEUMOCONIOSES. P. Nicaud. Bull. et Mem. Soc. Med. Hopit. de Paris, 250-7 (Feb. 21, 1938). (French).
With an illustrated description of fibrotic nodules, the author presents the typical view of a particular French school that all such fibrosis is due to infective organisms, although possibly modified by the presence of dust.
- 631 GRAVIMETRIC, TYNDALLMETRIC AND KONIMETRIC MEASUREMENT OF DUST. O. M. Faber. Staub 7, 372-408 (1937). (German).
The author points out that a universal method of dust measurement is not possible and that any standardization would impose marked restrictions. He carefully describes and discusses the chief methods. He tabulates the results of his survey to contrast the important properties of the three methods. He concludes that the gravimetric method is applicable for technical measurement, that the Tyndall method has not been thoroughly worked out as yet but may give equivocal results and that the konimeter is a useful aid for industrial hygiene purposes. Principles of each type are discussed but not particular instruments themselves.
- 632 EFFECT OF ANGLE OF DRILLING ON DUST DISSEMINATION. C. E. Brown and H.H. Schrenk. U. S. Bur. Mines, Rept. Investigation No. 3381 (February 1938). Obtainable free from Division of Information, U. S. Bureau of Mines, Washington, D. C.
Drilling tests were made with stopper and drifter drills of the wet type into granitic quartz rock in order to determine the relation between angle of drilling and dust concentration. Results of the tests with stoppers indicate that the maximum dust concentration occurs at the vertical position and that it is reduced by an average of 60% at an angle of 35°. Drifter tests show a reduction of 50% at an angle of 45° from the vertical. The authors suggest the following factors in explanation of the increase in dust dissemination as the angle approaches 90°: (1) decrease in contact of water with the face of the drill hole; (2) increase in amount of sludge dropping through the air; (3) increase in amount of sludge running down the drill steel and being thrown in the air; and (4) leakage of air from the front head of the drill.

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- 633 INDUSTRIAL EXHAUST VENTILATION. LOW PRESSURE PNEUMATIC CONVEYING SYSTEMS. John L. Alden. Heat. & Vent. 35, 30-4/(1938). See note on Abstract No. 569, August bulletin.
The earlier papers in this series dealt mainly with dust removal. In the present installment the same principles are applied to conveying material by pneumatic systems. The advantages and disadvantages of this type of conveyance are first outlined, and various methods and principles of air conveyance are discussed.
- 634 BANISHING DUST AND DARKNESS. F. L. Adams. Safety Eng. 76, 25-8 (August 1938). This article tells of the experience of a foundry in Massachusetts in removing accumulated settled dusts from ceilings, rafters, walls, etc. Dust removal was accomplished by the use of a portable electric vacuum cleaning outfit. The area cleaned was about 500,000 square feet of surface and was done at a cost equal to about one-half the labor cost in applying an equal area with one coat of paint. After cleaning, use was made of the scaffolds and rigging to give the surfaces one coat of a light color paint made especially for foundry interiors. Noticeable improvements were: the large increase (125%) in natural reflected light, greater general cleanliness, reduced dust concentrations and a general improvement in morale of the workers. Good housekeeping has a decided effect on lowering insurance rates.
- 635 PREVENTIVE MEASURES IN THE USE OF CRYSTALLINE SILICA. Ind. Med. 7, 472-5 (August 1938). Mack M. Shafer, M. D., Medical Director, Frigidaire Division, Dayton, Ohio. Presented at General Motors Conference.
The control of a silica hazard, once it is established that such a hazard exists, has three aspects, medical, engineering and managerial. These aspects are discussed in turn. The functions of medical control are listed, all depending upon physical examinations, with emphasis on elimination of the physically unfit from hazardous employment. The author feels that the following x-ray findings should be sufficient for rejection for employment in work with a silicosis hazard: (1) large hilus shadows with many calcified glands; (2) primary complex, or "Ghon's" tubercle; (3) marked increase in trunk shadows, extending toward the bases; (4) evidence of active or healed adult tuberculosis; (5) increased trunk markings or fan-shaped structures extending into either upper lobe; (6) many small scattered calcified areas throughout both lungs; (7) emphysema, and (8) x-ray evidence of other pathological condition. In other words, the employee should show an average normal chest x-ray. Periodic examinations of all exposed persons should also be made. Silicosis in the first or second stage has been found in cases showing no outward signs. Under the engineering aspects, the author briefly discusses preventive methods including positive pressure hoods, exhaust systems and respirators. He feels that workmen need not be required to breathe even 5 million particles of silica dust over long periods of time, and control methods will easily reduce dust below that point. Lastly, whole-hearted cooperation on the part of management is necessary in maintaining proper supervision and enforcement of preventive measures.
- 636 EXPERIENCE WITH THE USE OF AMORPHOUS SILICA. John S. Lambie, M.D., Medical Director, Fisher Body Division, Pontiac, Mich. Ind. Med. 7, 470-2 (August 1938). Presented at General Motors Conference, May 19-20, 1938.
Tripoli, used extensively in the final polishing of automobile bodies, consists largely of amorphous silica of diatomaceous origin. In its use in this industry, a paste consisting of a mixture of tripoli with oil and grease is dabbed on the painted surface and then subjected to the action of a wheel covered with sheepskin, rotating at 1800 revolutions per minute. As many as 89 polishers have been employed at one time, and no booths are used. Dust counts averaging 56

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million particles per cubic foot were obtained with a small portable counter, but it is stated in a note that later studies with the impinger showed an average count of two million per cubic foot. All employees in the plant were x-rayed but no silicosis or tuberculosis was found. The periods of dust exposure varied from less than 1 year to 8 years. The author advances several possible reasons for the absence of silicosis under the conditions, including protective action of other dusts, agglomeration, roundness of particles, and electrical charges. Despite the conclusion that tripoli is not harmful, the author recommends careful pre-employment examination of all men engaged in the work.

Note on Abstract No. 573, August Bulletin. (Inhalation of dust and control of dust hazards, by W. C. James). The original paper was published in Concrete (Cement Mill Ed.) 46, 200-1 (July, 1938) and 216-7, 222 (August, 1938). As stated, the paper is a general review from the standpoint of the cement operator. Two points that often cause confusion in the mind of the practical cement man are emphasized: (1) that the most dangerous material is the free silica, not the total silica as reported in an analysis, and (2) that when dust counts have been established with the impinger, short-cut methods may be used for checking up, but that the two methods are not correlated and that much higher results may be expected from the simpler methods.

- 637 PULMONARY SILICOSIS AND SAND DUNES. H. Velu. Comp. rend. Soc. de biol. 128, 13-14 (1938). (French).

The author analyzed the lungs of adult sheep from a sandy region of Morocco where vegetation is abundant in winter, but sparse in summer. Analyses of lungs of five animals (2 lambs and 3 sheep of unknown origin), presumably considered as "controls", showed values ranging from 0.36-0.63% of silica in the ash (insoluble in hydrochloric acid). The lungs of 3 sheep from the sandy region gave figures of 1.30, 1.34 and 1.75, while lungs of 4 others that lived at the edge of the desert yielded 5.83, 1.89, 3.82 and 6.32%.

- 638 SUITABLE APPARATUS FOR X-RAYING PNEUMOCONIOSES. W. Bergerhoff. Staub 5, 163-72 (1937). (German).

