



# Diseases of White Collar Workers

DAVID H. GOLDSTEIN, M.D., and LEO ORRIS, M.D.

APPROXIMATELY 3 percent of all occupationally caused disabilities are attributable to disease. The remainder fall into the category of accidental injuries. In New York State (1), and presumably in other States as well, about half of all reported occupational diseases were found in blue collar workers or workers engaged in manufacturing. Why then this interest in the occupational diseases of white collar workers? The reasons are simple: Occupational diseases are largely preventable, and when they occur they are expensive.

The legal definition of an occupational disease varies in each State, depending on the scope of its workmen's compensation law. For the purposes of this study, an occupational disease is defined as a compensable disease that arises out of and in the course of employment. It is any abnormal condition of health due to specific occupational hazard other than trauma. In general, occupational diseases fit into the following categories: dermatoses; diseases due to infectious agents; diseases due to dusts, fumes, gases, vapors, or mists; or diseases due to physical agents. Newly added are aggravation of pre-existing nonoccupational diseases and emotional stress. Many times it is exceedingly difficult to determine whether a specific illness occurred on the job or elsewhere, as, for example, in the household kitchen. This applies particularly to dermatological conditions.

Automation and other technological advances can be expected to expand the white collar segment of the labor force at the expense of the blue

collar group. According to the 1960 census (2), women constituted approximately one-third of the total civilian working population of the United States. Nationally, 54 percent of the employed women were in white collar jobs.

A brief outline of present problems may help to forecast the problems of the future.

## Dermatoses

It has been variously estimated that 50 to 80 percent of all occupational diseases are diseases of the skin.

Much like all occupational skin diseases, most of those affecting white collar workers are caused by chemical agents, with mechanical, physical, biological, and plant agents playing a lesser role. Chemicals, such as the dichromates, resins, plastics, and dyes, are among the most frequent offenders, and they may act either as primary irritants or sensitizers. The irritants will cause an eruption at the site of contact in any individual, whereas the sensitizers will not produce a reaction on initial contact but will sensitize the skin so that eruption occurs on later exposure. For example, a clerk washing a duplicating machine with an alcoholic solution may develop red, dry, crusted hands from the irritant action of the solution and eventually become sensitized to the ink and react violently not only on the hands but on other sites. On the whole, white collar workers are more likely to develop allergic reactions than industrial workers, who are more exposed to acids, alkalies, and solvents, many of which are strong skin irritants.

A mail clerk, then, using adhesives and glues may be sensitized to the synthetic resins incor-

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*Dr. Goldstein is a professor and Dr. Orris, an associate clinical professor, Institute of Environmental Medicine, New York University Medical Center.*

porated in such material. And the dyes in carbon paper and chalk may affect not only the typist and the teacher but also the executive giving a "chalk talk." The chemical 4-*t*-butyl catechol was used initially in some copy paper processes, and the clerk running the copy machine, the secretary collating the papers, and the executive reviewing the reports all developed dermatitis. When this chemical was identified as the allergen and eliminated, the dermatitis subsided. However, with the proliferation of newer processes, trouble from this source may again be encountered.

The chromates are a frequent cause of dermatitis. These chemicals, found in a wide range of materials and industries such as ink, textiles, dyes, matches, photography, photoengraving, rubber, and cement, cause various forms of dermatitis ranging from primary irritation to ulceration. The most frequent reaction encountered in this occupational group is allergic dermatitis caused by the hexavalent salts, sodium or potassium dichromate. The railroad industry found that sensitization to dichromates may take a long time to develop and even longer to subside. When dichromates were added to the coolant system of diesel engines as an anti-corrosive, it took months or years for dermatitis to develop. The first cases occurred among those actually engaged in filling and draining the radiators. Later other roundhouse workers and then office employees were affected. Minute amounts of dichromate became widely disseminated and were enough to sensitize many in the vicinity. Once acquired, the dermatitis may linger, despite removal of the apparent source, because of the widespread use of dichromate compounds and the new sources of exposure that are continually being uncovered. For example, it recently has been found that the pockets of those carrying safety matches may contain significant amounts of dichromate deposited from the matches.

Other frequent sources of allergic dermatitis among office workers are rubber products. These compounds contain two main sensitizing agents, accelerators and antioxidants, and the puzzling eruption on a file clerk's hand may be from sensitization to a rubber finger cot or rubber bands wrapped around the hand. Sometimes a glove-like eruption on the hands may

be caused by rubber gloves worn only while using a duplicating machine. In such instances a change to plastic gloves will aid in clearing the eruption.

