

Before experimenting with fancy methods for the prevention of occupational dermatoses, why not try simple methods of personal and environmental cleanliness?



Bradley Washfountain Co.

Try Cleanliness First

By W. R. REDDEN, M.D.*

MANY employees suffer from skin affections because of contact with cutting oils, dust and other irritants. In fact, industrial dermatoses head the lists of industrial diseases whenever reported. Yet the real trouble may be dirt—both the ordinary dirt that we recognize as “dirty” and the general kind that is merely “matter out of place.”

My own study and the experience of numerous industries convinces me that in many cases the best preventive is keeping clean. Personal and environmental cleanliness has definitely cut down the number of cases of dermatitis (skin inflammation) with only simple and inexpensive measures based on soap and water.

Of course, many circumstances give rise to skin irritations (dermatoses) but they are all subject to similar principles of origin and control. For instance, many young persons of adolescent age suffer embarrassment and distress because of greasy skin, blackheads and pimples. These skin conditions are the result of radical changes going on within the body as the child develops into an adult.

An examination of more than a million

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persons from 14 to 16 years of age in England during the period 1922-25—as these boys and girls came up for certificates of fitness for work—shows that for every 100 reasons given for conditional and definite rejection, 34.71 were for skin disease. A large number of these adolescents reach adult life with a skin particularly sensitive to external and internal reactions. In other words, there is an individual variation and susceptibility to skin reactions, irrespective of the cause.

Skin irritation and skin diseases are common to all who rub in dirt, grime, or other foreign materials.

After years of traveling, we, who have a normally clear skin, find that we have many blackheads about the nose after a whole day on a train, especially in warm weather. After a number of years of observation, we find that the ordinary dust and dirt which is stirred up in train travel lodges on the face. We rub it in a bit—and the dirt clogs the oil gland openings. This causes itching. Increased rubbing or even scratching on our part almost invariably results in a crop of blackheads and pimples about the nose.

As surgeon to the hotels at Yellowstone Park for a number of seasons, we had occasion to treat 300 or 400 patients

with boils during a four months' summer season each year—chiefly among bus drivers and the group of 85 or 90 motorcycle patrols who regulated traffic. We were well aware of the fact that these boils had no relation to bad blood, since years before it had been demonstrated that boils were an infection of hair follicles. This infection was due chiefly to dirt and bacteria that had been ground or rubbed into the openings of hair follicles where they caused an irritation which was relieved by scratching with finger nails or by the part of the garment in contact with that part of the skin.

What are some of the factors in the development of industrial dermatoses?

Anything from hot water and mild soap, which are harmless, to pitch, tar, and arsenic, which are definitely poisonous, may cause a skin irritation with resultant inflammation if these materials come in contact with the skin in sufficient quantities over a sufficient length of time.

It is well known in medicine that if a person is exposed to certain substances repeatedly, at first nothing may happen to the skin or to the body in general, but gradually or even rapidly this repeated contact may make the skin or body sensitive to the material and result

in a dermatosis or even a general body reaction. This might well be the case with workers in sugar, gardeners who handle hyacinth bulbs, or even housewives who fondle the beautiful blooms of the Japanese primrose. We are speaking of specific cases which have been personally observed. It is quite possible that certain persons who suffer from "rubber itch," "bakers' itch," etc., might fall under this group, even though we know that at least the hexamethylene-tetramin used in the rubber industry is of itself toxic.

Individual Susceptibility

Season, temperature and humidity, working conditions, and kind of skin play an important part. It has been observed that when workers in industries in which cutting oils or dust of various kinds are found, become soaked with perspiration, there is an increase in dermatoses; and that dry-skinned persons and persons troubled with excessive oil (seborrhea) are more susceptible than normally oily-skinned persons. Probably part of the answer in regard to heat and perspiration lies in the fact that more dirt is taken up by the perspiration; that the person in an attempt to keep the sweat out of eyes and off the hands, brushes his hands and arms across each other, across the forehead and the back of the neck, thus rubbing in the dirt. If the substance is toxic in itself, so much the worse. Moreover, if work clothes are filled with dust and dirt, then become soaked with perspiration or oil, every movement of the body as well as the rubbing with the hands grinds in the grime and irritating substances.

Apparently the oil on the skin is the first line of defense against irritants and other dermatoses producers. Hence, if the natural skin oil is frequently removed by gasoline, benzine, kerosene and other grease solvents, the skin becomes dry, harsh, and cracked, and the first barrier to dermatosis is destroyed. The same holds true when pumice, harsh and abrasive cleaners, and stiff brushes are used.

That this natural skin fat is an important factor in the prevention of cancer is indicated by the following:

Lanolin applications to the skin alternated with synthetic tar delayed tumor development.

Where lanolin was applied twice as often, cancer did not appear.

The synthetic tar used was many times more potent than shale oil, the most dangerous commercial oil.