The author describes the physical bases of x-raying procedure and the most important factors in taking roentgenograms of pneumoconiotics. The types recommended are the condenser apparatus and the rotary current form with rotary-anode tubes with an amplifier foil and high contrast film. The target-film distance must be at least 120 cm. and the exposure time less than 0.1 second.

Note on Abstract No. 588 (August Bulletin). This note on a portable dark room has been published in Industrial Medicine 7, 531 (August 1938).

- 639 INTRODUCTION TO THE BIOCHEMICAL STUDY OF THE PNEUMOCONIOSES. R. Fabre and E. Kahane. Arch. des maladies professionnelles, 1, No. 1, 21-28 (March and April, 1938). (French).

This paper deals with residues from lungs with particular reference to the amount of silica present. The tissue was broken down with a mixture of nitric and perchloric acids, and total silica was determined chemically. A table is given showing the amount of silica in mg. per 100 g. tissue and the silica percentage in the residue derived from 33 persons who died accidentally at ages ranging from 24 hours to 80 years. Animals injected with feldspar, kaolin, quartz, talc, etc., are reported as showing no morphological or chemical change, but a decrease in the amount of dust became evident in a few weeks. The authors also discuss briefly the carbon content of lungs and magnesia absorption.

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- 640 THE APPLICATION OF DUST-CONTROL PRINCIPLES TO FOUNDRY OPERATIONS. R. R. Meigs. Second N. E. Regional Foundry Conf., Mass. Inst. Tech., April 8, 1938. The paper presents a discussion of the principal sources of dust in each of the several operations of a foundry and outlines practical applications of control in each case. The subject is considered under 5 main headings: (1) molding, (2) coremaking, (3) shake-out, (4) sand conditioning and (5) castings cleaning. Many practical suggestions are made in regard to care, maintenance and methods of operation that will tend to improve existing conditions. The author has avoided consideration of the dust concentrations that may be encountered and the pathological effects of the dusts. A discussion by Manfred Bowditch and an additional paper by W. F. Terry combine to make the study an excellent and comprehensive treatment of the elements of dust control in foundries.
- 641 RECENT DUST EXHAUST APPARATUS. F. Prockat. Staub 6, 249-87 (1937). (German). First is a description, with examples and illustrations of the most important points of exhaust apparatus and the various kinds of dust removal: gravity systems, removal by utilizing the mass inertia, by centrifugal force, by filters, etc. The author then describes exhaust hoods, partly in agreement with those expressed in Drinker and Hatch's book, partly also on the basis of some of his own investigations of piping installations.
- 642 WORK OF THE DUST CONTROL OFFICE IN COOPERATION WITH GERMAN INDUSTRIAL COMPANIES. A. Laemmert. Staub 7, 365-71 (1937). German insurance carriers, because of silicosis compensation have become more interested in dust control. To furnish lacking data and knowledge of the physical and technic of dusts a central office was set up to do what could not be done individually. The central office set up a laboratory, began consulting individual inspectors and industries and investigating all problems bearing on dust control. Most of the interested companies joined.
- 643 ASBESTOS. S. R. Gloyne and E. R. A. Merewether. Occupation and Health, Supplement, 15 pp. International Labor Office, Geneva (1938). Information obtainable from International Labor Office, 734 Jackson Place, Washington, D. C. This is one of several brochures recently issued as a supplement to the 2-volume Encyclopedia on Occupation and Health. It is a treatise on asbestos, including physical properties, chemical composition, uses, extraction, manufacturing process, and especially risks to health. The discussion of asbestosis includes its essential features, diagnosis, pathological features, distinction from tuberculosis, preventive measures and compensation. The references to difficulties in diagnosis and to formation of asbestosis bodies, illustrated by 41 drawings, are of special interest. The most important single clinical sign of asbestosis is that of diffuse bilateral impairment of the percussion note, slight in degree and associated with a slight sense of resistance. The other important feature is the radiographic examination of the chest. The distinguishing features between asbestosis and silicosis in x-ray pictures are listed. It is emphasized that neither method alone is conclusive, but that asbestosis can be diagnosed with certainty with the aid of both, even if symptoms and disablement are absent. In difficult cases where extensive tuberculosis is present, careful investigation of the subjects' exposure to asbestos dust will enable the correct decision to be reached. The preventive measures are based largely on the principles of the British Code of Regulations. The views expressed are authoritative and very instructive.
- 644 PREVENTION OF ASBESTOSIS IN INDUSTRY. F. Prockat. Staub. 5, 133-62 (1937). The paper includes a description of asbestos, and of its various forms, its uses and methods of preparation for industrial purposes. It is shown by many illustrations how dust can be decreased in certain processes by installation of exhaust systems and practical planning.

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- 645 A COOPERATIVE EFFORT IN THE CONTROL OF TUBERCULOSIS. R. D. Mudd, M.D., Medical Director, Chevrolet Gray Iron Foundry, Chevrolet Transmission Plant, Saginaw, Mich. Ind. Med. 7, 475-8 (August 1938).
In addition to accident and occupational disease prevention, the efforts of industrial medicine have drifted into a third phase, that of the study of the general industrial health. It is now necessary to answer the question of the extent of the contribution of industry to the morbidity and mortality of diseases not ordinarily considered occupational. With that question in mind, the author made a tuberculosis survey of the company's plant, employing up to 6000 persons. The tuberculosis death rate in the county was 47.1 per 100,000, as compared with over 90 in 3 mining counties and 16 as the average of 3 non-industrial counties. Out of 4790 employees examined, 550, including all those who lost time on account of pulmonary diseases, were given tuberculin tests, usually including a second test when the first one was negative. The tests were completed on 363 workers, the remainder having been laid off or not appearing for various reasons. Of this number, 326, or 90% gave positive tuberculin tests or positive x-ray indications. Out of 219 who were given further examination, 136 showed a negative chest, 12 had active tuberculosis, 35 had healed tuberculous lesions, silicosis was suspected in 6, and the remainder had other respiratory affections. The occupational distribution of the 35 cases of healed tuberculosis showed no connection with the particular occupation, and the fact that no active tuberculosis or silicosis developed speaks well for the occupation. Some of the 6 suspected silicotic cases had previous occupational histories conducive to silicosis. Both of these classes were transferred to safe environments. The author urges cooperation between employers, private physicians and health departments, which contributed to the results of the present survey. Some plan of protecting the tuberculin negative group should be adopted and repeated tests of this group seem to be indicated. The private physician is probably the most important element in the attack on tuberculosis, and while industrial physicians must protect the workmen by uncovering tuberculosis cases, the families of all positive reactors should be referred to the family physician for further study.
- 646 THE ROENTGENOLOGICAL RECOGNITION OF CERTAIN BRONCHOMYCOSSES INVOLVING OCCUPATIONAL RISKS. R. Fawcitt. Am. J. Roentgenol. 39, 19-31 (1938).
The author has studied the x-ray aspects of various fungous diseases of the lungs, especially that of agricultural workers exposed to mouldy dust of grain or hay. It is seasonal and may appear as an epidemic. Dyspnea is the outstanding symptom and the disease is often mistaken for tuberculosis. It is curable in the early stages, but may progress to dense fibrosis and calcareous nodulation and early diagnosis should be made. Other frequent symptoms are described. The x-ray reveals 4 stages of the disease: (1) lung markings more defined than normal; (2) the acute stage, with snowflake mottling in both lungs, and emphysema is common; (3) more definite markings, sometimes with elongation and narrowing of the heart; and (4) coalescence of fibrotic areas, marked restriction of diaphragm movements and great exaggeration of the linear markings. The heart may widen and fibrous rings appear. Four kinds of agricultural mycosis are described and illustrated. The author was struck by the similarity of the x-ray picture of lungs with these mycoses to that of the lungs of hematite miners. Fungi were present in the sputum, as well as in the air, timbers and iron ore of the mines. One miner whose lungs showed the snowflake mottling, was autopsied after death from another cause. The lungs were normal, with neither silicosis nor hematite deposition. Autopsy of another man who had received compensation for silicosis showed dark blue-gray lungs, edema and congestion, with no resemblance to silicosis, although 2 small silicotic nodules were present. The author believes this case to be one of fungous disease. Six pensioned silicotic miners were given intensive potassium iodide ^{treatment} and all improved markedly.

