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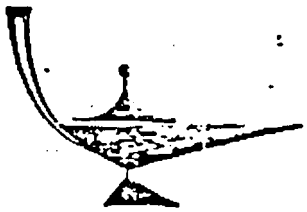
1829  1957

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INDIA–JEFFERS

in great part by white-collar workers, and the financial arrangements involve purchasing the dwelling with the assistance of the employer. Apart from such special examples, the company town planned from the start by the employer for his workers is becoming an incident in the past growth of industry.

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INDUSTRIAL HYGIENE. The application of the combined techniques of engineering, chemistry, physics, and medicine to the control of the environment of the industrial worker, in order to protect his health, is the major concept of industrial hygiene. Employment of medical and nursing principles to improve the health of a group of employees, entirely apart from any occupational hazards, is a secondary concept.

Infectious diseases, with a few exceptions, are not typically occupational in origin and are not a major concern of the industrial hygienist. Occupational diseases, prevention of which is the chief purpose of industrial hygiene, are most commonly caused by dusts, fumes, vapors, gases, irritating chemicals, and abnormal physical factors in the environment of the worker.

Dust Diseases.—*Silicosis*, a disease of the lungs caused by inhalation of dust containing free silica, is perhaps the most important occupational disease. The American Public Health Association defines silicosis as a "disease due to breathing air containing silica (SiO_2), characterized anatomically by generalized fibrotic changes and the development of miliary nodulation in both lungs, and clinically by shortness of breath, decreased chest expansion, lessened capacity for work, absence of fever, increased susceptibility to tuberculosis. . . ."

Ordinarily silicosis is developed only after several years of work in a dusty environment; but when dust concentrations are unusually high, it may follow exposure of only a year or two. Combined silica (silicate) does not cause silicosis. The form of free silica most commonly encountered in nature and responsible for most cases of this disease is quartz. Occupations in which silicosis may present a hazard include mining, tunneling, stonecutting, pottery manufacturing, sandblasting, and other foundry operations.

Asbestosis is a lung disease caused by inhalation of asbestos fibers. The changes produced are unlike those of silicosis. The fibrosis is diffuse and not nodular, and there is less susceptibility to tuberculosis. However, there is evidence that asbestosis may be associated with lung cancer.

Byssinosis is a lung disease contracted by cotton mill workers, especially in England.

Siderosis is a nondisabling condition characterized by a deposit of iron oxide in the lungs, frequently observed among welders and miners of iron ore.

Beryllium results from the inhalation of beryllium oxide and certain other beryllium compounds. While its chief symptoms refer to the respiratory tract, it is considered by some authorities to be a systemic disease. The greatest concentration of cases has been in the fluorescent lamp industry, where the phosphors (fluorescent powders) u[illegible] coat the inside of the lamps formerly contained beryllium. Short exposure to high concentrations of beryllium compounds, particularly soluble compounds such as the fluoride, may result in pneumonitis. Both forms of the disease are frequently fatal.

Heavy Metal Poisoning.—*Lead poisoning* ranks next to silicosis among occupational diseases. Formerly it was associated chiefly with the painting trade; now it is rarely encountered among house painters, but is found frequently in such diverse industries as storage-battery manufacturing, nonferrous foundries, lead smelters and refineries, plastics manufacturers, and automobile assembly plants. The commonest symptoms are colic, weakness of the wrists, and anemia.

Mercury intoxication, as observed in industry, usually results from inhalation of the vapor. It was formerly common among felt hat makers who knew it by the descriptive terms, "hatter's shakes." Many countries and various states of the United States ban the use of mercury-treated fur for hat manufacturing; but there are many other industrial uses of mercury.

Manganese poisoning from the inhalation of high concentrations of the dust of manganese compounds may result in damage to the nervous system and partial paralysis. Typical symptoms are a stumbling gait and mask-like facial expression. The disease is most prevalent in smelting and mining operations.

Cadmium poisoning most frequently results from inhalation of fumes of heated cadmium, and takes the form of a severe chemical pneumonitis. Chronic cadmium poisoning among workers engaged in the manufacture of cadmium-nickel storage batteries has been reported in Sweden and France.

Zinc fume fever is a transient illness resulting from inhalation of freshly formed fumes of zinc oxide. It occurs chiefly among brass founders and welders of galvanized metal.

Other heavy metals, such as arsenic, vanadium, thallium, and uranium, are toxic and produce occasional occupational intoxications.

Organic Solvents.—*Benzene*, or benzol, is one of the most dangerous of the common solvents. Absorption of the vapor not infrequently results in blood changes which may progress to aplastic anemia, a fatal disease. Because of its toxicity, the use of benzene in rubber cements and lacquer formulations has been virtually abandoned in the United States; but it is still employed in paint removers and as a raw material in the chemical industry.

Carbon tetrachloride, widely used as a cleaner because it is volatile and will not burn, is a dangerous kidney and liver poison. At present it is probably the number-one toxic solvent problem in the United States.