The occupational dermatoses are not primarily caused by infection of the skin. When the skin becomes irritated, when bacteria from the

skin are carried by dirt, grease, non-poisonous or poisonous substances in the openings about the hairs, the way is open for infection. When itching causes scratching with bacteria-laden finger nails, or rubbing with dirty hands, arms, or clothing, the skin is broken and germs find an open door to a fine incubator. When the skin is wiped with coarse burlap, waste, or cloths which contain minute particles of dirt and metal, or when a skin covered with oil and dirt is rubbed with clean waste or clean cloths, the surface is broken and the greatest defense of the skin against infection is destroyed.

With these preliminary statements we are now ready to consider the *prevention of dermatoses* and their control in industry.

Obviously, for materials like acids and alkalis, including chromium, which destroy the skin oil and skin, there are two answers: provide closed equipment wherever possible; provide workers with adequate protective covering. In other words—keep these skin destroyers off the skin.

Require a pre-employment physical examination for every applicant and a periodic examination of all employees when there is to be an exposure to a known toxic substance. Exclude those with skin disease. In the case of paraffin workers, there should be a daily skin examination.

Do a patch skin test on all who are to be exposed to toxic materials and also on all who develop a dermatosis during employment. The skin patch test is simple. Soak a piece of sterile gauze about one inch square in a solution of the substance to be tested; apply this to the skin of the inner surface of the forearm and hold it in place with adhesive and allow it to remain 24 to 48 hours. Redness at the end of this time indicates a positive reaction. A crop of small blisters indicates a more positive reaction. No special change is a negative.

Avoiding Contact

Whenever it is evident that a worker has a susceptible skin, whether this is due to a systemic condition, to a natural dryness of the skin, or to sensitization of the skin following repeated exposure, the person should be transferred to a non-exposure task.

In addition, it is important to keep as much of this toxic material as possible away from contact with the worker. This is done by use of a closed process as far as this is possible and by the use of protective materials such as gloves, aprons, snug fitting clothes tight at neck, wrists, waist and ankle.

It is just as important to remove these substances as rapidly and as effectively as possible from the skin. An illustra-

tion of how the American Cyanamid Company solves its problem will help. It was found that the most satisfactory results were obtained as follows:

1. Workers change from street clothes into clean work clothes at the beginning of the day.
2. They bathe thoroughly before leaving the plant.
3. They make a complete change of work clothes from the skin out after the wash-up.
4. Men unloading cars of cyanamid are furnished with clean underwear and outer clothing.
5. Soap dispensers were installed in the locker rooms containing the following solution:

Glycerine	960 grams
Alcohol	691 grams
Salicylic Acid	40 grams

This solution is applied to the face, neck, wrists and hands after bathing and seems to keep the skin soft and pliable.

6. Plant hospital records showed 225 cases of dermatitis treated during 1929. During the next year, after the above system was put into effect, only 29 cases were treated, and these fell within the first five months.

Fungus Infection

Fungus infection has claimed more and more attention during the past few years, because of publicity given to cures for so-called "athletes foot". This has been helpful to industry because it has unearthed cases of dermatitis due to fungi. Since the United States Public Health Service estimates that as high as 50 million people in the United States have this ringworm infection each year, it is obvious that many of these cases must appear in industry.

Recently it was recognized that a person with ringworm infection in one part, like the toes, may develop a dermatitis elsewhere without spread of the infecting agent to that part. In other words, a toxic substance may cause this distant dermatitis. Fungus forms of dermatitis have not been studied sufficiently to warrant further discussion at this time, but this form should be kept in mind when dermatoses are considered.

Before you try any of the innumerable methods for the prevention of industrial dermatoses, give the simple methods of personal and environmental cleanliness a thorough trial under adequate supervision. Then add to these the proper handling of oils for re-use.

For cutting oils and compounds, then, the primary preventive measure rests squarely upon supervised washing with a mild soap, a soft individual scrubbing brush, running hot water, and the use of a personal towel.

To this we add, wear leather aprons to prevent abdominal irritation and wear a simple, clean band about the forehead such as is used by tennis players to keep perspiration from pouring down into the eyes and to prevent contact of the arm

or soiled hand to wipe away this perspiration. Such a procedure calls for plenty of clean protectors made of old, soft cloth.

Keep all work clothes clean and dry. The frequency of washing the clothing will depend upon the amount of contact with dirt, oil, or perspiration. Some groups have found it pays to set up a laundry equipment to handle underclothes and outside work clothes and the towels of the employees.

Washing Facilities

Certain it is that work clothes should always be changed for street clothes, etc., and should be kept in locker rooms where they will thoroughly air and dry.

The re-used oil should be freed from metallic materials and should be sterilized.

The workers should be taught never to use waste to wipe oils from the hands because waste contains bits of metal and dirt which may break the skin and open the way for infection. It has been found that a magnet will pick up plenty of such particles when the skin is wiped with waste.