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- 647 THE PHYSICIAN'S RESPONSIBILITY IN INDUSTRIAL HYGIENE. C. D. Selby, M.D., Medical Consultant, General Motors Corporation, Detroit, Mich. Ind. Med. 7, 519-22 (August 1938). Presented at Midwest Conference on Occupational Diseases. Reprints obtainable from author.

Theoretically the physician should be responsible for the detection and possibly the correction of conditions that impair health, but the author questions whether he can assume that responsibility in industry. The study and correction of such conditions require more of a chemical and engineering knowledge than medicine is able to furnish. Therefore, engineers have taken the opportunity and have won recognition. The important question now is whether the physician has any responsibility toward industrial hygiene, and if he has, to what extent. There are 3 groups of physicians practicing in industry--full-time, part-time, and those on call. The full-time physician should have full supervision over plant hygiene and hazard protection and should be prepared to accept the responsibility. The part-time and occasional industrial physician should frankly admit their dependence upon industrial hygienists, but should be sufficiently informed in the principles of industrial hygiene to interpret and use the information obtained by engineering methods. When a plant is too small to justify the employment of a full-time hygienist, the doctor may arrange for part-time service of someone out of the engineering department or the chemical laboratory, or a consulting hygienist who will come on request or for stated periods. The safety engineer can also be a valuable aid to the doctor in the furtherance of his industrial hygiene program.

By way of illustration of procedure and cooperation in a particular problem Dr. Selby uses the case of exposure to lead dust, as treated in abstract No. 667. The possibilities to be considered are: (1) eliminate lead; (2) prevent formation of dust; (3) remove dust at source; (4) segregate uncontrollable dust; (5) furnish personal protection by respirators; (6) inculcate responsibility in the workman; (7) physical examination of the workers; and (8) transfers. Consideration or trial of the first 5 is the job of the engineer, with direction by the physician, and the doctor should have much of the responsibility for education of the workmen and in making transfers, as well as making the physical examinations.

- 648 MEDICAL SERVICE IN INDUSTRY. M. N. Newquist. Personnel J. 17, 40-5 (June 1938). No information about reprints but the subject is discussed more fully in the next abstract. The scope, organization and functions of industrial medical service are discussed. A survey of 925 companies in 1932 disclosed that only 2% of the small plants (1-249 employees) had full time medical directors, while 36% of those having 1000 employees and over provide that service. The large plant has a great advantage over the small one as far as cost is concerned. Medical and compensation costs for a large plant are given as \$4.93 and \$3.49 respectively, per employee, whereas in the small plant the corresponding costs are \$8.73 and \$4.76. The author attributes the difference in part to the more efficient organization of medical and safety service in the large plants. He recommends group service for small plants that cannot afford individual service. Group insurance, partly paid by the employer, has resulted in a greater interest in medical service and in reduced compensation costs. In one large plant this reduction amounted to 63%. The industrial physician should be given full power to develop and supervise his own department. The role of oculists, dentists, nurses, etc., is discussed, along with the question of the treatment by the plant physician of non-industrial injuries and diseases among the workers.

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- 649 MEDICAL SERVICE IN INDUSTRY AND WORKMEN'S COMPENSATION LAWS. M.N. Newquist. Pamphlet published by American College of Surgeons, 40 East Erie St., Chicago, Ill., and obtainable at that address.
In addition to a thorough treatment of the subjects discussed in the preceding abstract, extensive statistical tables and graphs show the occurrence of injuries and diseases, absenteeism from those causes, and medical and compensation costs. The essential features of workmen's compensation laws and insurance systems are summarized with comments. A system of routine physical examinations with suggested forms is given in an appendix.
- 650 INDUSTRIAL MEDICINE OF TOMORROW. Robert T. Legge, M.D., Univ. of California, Berkeley, Calif. J. Am. Med. Assoc. 111, 291-3 (July 23, 1938); Ind. Med. 7, 534-8 (August 1938). Reprints probably obtainable from author.
In an address before the Section of Preventive and Industrial Medicine and Public Health at the San Francisco Meeting of the American Medical Association, Dr. Legge traced the development of preventive and industrial medicine and its present and future importance. Preventive medicine has been elevated to a pre-eminent position and industrial physicians are highly trained capable specialists in their field. Modern physical and synthetic chemistry has introduced many new substances which not only bring about social and industrial changes but introduce also hygienic industrial and domestic problems. The list of industrial poisons is constantly increasing. Through its new Council on Industrial Health, the American Medical Association can do much to supplement what has already been done in the prevention of industrial disease.
- 651 PRESENT STATUS OF DISEASE IN INDUSTRY. R. R. Sayers, M.D., Senior Surgeon, U. S. Public Health Service, Washington, D. C. Ind. Med. 7, 486-7 (August 1938).
In a brief address, the author calls attention to the magnitude of the problem of lost time from illness, and points out that the problem can be solved only through cooperation of employer, employees and especially physicians, industrial as well as private.
- 652 SICKNESS AND INDUSTRY. R. B. Rbsch, M.D., Medical Director, General Motors of Canada, Ltd., Windsor, Ont. Ind. Med. 7, 483-5 (August 1938). Presented at General Motors Conference.
A tabulation of non-industrial illness among employees of a plant employing 300 to 500 persons, and having no occupational disease hazard, is followed by a discussion of absenteeism due to non-industrial diseases. In addition to pre-employment and periodical physical examinations, the author advocates determining the cause of absence, re-examination on returning to work, determining the frequency of particular disabilities and especially cooperation with the family doctor. In particular, the doctor should be informed of the employee's condition when the employee is advised to visit him, and in general, cordial relations should be established.
- 653 REPORT OF THE DIRECTOR OF THE SARANAC LABORATORY, FOR YEAR ENDING SEPTEMBER 30, 1937. L. U. Gardner, MD., Director, Saranac Lake, N. Y., 1938. Obtainable from Saranac Laboratory.
This report is a review of the studies now in progress at Saranac Lake. One important study deals with the effects upon animals of various dust mixtures, as encountered in practical work. Various silicates, including asbestos, are among the dusts under investigation. Field studies of iron miners, of 7,000 steel workers, and extensive work in cement plants are reviewed briefly.