Carbon disulphide was formerly used in the rubber industry, but is now found chiefly as a raw material in viscose rayon manufacture. It produces mental symptoms, leading in extreme cases to insanity. Major episodes of carbon disulphide poisoning have been reported in Poland and Italy.

Other solvents which have produced serious occupational intoxications include tetrachlorethane, ethylene chlorohydrin, and dioxane.

Pesticides.—The use of toxic chemicals to control insect, fungus, and rodent pests has created some serious occupational hazards. Methyl bromide, a gas used as a fumigant, also to some extent as a fire extinguisher, damages the central nervous system and also is a lung irritant. Parathion

(2) Isolation: enclosure of process to prevent dissemination of dust or vapor into workroom air.

(3) Wet methods: especially where dust is produced; notably effective in underground drilling.

(4) Local exhaust ventilation: removal of dust or fume as it escapes from the process, before it has a chance to be dispersed into room air.

(5) General ventilation: dilution of the air in the room with fresh air to reduce the concentration of atmospheric contaminant.

(6) Personal protective devices: respirators, gas masks, or air-supplied hoods or helmets, where the hazard is a dust or fume; gloves, aprons, or other protection where contact with a corrosive or irritating chemical is the problem.

As a rule, substitution of a relatively non-toxic substance is the most satisfactory solution, and use of respirator devices least satisfactory. Local exhaust ventilation is the solution most frequently applied.

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INDUSTRIAL INSURANCE. See INSURANCE, INDUSTRIAL.

INDUSTRIAL OR LABOR RELATIONS IN THE UNITED STATES. Industrial relations usually means the relationships between employer and wage worker which, with the rise of the factory system, large-scale modern industry, and the corporation after the Civil War, succeeded historically earlier relationships between master and servant and owner-manager and his few employees. The term is applied primarily to relations between management and labor in the manufacturing, extractive, transportation, communications, and distributive industries. In accordance with this usage, employer-employee relationships in other fields are commonly called labor relations; but the distinction is haphazard, for the two terms are also used interchangeably.

Considered in its more restricted meaning, "industrial relations" nevertheless includes a vast complex of diverse, varying, interacting, and interpenetrating relationships. Among essential aspects of industrial relations are wages and hours; labor and social legislation; vocational training; scientific management; inter-racial relationships; collective bargaining; the scope and power of employer organizations and combinations; the strength and status of trade unionism and the influence of the labor movement; labor-management disputes, and voluntary arbitration and government mediation and conciliation; strikes, the status of civil liberty, intervention by the state, and government seizure and operation of privately owned industry; and management and labor representation in government economic and industrial administrative bodies.

A Modus Vivendi Between Capital and Labor.—In their totality, these relations signify a *modus vivendi* between capital and labor whereby the production and distribution of goods and services are carried on under increasing governmental regulation. But it is a dynamic equilibrium which is the result of a long period of development and which, moreover, is in process of continual change.

The complex character of contemporary industrial relations stands in sharp contrast to the comparatively simple relationship which obtained between employers and employees during the early stages of the industrialization of the United States in the latter part of the 19th century. Basically, that relationship was an unwritten express or implied contract between the employer, who was increasingly a corporation, regarded at law as a juristic person, and the employee, who was invariably an individual. Payment of wages by the employer for work performed by the employee were the principal terms of the contract. Theoretically, employer and employee were equal parties, free to bargain for terms, and acquired equal rights and duties. Actually, however, the employer, because of superior economic strength over the individual employee—whose only marketable asset was his ability to work and who had no alternative but to work—possessed decisive bargaining advantages and dictated the terms of the contract, subject only to the loose and variable control of the competitive system. Owing to the relatively elementary state of industrial development, the rules governing work, formulated by the employer, were correspondingly simple.

Scientific Management.—Three basic factors profoundly modified the development of industrial relations to their present state. The first was the rapid technological revolution which made United States industry the most productive in the world. The development of vast enterprises employing first thousands, then tens of thousands, and finally, hundreds of thousands of workers, made necessary complex codes of rules governing working conditions. Precision and smoothness are vital in the operation of mass-production industries. Economies made through division of labor and specialization are jeopardized by interruptions to the flow of work arising from absenteeism, tardiness, lack of discipline, and lack of efficient coordination on the part of management.

From these needs arose the theory and practice of scientific management. Originally, scientific management was limited in its basic aim to the achievement of increased productivity through improvement in the skill of the labor force and in the planning and coordinated operation of production. Subsequently, scientific management was extended to include the development of cooperation between capital and labor through cultivation of good will of both parties toward each other. Included in this sphere are establishment of fair standards of work; determination of appropriate, as well as effective, incentives for work; selection of personnel in accordance with the aptitude of workers for various positions and tasks; and a degree of cooperation between management and workers in the practical solution of these problems. Involved in this extension of scientific management are the application to in-