The epoxy resins and plastics which have affected many industrial workers also have produced allergic skin reactions among white collar workers. These compounds are made from monomers which harden into the inert polymer. However, sometimes some of the monomer does not react completely or is leached out during use of the plastic, and allergic reactions are induced. Such eruptions have occurred on dental technicians working with plastic dentures, on nursing assistants preparing acrylic fillings, and on typists using plastic earphones when transcribing dictation.

With the introduction of new fabrics processed for crease resistance, sales personnel handling such materials have developed eruptions traced to free formaldehyde, unreacted or leached from the formaldehyde-resin finish used in the antiwrinkle process. Similar situations have occurred with antimildew, waterproofing, or other agents.

The constant introduction of new chemicals and processes brings new problems and emphasizes the need for continued awareness.

As already stated, some substances may not only irritate but may also sensitize the skin. For example, most soaps are strongly alkaline and if left on the skin and covered will irritate it. Soaps also contain perfumes and occasionally dyes from which allergic sensitization can develop and become widespread. A file clerk with an eruption on her hands may have forgotten the pre-existing irritation under her ring and attribute her sudden widespread rash to the glue she used for paste-ups. Removing from the ring the accumulated soap acquired in dishwashing at home will remove both the irritant and the sensitizer.

Thus a frequent problem is differentiating an eruption acquired at work from one developing at home from cosmetics, detergents, photo-developers, or other agents. In attempting to clarify this problem, patch testing in which the suspect material, in proper concentration, is applied to the skin for 24 to 48 hours may be of diagnostic value. A positive reaction is good presumptive evidence that the material is the

cause of the eruption. Obviously, a good history and differential diagnosis are essential and may require the services of a dermatologist, particularly in detecting a pre-existing dermatosis such as psoriasis or lichen planus. These common skin conditions are frequently aggravated by mechanical stimuli, such as friction, trauma, and pressure, which may also produce cuts, abrasions, and callosities among office clerks, business machine operators, or sales personnel. Such trauma may result in local infections or cause the spread of a psoriatic lesion. Knowing the nature of these essentially dermatological conditions and their localization in other sites not exposed to work hazards will help to establish the nonoccupational character of the eruption.

While the incidence of dermatitis among white collar workers from physical agents such as extremes of temperature, sunlight, electricity, and radiation is relatively small, there is an increasing number of instances of photosensitizing reactions from drugs, in particular, tranquilizers, antibiotics, and diuretics. The use of these medications by clerical personnel in offices equipped with fluorescent lights, which emit some ultraviolet, may cause eruptions on the face, vee of the neck, and back of the hands. Others develop a "winter itch" in the summer by being constantly in an air-conditioned environment. The lowered indoor humidity, increased air movement, lack of sweating, and the excessive use of hot water and soap, all contribute to overdehydration of the skin and damage the stratum corneum. The role of bacteria, viruses, fungi, and parasites in contributing to occupational dermatoses as secondary invaders is well known. However, nurses, laboratory assistants, and medical technicians are especially prone to primary infection.

Some plants and woods also produce dermatitis. The most common, of course, is poison ivy. While such contact is not usual to inhabitants of offices, some white collar workers, such as surveyors or reporters, may contact the weed during outdoor duties. Other sources of trouble have been woods such as cocobolo and the cashew. The cocobolo may be used in the handle of a letter opener, and the cashew fashioned into Voodoo dolls. Sales personnel and buyers have developed eruptions from handling these

dolls, particularly those who are sensitive to poison ivy. The sensitizers in both the cashew and the ivy are related catechol compounds.

Most occupational dermatoses are preventable, and the primary object in any preventive program is personal and plant cleanliness. Washing with a mild soap will effectively remove most irritants or sensitizers from the skin. Where the exposures are continuous and hazardous, gloves and other clothing of a material impervious to the irritant will protect the skin.

In some offices waterless-type cleaners are being used increasingly. These agents, usually liquid or a semisolid grease, effect cleansing by their solvent, alkali, or wetting agent content. The most useful and least harmful waterless cleanser is based principally on wetting agents with a neutral pH. The value of protective ointments is disputed, but in any event they are of limited use among white collar workers because of the very nature of their duties.