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- 654 NATIONAL HEALTH SURVEY, 1935-1936. U. S. Monthly Labor Review 46, 664-74 (March 1938). Mimeographed copies of the original report or information concerning it may be obtained from U. S. Public Health Service, Washington, D. C. Based on a national health survey covering 740,000 urban and 36,000 rural families, the U. S. Public Health Service estimates that 6 million persons are ill or unable to work, attend school or pursue other usual activities each day during winter months. The study shows the varying frequency and severity of various illnesses in different age groups and according to economic status. Disabling sickness lasting one week or longer was 57% higher among families on relief than among families with incomes of \$3000 or over. Both frequency and duration of illness are higher in relief and low income families than in families in the higher income groups.
- 655 REPORT OF THE DIRECTOR-GENERAL OF PUBLIC HEALTH, NEW SOUTH WALES, FOR THE YEAR 1936. Division of Industrial Hygiene, Section I. E., Sydney, 1938. The industrial hygiene section of the report includes studies of lead poisoning, arsenic poisoning, ventilation of motion-picture projection booths, candy manufacture, galvanizing works, and cases of dermatitis. The sources of 54 proved cases of lead poisoning include manufacture of storage batteries, painting, vitreous enameling and lead smelting. In galvanizing works, ammonium chloride was found in considerable amounts, with traces of lead and arsenic, and sulfur trioxide in one instance. Cases of dermatitis were apparently caused by oils, alkalis, debairing materials in a tannery, ammonium sulfide in a hair dressing establishment, trichlorethylene, linseed oil, tobacco leaf and manure. A report on lungs of pneumoconiotics is given in another abstract.
- 656 AVOIDABLE AND UNAVOIDABLE INDUSTRIAL DISEASES. R. Barthe. Presse med. 539-40 (1938). (French). The author states that from the viewpoint of technical individuals all industrial diseases are avoidable but he thinks that because of variable sensitivity in man that many are unavoidable. Acute diseases from the use of unknown materials and from injuries by machinery are always possible. Chronic diseases are always possible also, largely due to varying susceptibilities. Technical protective measures and early medical diagnosis are necessary, and close collaboration of technician, doctor, workers and industry is essential.
- 657 A PLAN FOR HEALTH MAINTENANCE. Henry Snow, M. D., Medical Director, Delco Products Division, Dayton, Ohio. Ind. Med. 7, 478-83 (August 1938). Presented at General Motors Conference. The paper describes a survey undertaken to determine what could be done to lower the number of days lost on account of sickness. First the insurance and compensation cases were thoroughly analyzed, and finally all employees (over 5000) were re-examined. Although the greater number of cases of absence from sickness are unrecorded in the insurance data, because the period of absence was less than a week, many cases of preventable illness were disclosed. When a risk was apparent, the card was marked for special care. Cooperation with the family physician, winning the trust of the employee, proper placing of handicapped workmen, more active inquiry into syphilis and tuberculosis, careful original selection of employees, and a confidential record system with visible reminders are advocated, and have been carried out as far as possible in the survey reported. Sample forms are illustrated and the results are tabulated.

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- 658 **MEDICINE--THE GUIDE AND MEASURE OF SAFETY.** William J. Fulton, M.D., Medical Director, Fisher Body Division, Chevrolet Motor Division, Baltimore Md. Ind. Med. 7, 500-10 (August 1938). Presented at General Motors Conference.

First is a general discussion, of which one noteworthy feature is the author's conviction that 85% of industrial medical service and cost is bestowed upon 30% of the workers, and that 60% of our industrial family is composed of good, average American citizens requiring the remaining 15% of the cost and service, with another 10% who require no service at all. Within the 30% are the majority of radicals, indigents, neurotics and otherwise below-par brothers. In the consideration of industrial ills, the stability of the 70% is often overlooked. The general discussion is followed by a description of the methods of recording details of accidents, with sample charts and maps, and methods taken to avoid repetition of the accidents. Attention of employers and industrial physicians must also be given to non-industrial illness; otherwise, ill-considered legislation will impose upon industry the unfair burden of responsibility for such illness.

- 659 **FACTORS DETERMINING REASONABLE AND EQUITABLE TEMPORARY TOTAL DISABILITY PERIODS.** Philip H. Kreuscher, M.D., Chief Surgeon, Chicago Area, Illinois Steel Corp., Chicago, Ill. Ind. Med. 7, 525-8 (August 1938). Presented at Midwest Conference on Occupational Diseases.

The author discusses a number of factors that must be taken into account in estimating periods of total disability, especially those following accidents. There is no standard method nor yardstick by which temporary total disability can be prognosticated or estimated. The personal equation, as well as the various factors enumerated, must be taken into consideration at all times. The author pleads for more competent and honest doctors in industry, with the courage of their convictions and the backbone to be honest.

- 660 **MEETING ON THE PATHOLOGY AND ORGANIZATION OF WORK, PARIS, JUNE, 1937.** V. Dhers. Med. du trav. 9, 225-50, 276-86 (1937); 10, 33-40, 66-84 (1938). (French). Various phases of industrial hygiene and toxicology were discussed at this meeting, and several sessions were devoted to particular subjects. The information at hand only summarizes the topics discussed, and fuller accounts of the individual papers are expected later.

- 661 **THE INVESTIGATION OF ATMOSPHERIC POLLUTION. REPORT ON OBSERVATIONS IN THE YEAR ENDED MARCH 31, 1937.** Great Britain, Dept. of Scientific and Industrial Research H. M. Stationery Office, London, 1938.

This is a complete report of the year's progress in the atmospheric pollution studies which are being made in England. The work was carried on in about the same manner as previously, the main innovation being the beginning of a complete and comprehensive survey in the city of Leicester, a large industrial and residential center. The results are expected to be of great value. Measurements and data include deposit gauge readings, suspended solid impurity readings, sulfur determinations, daylight measurements and ultraviolet radiation data. "Directional" and "fully exposed" gauges are used in the sulfur determinations and give an indication of direction of the source of pollution. All results are tabulated and explained fully in the report.

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ADDITIONAL STATE BULLETINS. The following reports have been received from the Michigan State Health Department, Bureau of Industrial Hygiene, Lansing, Mich., and are obtainable on application to that Bureau.

- 662 THE FOUNDRY INDUSTRY IN MICHIGAN. Michigan Dept. of Health, Bur. of Ind. Hyg., Lansing, Mich. Preliminary Report (June 1937).
This report is the result of a preliminary survey of 119 ferrous and 46 non-ferrous foundries in Michigan. The object of the survey was to gather information on general conditions of the industry in the state and to collect data regarding numbers employed, preventive measures in use and for general information on which to base later, more specific surveys. The hazards predominating, in addition to dust, are sudden temperature changes and excessive heat, occasional high carbon monoxide, oxides of metals causing metal fume fever, and various irritating gases and fumes. Control measures of a general nature are discussed and it is expected that the report will assist in emphasizing the existing hazards to management.
- 663 THE FURNITURE INDUSTRY IN MICHIGAN. Michigan Dept. of Health, Bur. of Ind. Hyg., Lansing, Mich. Preliminary Report (June 1937).
This report, similar to the above report on foundries, is the result of a survey of 89 furniture factories and 30 woodworking plants. Apart from accidents, the chief hazards found were: (1) exposure to non-metallic wood and vegetable dusts, which sometimes cause inflammation of skin and eyes, and may be partly responsible for pulmonary tuberculosis, and (2) exposure to various chemical solvents and stains in the finishing rooms. The lack of adequate safety programs was noticeable. In many cases ventilating systems were adequate but lack of maintenance, carelessness and improper application were responsible for inadequate operation. Safety directors, either part-time or full-time, were suggested by the Bureau.
- 664 THE PRINTING INDUSTRY IN MICHIGAN. Michigan Dept. of Health, Bur. of Ind. Hyg., Lansing, Mich. Preliminary Report (March 1938).
From a survey of 116 printing, engraving and electroplating plants it was found that 30% of the employees were exposed to possible lead poisoning and that there was evidence that certain cases of lead poisoning had occurred. A supplementary survey of 14 newspaper plants to determine lead concentrations yielded results surprisingly high, and in some cases sufficiently high to be classed as potential hazards. Other possible hazards are listed for each type of plant. Recommendations include: check up of ventilation system, installation of forced draft system where necessary, better housekeeping, separate lunchroom, and keeping of sickness records.
- 665 THE DRY CLEANING INDUSTRY IN MICHIGAN. Michigan Dept. of Health, Bur. of Ind. Hyg., Lansing, Mich. Preliminary Report (Nov. 1937).
The main hazards found were in the use of the solvents which can be divided into 2 groups: petroleum solvents and chlorinated hydrocarbons. According to law, the cleaning with petroleum solvents has been carried on in separate buildings and the health hazards from that method have not been extensive. Until recently, however, no such law applied to the chlorinated hydrocarbons and the cleaning was largely done in one building or room. While not hazardous from a fire risk standpoint, high concentrations of these solvents and products of their decomposition (phosgene and hydrogen chloride) were sometimes found. Ventilation systems in use were found inadequate in many cases largely because the gases, being heavier than air, could not be exhausted near the ceilings. A new law (1937) requires change of air every 5 minutes. A list of the solvents used in spotting and in moth proofing (a comparatively new feature in dry cleaning establishments) is included.

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- 666 THE PAPER INDUSTRY IN MICHIGAN. Michigan Dept. of Health, Bur. of Ind. Hyg., Lansing, Mich. Preliminary Report (June 1937).
The paper industry in the general preliminary survey was found to be comparatively free from occupational disease, although in all mills some details require attention. The major hazards found were chlorine gases, dermatitis, heat prostration and dust. Other gases encountered are ammonia, denatured and methyl alcohol fumes, sulfur dioxide and sometimes benzol. In Michigan the paper industry consists mainly of large plants, a condition which tends to produce better than average safety and health provisions.
- (C) Papers on Industrial Poisons, Cancer, Dermatitis, etc.
- 667 THE CONTROL OF LEAD IN DULUXING AND METAL FINISHING OPERATIONS. Grant L. Bird. M.D., Medical Director, General Motors of Canada, Ltd., Oshawa, Ont., Canada. Ind. Med. 7, 510-5 (August 1938). Presented at General Motors Conference.
Exposure to lead in metal finishing operations in the building of automobiles occurs in the application of solder to body joints in body building, and in the removal of the excess of this solder from these joints. The solder consists of approximately 75% lead, 24% tin and 0.2 to 1% antimony. There is little hazard in practice in the melting and application of the solder because the metal is not heated to the point of giving off fumes, and effective ventilation is easily provided. No lead poisoning has developed in men engaged for long periods at this work. The removal of cold solder by hand tool is also non-hazardous, as the particles are fairly large. However, mechanical removal by belts or disks causes discharge of fine dust consisting largely of metallic lead. Exposure to this dust has been responsible for a large amount of lead absorption and a definite number of lead poisoning cases. The preventive measures for the control of lead may be summarized as follows: (1) elimination of the use of lead by perfecting a hard metal joint or substitution of a non-toxic malleable metal; (2) care of solder pots by ventilation and temperature control; (3) use of manual tools alone for removal of solder, and (4) protection of the workmen mechanically removing solder by segregation in an air conditioned chamber, use of air helmets, routine precautions against lead, and periodical clinical and blood examination of workmen. Filterrespirators, forced exhaust ventilation and wet disk processes have not been found to give sufficient protection.
In the painting or duluxing process, exposure to lead occurs from the application by spray of paint containing lead pigments. Fortunately the lead content of the pigments is low, and the lead compounds are mostly sulfate and chromate, which have a low toxicity. However, lead absorption is sometimes found when respirator are not worn, and examination of the content of respirator filters also shows that lead compounds in possibly injurious quantities are present. Filter respirators are more or less objectionable, and an air helmet has been devised for the purpose. It is hoped that substitutes for lead will be found for the dulux paints. "Putty glazing" consists of the application of a putty to metal surfaces both before and after the application of primer and surfacer coats. Some kinds of putty contain injurious quantities of lead carbonate, but lead-free putty is equally satisfactory and should supplant the lead-containing type. Periodic examinations are recommended for all exposed workmen.
- 668 LEAD ENCEPHALOPATHY WITH POST MORTEM TEMPERATURE RISE. H. Taeger. Samml. v. Vergift. 9, 23-30 (1938). (German).
A case is described in which a third attack of lead colic, with symptoms of lead encephalopathy, was fatal. It is noteworthy that at death the temperature was 40.8° C, but that it rose 4 hours later to 41.6° C (106.4° to 106.9° F.) Careful

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clinical and chemical findings during the course of the illness and determinations of the lead content of the brain and many organs after death are included. Of special interest are the increase in spinal fluid pressure and low lead content of the brain.

- 669 RECOGNITION AND PREVENTION OF LEAD POISONING. R. A. Kehoe. Surg. Gynec. Obstet. 66, 444-7 (1938).

This is a general paper with emphasis on application of present knowledge of lead poisoning to minimizing of new cases. When the physician has established the presence of lead poisoning it is the responsibility of the engineer to remove the cause. The physician, however, must keep close check on the physical condition of the workers. Exposure of 1.5 to 2 mg. of lead per day are said to be dangerous to most workers and the atmospheric content must be kept below those figures. Lead excretion is a reliable indication of the presence of lead in the system and must not be disregarded even if atmospheric conditions appear satisfactory. Cooperation between clinicians, toxicologists and engineers is essential.

- 670 PREVENTION OF LEAD POISONING. F. V. Gonzalez. Revista del Trabajo. 2, 127 (March 1938) (Mexico) (Spanish).

The author has reviewed some of the basic considerations in the diagnosis of plumbism. Among these considerations he has laid emphasis on the laboratory determination of the basophiles by McCord's method. Because of some difficulty with the particular dye preparation suggested by McCord, the author has experimented with others, and has found the following to be efficacious: borax (C.P.), 2 gm; toluylene blue, 2 gm; distilled water, 100 cc. In the city of Monterrey, workers exposed to lead dust are permitted to work only for short periods, and their place of employment is changed every two weeks.

- 671 LEAD INJURY TO PAINTERS. H. Rennert. Med. Klin. 34, 508-11 (1938). (German).

The author examined 145 members of the Jena painters guild, including masters, helpers and apprentices, many of long experience. Anamnestic lead poisoning was found in 6, and in only one was seen the lead line, lead coloring and punctate erythrocytes. In the urine examination, porphyrine was seen in slightly increased amounts in 9 cases. Blood pressure was high in nearly all those examined, but was not attributed to lead. The author concludes that a real hazard no longer exists among painters.

- 672 THE ABSORPTION AND EXCRETION OF LEAD ARSENATE IN MAN. L. T. Fairhall and P. A. Neal. U. S. Publ Health Reports 53, 1231-45 (July 22, 1938). Obtainable from Supt. of Documents, Washington, D. C. for 5 cents cash.