#### **Diseases Other Than Dermatoses**

Health workers may acquire specific infections from exposures encountered in their daily work. For example, pulmonary tuberculosis among hospital nurses continues to be reported and is deemed compensable. In New York State for the year 1959, of the 2,896 occupational disease cases closed, 92 were designated tuberculosis and 149 were classified contagious and infectious. The latter category, while not specified by diagnosis, ranged from hepatitis to amebiasis. The incidence of infectious hepatitis has increased markedly in the past few years. This may be interpreted as arising in the course of occupation when either of the following circumstances prevails: (a) a white collar worker develops hepatitis within 2 to 6 weeks from the time a fellow worker with whom he had close contact came down with hepatitis; (b) an employee travels on company business to an area having high incidence of infectious hepatitis and develops the disease within the appropriate incubation period.

In this era of rapid travel, the practice of sending employees abroad on company business has increased significantly. If disease is acquired in the course of travel in areas where the hazard of acquiring such disease is many



**Animal inhalation exposure chamber used for the study of highly toxic airborne industrial chemicals**

times greater than at home, then such disease has been declared occupational. Amebiasis and malaria are examples.

Food poisoning acquired in on-premises eating facilities provided by management has been interpreted as an occupational disease.

Infrequently, irritative and at times true allergic bronchitis are induced by materials handled in routine office practice. Both the solvents and the dyes incorporated in duplicating and hectograph inks have exhibited this potential.

The incidence of heavy metal or solvent poisoning among white collar workers has been low. Most of the cases have been encountered

among laboratory workers who have failed to exercise appropriate precautions.

Radiation-induced skin cancer among physicians using X-ray equipment for diagnostic and therapeutic purposes is, happily, largely an affair of the past. While the safety record of the present atomic energy era has been remarkably good, accidents have occurred. Total body radiation exposures of serious and at times fatal consequence have occurred among scientists working with reactors. Most episodes have taken place during criticality operations. Cataracts have been reported among those working with the cyclotron. Microwave radiation encountered in the use of high-powered

radar is capable of producing body injury through its thermal effects as well as through its capacity to induce opacities in the crystalline lens of the eye (cataract formation). Such effects have been produced experimentally in animals and by accident in both white collar and blue collar workers.

Industrial applications of radiation-producing equipment are found in metal radiography, gauging and control equipment, devices for the suppression of static electricity, and in the study of mechanical and chemical reactions with tracer isotopes.

The use of laser devices is currently a burgeoning technology. The highly parallel, intense beams of light produced have introduced new hazards to the occupational environment. The thermal effects on the skin and the eye, especially the retina, are well known. Less well understood are the athermal effects produced by the electromagnetic fields these devices create.

Travel by airplane has at times given rise to aero-otitis, an acute disease of the ear resulting from pressure differences in the middle and external ear. The eardrum may become hemorrhagic and perforate.

The introduction of hyperbaric oxygen therapy under two or three atmospheres of pressure provides a real hazard of compression sickness for hospital staff and attendants.

Until recent times, occupational loss of hearing has been confined to blue collar workers engaged in heavy and noisy manufacturing.

The introduction of automated equipment for a variety of clerical operations has presented a new hazard to the noise-sensitive white collar worker. While the computer itself may be quiet, sorters and printers used in automated operations may produce noise in the intensity range of 85 decibels. As with most occupational disease hazards, this one is also preventable. Changes in design of the machine and sound-proofing room materials are the answer.

Several States in the past few years have awarded compensation to workers who have

developed acute psychoneurotic or psychotic reactions to unusually stressful business, interpersonal relationships, or work situations.

There is a growing trend in some States to concede as occupational and compensable the aggravation of pre-existing medical disease as a result of some occupational stress. Notable examples are arteriosclerotic heart disease where myocardial infarction supervenes while at work, and dermatitis aggravated by the use of soaps or physical abrasion on the job.

### Summary

In general, the incidence of occupational disease is low among all workers, and lower in white collar workers than blue collar workers. Dermatitis continues to be the leading cause of occupational disease among both white collar and blue collar workers.

In this era of automation, advances in chemistry, and expanded application of atomic energy, new hazards are being introduced to the labor force. The impact of these technological advances is evident among the expanding population of white collar workers who are now manifesting occupational illnesses not previously seen in this group. Most of these afflictions are identical to those of production workers, but they are more readily preventable. An awareness by occupational health workers of the toxicological potential of new devices and chemicals, as well as vigilance in the recognition of long-established occupational hazards, is fundamental to their control. Much more difficult in diagnosing occupational diseases among white collar workers is the distinction between illnesses acquired on the job and off the job.

### REFERENCES

- (1) New York State Workmen's Compensation Board: Compensated cases closed 1959. Research and Statistics Bulletin No. 14, 1961.
- (2) U.S. Bureau of the Census: Census of population: 1960. Report PC(1)-IC, tables 127 and 130. U.S. Government Printing Office, Washington, D.C., 1962.