Lead arsenate is used extensively as an insecticide spray material. To determine its effect and behavior in man, careful experimental control was necessary, so two men were selected for the experiments. One hundred mg. of lead arsenate were ingested by each of the individuals over a period of 10 days while on a controlled diet. The lead arsenate was found to be completely broken down within the body. Lead was excreted in the feces and the arsenic through the urine, and the greater part of each was directly recovered. No ill effects on the men were noted for this dosage but no conclusions are reached as to toxicity of larger doses or continued ingestion of smaller doses over a long period of time.

- 673 THE SPECTROGRAPHIC DETERMINATION OF LEAD IN BLOOD FROM NORMAL HUMAN SUBJECTS.

G. H. Scott and J. H. McMillen. Am. J. Med. Sci. 195, 622-7 (May 1938). The blood of 89 medical students with no history of industrial lead exposure was examined spectrographically, using the interrupted arc. The iron in the blood was used as the internal standard. In one-half of the individuals no lead was detected. The remainder showed between 0.001 and 0.06 mg. % of lead in the whole

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blood. None of the individuals presented any symptoms of lead poisoning. The limit of sensitivity is claimed to be 0.001 mg. %.

- 674 **MERCURY POISONING FROM THE PUBLIC HEALTH VIEWPOINT.** Paul A. Neal, M.D., Passed Ass't. Surgeon, U. S. Public Health Service, Washington, D. C. Am. J. Public Health 28, 907-15 (August, 1938).

Mercury and its toxic effects have been known for centuries and it is one of the oldest causes of industrial diseases. Its uses today number about 80, which are tabulated. The most important are in the manufacture of felt hats, chemicals, explosives and alloys. Introduction to the body is by four methods: inhalation of vapor, ingestion and absorption, through the skin and through subcutaneous tissue; the first is the most important. The toxicity of mercury and its compounds depends upon their solubility, dissociation, and volatility as well as dosage, length of exposure, route of introduction and susceptibility. Symptoms are roughly two types, one with stomatitis, colitis and nephritis predominating, the other with tremor and neurological symptoms more prominent. The latter is probably the more common especially when introduction to body is by inhalation. Threshold dosage cannot be stated definitely, although from U. S. Public Health Service studies, the incidence of poisoning increased rapidly in concentrations above 2.0 mg. per 10 cu. m. Mild cases may recover in a short time, severe chronic cases require months of careful medical care. Prevention, both an engineering and medical problem, requires healthful environment and early diagnosis.

- 675 **SKIN CANCER FROM ARSENIC POISONING IN INSECT CONTROL.** H. Von Pein. Deutsch med. Wchnschr. 64, 565-6 (1938). (German).

Chronic arsenic poisoning is frequently found among vineyard workers at the Freiburg Clinic where the author practices. His report is on a worker who used an arsenious compound (about 4% arsenic) from 1927-1931. Small warts first appeared on the dorsal surface of the hands, later on palms and lower arms. In 1934 a wart on lower arm began to grow and in 1936 it ulcerated. Examination (date not given) showed a general arsenic melanosis, an ulcerating cancer the width of the hand like a cauliflower on the left arm and an ulcer on the 5th finger. Histological examination proved it to be a squamous cell epithelioma. It was necessary to amputate the arm above the elbow. The axillary glands were removed.

- 676 **CHRONIC ARSINE POISONING.** L. Schwarz. Samm. v. Vergift. 9, 1-8 (1938). (German).

A man employed in vat welding and galvanizing fell ill with symptoms that increased gradually over a year's time. The examination showed paleness, slight yellowing of the sclera, cyanosis, red blood count 2.1 million, blood pigment 44%, and tachycardia. The material used in the welding and galvanizing was shown to contain arsenic, and in some of the work processes, arsine was found. The acetylene used contained arsine and phosphine. The author therefore concluded that a chronic arsine poisoning was indicated.

- 677 **INDUSTRIAL POISONING FROM VAPORS OF BENZENE, COLLOPHANE AND LINSEED OIL.** F. Undritz. Progres med. 66, 569-70 (1938). (French).

A factory owner invented an impregnating substance for his product (paper spindles for textiles), made by mixing benzene, collophane and linseed oil and heating to 150°. After producing and using this substance for several months he developed a swelling of the lower arms and in about a year had hemorrhages of the nose and gums. Three years later he was in an auto accident and suffered severe hemorrhages, feverish grippe, later bleeding in the knee joint. His doctor then found severe heart symptoms: dilatation of the right heart, murmurs and insufficiency in all ostias. Hemoglobin sank to 52%, red blood corpuscles to 1.54

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million and white blood corpuscles was 32,250. Anisocytosis and polychromatophilia were present. Severe diarrhea and intestinal hemorrhages set in. The patient died of a weak heart and the author considers the disease a combined poisoning from the materials named.

- 678 VITAMIN C METABOLISM AND CHRONIC BENZENE POISONING. J. Hagen. Arch. f. Gewerbepath. u. Gewerbehyg. 8, 541-69 (1938). (German).
The author induced a chronic poisoning in 2 rabbits by having them inhale benzene for 5 and 3-1/2 months respectively. Leucocyte and differential counts were made every 3 days, red blood counts every 4-6 days and ascorbic acid excretion determinations (Tillman's method) daily. A drop in ascorbic acid secretion was noted even before the appearance of the marked leucocyte fall, but with more rapidly falling leucocyte count a rise in excretion was noted. This the author believed to be a flushing out of the vitamin C store. Upon giving large quantities of vitamin C intramuscularly to one of the animals which was in a very bad condition it improved remarkably in spite of continued exposure, as was also shown on autopsy. The author concludes that the examination of random samples of urine and ascorbic acid excreted is not useful for early diagnosis of a beginning benzene injury and that vitamin C offers a valuable means of therapy and prophylaxis. He suggests therapeutic tests of vitamin C on workers with careful clinical observations and blood tests.
- 679 EFFECT OF SPLENECTOMY IN TWO CASES OF FATAL BENZENE POISONING. A. Cain, R. Cattein, and S. Hertz. Bull. et mem. de la Soc. med. des Hop. de Paris 54, 530-7 (1938). (French).
The authors report on two cases of industrial benzene poisoning; one a typical case while the other, which lasted for several months, was somewhat atypical. The blood picture in the latter is as follows: 1.02 million red blood corpuscles, 3400 white blood corpuscles, 43% neutrophils, 35% monocytes, 19% mononuclears, and 2% lymphocytes. Splenectomy was carried out in both cases since the prognosis was very poor. In the first case, although it immediately stopped the uterine bleeding, it could not prevent a fatal outcome. The second case was also fatal.
- 680 THREE NON-FATAL CASES OF POISONING FROM THE MOTH DESTROYER "MELAN" (P-DICHLOR-BENZENE AND CARBON TETRACHLORIDE). H. Robbers. Samml. u. Vergift. 9, 37-40 (1938). (German).
Two soldiers and a worker employed in de-mothening clothes became sick and unconscious after spraying the substance for five minutes in a chamber. They remained in the room 40 minutes until discovered. One of the men complained only of headache, the second showed marked excitation and weak pulse. The third complained of headache, nausea, dizziness and bad skin injuries because he had fallen into the liquid. Later, after a day, he developed renewed vomiting. The substance was chiefly carbon tetrachloride but contained a small amount of paradichlorbenzene.
- 681 INDUSTRIAL POISONS, WAR GAS AND LEUCEMIA. J. Am. Med. Assoc. 110, 1508 (1938).
The question is asked whether industrial poisons cause leucemia and whether war gas poisoning may also be a cause. The reply states that many sources^{87c} cited which tend to incriminate benzene as a cause of leucemia; ethylene glycol monomethyl ether and radioactive substances are also mentioned. War gases evidently do not produce this condition.
- 682 VAPOR PRESSURES OF SOLVENTS. D. S. Davis. Ind. Eng. Chem. 30, 320-1 (1938) and D. H. Killeffer, Ind. Eng. Chem. 30, 477-9, 565-7 (1938).
Monographic charts are given in which the logarithm of vapor pressure is plotted against inverse temperatures for a group of solvents boiling below 90° C, between

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90-150°, 150-200° and above 200°. The charts are especially convenient for anyone working in industrial hygiene. A set can be obtained for 25 cents from Industrial and Engineering Chemistry, 706 Mills Bldg., Washington, D. C.

- 683 SAFE USE OF TRICHLORETHYLENE AND OTHER DEGREASERS. A. L. Brooks, M.D., Medical Director, Fisher Body Division, Detroit, Mich. Ind. Med. 7, 492-3 (August 1938). Presented at General Motors Conference.

The author briefly describes the properties of trichlorethylene, the most generally used degreaser, and the hazards involved in its use. Stabilizers are generally added to prevent decomposition with formation of hydrochloric acid. Contact with flames must be avoided, otherwise phosgene is formed. The degreasing process, including self distillation, is described. Among other compounds, tetrachlorethane is more toxic, while tetrachlorethylene is less so. Dichloromethane/dichlorethylene are similar and less toxic than carbon tetrachloride or trichlorethylene. Ethylene dichloride has a peculiar tendency to cause corneal opacity. Among the safety rules are selection of healthy, non-alcoholic employees, provision for a safe place to work, personal protection, frequent examination, and adequate instruction.

- 684 INDUSTRIAL POISONING FROM DIPHENYLAMINE IN THE PRODUCTION OF POWDERS. Robert, Derville and Collet. Med. du travail 10, 49-65 (1938). (French). Diphenylamine is a white, fine, crystalline powder that dissolves in water, alcohol, ether, petroleum and benzene. It is used in making dyes, but more often in making scouring powders, usually in alcohol solutions. Poisoning arises partly from inhaling vapors of this solution, partly from the dust, but also as a result of skin absorption. The clinical symptoms are exhaustion, headache, loss of weight, cyanosis, loss of appetite, vomiting, bladder troubles, tachycardia, hypertension (in poisoning from the alcoholic solution), and eczema. Poisonings are always slight and infrequent when hygienic measures are improved. In dust inhalation experiments of 2-4 months duration, animals showed digestive disturbances and cyanosis, also slight liver enlargement, marked enlargement of the spleen and chronic kidney inflammation. These are apparently the first cases of diphenylamine poisoning to be reported.

- 685 CARBON MONOXIDE POISONING IN INDUSTRY AND ITS PREVENTION. M. R. Mayers, N. Y. State Dept. of Labor, Div. Ind. Hyg. Spec. Bull. No. 194 (1938). Obtainable from N. Y. State Dept. of Labor, 80 Centre St., New York, N. Y. Price not given. This bulletin presents briefly the general principles underlying the prevention of carbon monoxide poisoning in industry. A resume of the physiological effects is given as a background for the understanding and application of the rules set forth. More detailed consideration is then given to certain of the more important problems of prevention, such as are found (1) where workers are exposed to carbon monoxide in the use of industrial appliances where gas, oil, coal, wood or other fuels are burned and (2) where workers are exposed to carbon monoxide as one of constituents in exhaust gas from autos in garages and service stations. Maximum permissible concentration for continued exposure is given as 1 part in 10,000, and included is a general outline for medical supervision of workers in places where, for special reasons, exposure cannot be kept within safe limits.

- 686 THE DETERMINATION OF LOW CONCENTRATION OF CARBON MONOXIDE. J. Soc. Chem. Ind. 57, 79 (March 1938). Two methods of analyzing grab samples of air containing low concentrations of carbon monoxide are presented. The reaction with palladium chloride is utilized in both, with use of a solution in one and a test paper in the other. The color in either case is measured photoelectrically. The method is in good agreement with the iodine pentoxide method and is more convenient. Concentrations as low as 25 p.p.m. are measured accurately. Precautions in preparing reagents, etc., are described, but details of the analytical procedure are not given. An appar-

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atus for preparing a known mixture of carbon monoxide and air is also described.

- 687 PROLONGED CEREBELLAR-SPASMODIC SYMPTOMS AFTER A COMA CAUSED BY HYDROCYANIC ACID. N. Flessinger, M. Duvoir and G. Bondin. *Med. du travail*. 10, 23-32 (1938). (French).

A man who poured sodium cyanide into an acid vat was ill for a few days afterward and then during work suffered nausea, dizziness and unconsciousness. In 3 days the coma improved so that he could answer questions. Blood showed 3.5 million erythrocytes, 37% hemoglobin, and 17% eosinophilia which fell to normal after two weeks. Immediately after return to consciousness, however, he showed a cerebellar-spasmodic symptom complex; adiadokocinesis, fine finger tremors, especially on the left, unsteady gait with a tendency to fall to the left, reflex increase in all extremities, left Babinski, slight facial paresis on the right, and horizontal nystagmus. These symptoms improved in course of a year, and the disease was apparently not fatal. The authors note in animal experiments a serous transudation in the brain and diffuse hemorrhages in the gray nuclei, and refer to autopsies on a man with similar findings. They note the analogy to carbon monoxide poisoning, the rarity of observations of severe but non-fatal hydrocyanic acid poisoning, and point out the causal relations between hydrocyanic acid poisoning and diseases of the nervous system.

- 688 AN INSTRUMENT FOR INDICATING AND RECORDING TRACES OF HYDROGEN SULFIDE IN COAL GAS. J. B. Reed. *J. Soc. Chem. Ind.* 57, 43-44 (Feb. 1938).

A description of a method used in determining continuously the hydrogen sulfide content of manufactured coal gas. The hydrogen sulfide content is established by law and although the maximum amounts are not specifically defined in the codes, it is considered that requirements are met when the concentration is below 1.0 p.p.m. The method consists in passing the gas through an inch square opening in a spherical surface across which is slowly drawn a strip of absorbent paper, impregnated presumably with lead acetate. Hydrogen sulfide gas causes a dark stain on the paper. The intensity of the stain is measured by the intensity of a light beam of known strength that is passed continuously through the opening and which has previously been calibrated against known concentrations of hydrogen sulfide. The paper is drawn across the opening at the rate of 12 inches per day at a tension sufficient to maintain a gas-tight joint against an air pressure of about 0.5 inch water gauge. No further description of the absorbent paper is given. The method, while not precisely accurate, is sufficiently approximate for concentrations below 1.0 p.p.m.

- 689 THE UTILIZATION OF LETHAL GASES IN HYGIENE. P. G. Stock. *Proc. Roy. Soc. Med. (Epidem. and State Med.)* 31, 427-42 (March 1938).

Lethal gases have many uses in hygiene, among which are destruction of pathogenic organisms, disinfection of water and sewage, destruction of rodents and insects, and destruction of agricultural pests. The author discusses the different gases used, which include oxides of sulfur, carbon monoxide and dioxide, calfores (a mixture of carbon bisulfide and alcohol), hydrogen cyanide, orthodichlorbenzen trichloronitro-methane, tetrachlorethane, ethylene oxide and chlorine. He also includes a clear, concise and instructive discussion of uses, methods of application and danger encountered in each case.

- 690 REPORT ON EXAMINATIONS CARRIED OUT IN THE SCHNEEBURG DISTRICT AT THE INSTIGATION OF THE REICH COMMITTEE FOR CANCER RESEARCH. A. Brandt. *Ztschr. f. Krebsforsch.* 47, 108-111 (1938). (German).

The examinations, as yet incomplete, cover the following points: (1) measurement of radiations of mine air, rock dust, and inhaled and exhaled air of the workers,

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also examinations of the air of homes of those dying of cancer; (2) clinical examinations of miners, including x-rays and autopsy of miners dying; (3) statistical increases in the population; and (4) animal experiments on mice and rats from the mines. In the 28 animals that have died up to the present, a macroscopically visible tumor could be seen in 7 animals. In all there were thyroid changes.

- 691 PROTECTION OF X-RAY AND RADIUM WORKERS. J. Am. Med. Assoc. (London letter), 110, 1500 (1938).

The British X-ray and Radium Protection Committee has issued another list of recommended practices. A normal person can probably tolerate exposure to about 1 roentgen a week and the exposure should be checked regularly. Employees should not work more than 7 hours a day, 5 days a week, and should have a 4 week vacation. As much time as possible should be spent out of doors. Blood counts of applicants must be satisfactory; that is, leucocyte count must exceed 6,000 and the lymphocyte count must be 1200. Periodical examinations every 6 months for x-ray workers, 3 months for radium workers, are suggested. A sustained fall in leucocyte or lymphocyte count indicates that the work must be abandoned. General recommendations for x-ray departments are given.

- 692 REPORTS OF THE COMMITTEE ON INDUSTRIAL SKIN IRRITANTS TO THE INDUSTRIAL HYGIENE SECTION, AMERICAN PUBLIC HEALTH ASSOCIATION. H. F. Smyth, Chairman. Mimeographed 211 pp. Obtainable from Division of Industrial Hygiene, U.S. Public Health Service, Washington, D. C.

This publication comprises the first three reports of the above committee, made in 1928, 1929 and 1935, respectively. The first two contain a complete bibliography for the years 1926 to 1928 and a part of 1929, with discussion, and include 173 titles. The increase in interest in the subject is shown by the increase to 784 titles in the third report, a proportion of more than twice as many articles per year. A few non-industrial skin irritants are included, because they may be confused with industrial irritants in diagnosis. Many papers on experimental cancer are included, as they have a very definite bearing on the subject of industrial skin cancer. The third report, especially, is thoroughly indexed, with complete cross-references for trades and irritants.

- 693 DERMATITIC PROPERTIES OF TUNG OIL. M. W. Swaney. Ind. & Eng. Chem. 30, 514-5 (May 1938).

Allergy to tung oil is rare, but a case is described in which the affected person was present in a laboratory in which tung oil, probably of Chinese origin, was used in varnish making. A severe irritation was produced, sometimes affecting the entire body. Injections of tung oil dissolved in olive oil gave immunity which apparently wore off after about a year. The reaction to the injections was very severe and the method is not recommended for general use. The literature on tung oil allergy is reviewed briefly. The identity of the substance in the tung oil responsible for the dermatitis has apparently not been established.

- 694 DERMATITIS FROM CUTTING OILS AND COMPOUNDS. A. A. Tower, M.D., Medical Director, New Departure Division, Meriden, Conn. Ind. Med. 7, 515-6 (August, 1938). Presented at General Motors Conference.

Cutting oils and compounds are among the most frequent causes of dermatitis. The oils consist of mineral oil, saponifiable oil, sulfur and paraffin. The compounds are made up of mineral oil with emulsifiers which make them water-soluble. Their chief function is to cool the metal without causing rust and without fouling the machines. They are usually reclaimed, clarified, sterilized and used over and over again. The oils are satisfactorily sterilized by heat, but the compounds cannot be thus treated. The fluids are not good culture media, but

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various bacteria are occasionally found in the oil. A ten years' survey of a large industrial plant has shown an incidence of from 0.1% to 1.7%. The form and development of the disease are described and its cause is discussed. The author accepts the view that it is neither bacterial nor allergic, but that it is due rather to plugging of the pilosebaceous apparatus by the oil or some of its constituents. Prevention consists in cleanliness, removal from contact with the oil in cases of secondary infection, and the use of protective substances, although there is doubt as to the advantages of their use.

- 695 OCCUPATIONAL CANCER. G. T. Pack. Bull. Am. Soc. Control of Cancer 20, 1-3 (March 1938).
In this short article the author describes the various industries in which cancer may occur as an occupational disease. These include the Schneeberg mines in which radium emanations are believed to cause lung cancer. Some increase in lung cancer incidence is likely in workers exposed to coal gas and tar, and those working with alcohol show a high incidence of laryngeal cancer. Urinary bladder cancer among dye workers is discussed. In Germany the cause is held to be the aniline, but American investigators consider benziidine and alpha and beta naphthylamine to be the important factors. Skin cancer and the substances which seem to cause it are discussed, as is the sarcoma seen in radium poisoning. In conclusion, the author discusses carefully the cancer of traumatic origin and the medico-legal questions regarding it.
- 696 CHEMICAL COMPOUNDS AS CARCINOGENIC AGENTS. FIRST SUPPLEMENTARY REPORT; LITERATURE OF 1937. J. W. Cook and E. L. Kennaway. Am. J. Cancer 33, 50-97 (May 1938).
The first report was abstracted briefly in our No. 471 (1937). The present paper continues the exhaustive review through the literature of 1937.
- 697 HEAT-STROKE AND HEAT-EXHAUSTION. F. Marsh. British Encyclopedia of Medical Practice 6, 396-415 (1937).
This is a complete treatise on the subject, including etiology, pathology, clinical picture, course, prognosis, diagnosis and treatment.
- 698 FIRST AID IN INDUSTRY. L. J. Goldwater. N.Y. State Dept. of Labor, Div. Ind. Hyg. Spec. Bulletin No. 193, (1938). Obtainable from N.Y. State Dept. of Labor, 80 Centre St., New York, N.Y. Price not given.
The importance of adequate first aid treatment in industry is recognized, but there are still 15 states that do not have compulsory laws covering such treatment. In this small bulletin, which should be of interest to employers, the author presents the essentials of first aid. Legal requirements in New York, first aid equipment and personnel, and principles of first aid are discussed in separate chapters. In the last chapter, methods of treatment for various accidents are summarized.
- 699 CAUSES AND PREVENTION OF ACCIDENTS IN THE FERTILIZER INDUSTRY, 1936. M. D. Kossoris and S. Kjaer. U.S. Monthly Labor Rev. 46, 831-834 (April 1938).
The fertilizer industry, from past records, has ranked among the industries with very high accident rates. With the cooperation of the National Fertilizer Association, the Bureau of Labor Statistics has just completed a comprehensive accident survey of that industry, with particular reference to causes of accidents and means of possible prevention. The survey makes clear that practically all the serious accidents reported could have been prevented by efficient supervision and management.
- Note on Abstract No. 531, July bulletin. (Dr. Sappington's paper on Medico-Legal Trends in Occupational Disease.) The journal reference was omitted. It is Ind. Med. 7, 331-7 (June, 1938).

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