The workers should be taught to rinse off the oil, etc., under running hot water with the use of mild soap rather than to use the cutting compounds for cleansing purposes. This holds true for the use of kerosene, gasoline, etc., as before mentioned.

Dr. Gray,* Director of the Bureau of Industrial Hygiene of Connecticut, says, "We feel that if proper washing facilities are provided and someone of authority be delegated to see that they are used, that oil dermatitis can be readily controlled.

"Dr. Taylor, Director of the Medical Department of the General Electric Plant of Bridgeport, has eliminated oil dermatitis from the plant by insisting on proper washing and banishing harsh cleaners and abrasives from the washing rooms."

The purely mechanical action in plugging skin openings, causing a backing up of skin oil with distension of the oil ducts and subsequent irritation is well illustrated by zinc oxide.

This non-toxic, non-irritating substance causes what is known in the industry as "zinc pox". Just as with other dust that is rubbed into the skin openings, zinc oxide causes itching and as the dust is rubbed into the gland ducts it carries with it body dirt, waste and bacteria.

The itching results in scratching with

dirty finger nails or rough, soiled clothing. Frequently, a purely mechanical irritation is turned into a secondary infection. The gland ducts plugged with dirt and skin waste offer a splendid chance for bacterial development in an incubator with automatic control.

When the tops of the pimples are scratched off and the material is squeezed out, itching is relieved.

The condition is found most frequently in the pubic region, scrotum, and inner surface of the thighs; that is, where there is continuous exposure of the body and clothing to zinc oxide during work periods. This is aided by free perspiration (greater in parts of skin rubbed together).

The prevention of this type of dermatosis is simple:

1. Exclusion of zinc oxide dust by using a closed system as far as possible.
2. Use of special work clothes—close weave, snug neck, wrist, waist and ankles.
3. Frequent cleaning of work clothes.
4. Thorough washing of muslin and collecting bags before they are mended.
5. Provision of adequate and suitable bathing facilities so that workers can bathe at the end of the work day.
6. Instruction of the workers in personal hygiene which really amounts to instruction in personal cleanliness. This matter of personal cleanliness is the prime factor in prevention, for even the workmen themselves say that the disease depends entirely upon personal cleanliness, and that if they take a daily bath there is no trouble.
7. Reporting of the skin disease should be made compulsory.
8. Bathing should be under supervision and a serious attempt should be made to develop an esprit de corps among the workers that will automatically swing new workers into line and keep old workers in line.

General Preventive Measures

Because dermatoses form such a large proportion of all occupational diseases and are often disabling, one should be familiar with at least the more important occupations that are exposed to skin irritants.

Complete lists are almost impossible because almost any foreign substance can become a skin irritant if it is in continuous contact with the skin. But it is always possible to have in chart form a complete listing of all chemicals used in your plant. To this list should be added a complete chemical analysis of all new materials as they are introduced into old or new processes.

Against such a list, it is then possible to check up on the substances that are known irritants or that are known to cause dermatoses. Substitute a non-irritating substance for a known irritant wherever possible.

Give the worker every possible protection against contact with a known irritating substance. In addition to the use of protective clothing, the length of time of exposure each day should be reduced by a system of alternation of work wherever this is possible.

Provide for cleaning down machines, walls, benches, and other surfaces. Make this cleaning frequent enough to keep the equipment and the air as free as possible from scatterable dust and to reduce to a minimum the contact of the worker with oils, dyes, and other substances used in the operations.

Make floors impermeable and keep them clean.

Paint walls so they will show up dirt and so they can be thoroughly cleaned and have them cleaned regularly.

Wherever possible, have machinery painted to show up oil and dirt, and keep it clean.

Put the workers in washable uniforms provided by the company and laundered by either the worker or the company. The American Rolling Mill Company tried this out with men handling sheet metal—and found it paid.

Have adequate handwashing and other toilet facilities readily available in comfortable places and provide ample shower heads to take care of peak loads.

Either supply soap and towels, or provide a routine whereby each worker has his own. If a scrubbing brush is indicated, make it a part of required equipment but be sure brushes are not harsh.

Supervise handwashing, bathing, and the change from street clothes into work clothes and work clothes into street clothes.

Put all toilets, washrooms, and locker rooms in charge of a cleaner who does nothing but keep equipment and rooms clean.

Many plants have used for years a "worker scrubber" who handles humans as laundry instead of clothing. These scrubbers scour the skin of workers who have been exposed to dirt, dust, or oils during the work day.

Give the workers sufficient time for the routine clean-up on company time; you will find it does not take long once a system is established. You will find that reduction in lost time will more than pay for the effort.

Before you try fancy methods for the prevention of industrial or occupational dermatoses, try the simple methods of personal and environmental cleanliness, for there is no industrial disease that can be prevented and even cured to a higher degree by this simple method.

*Dr. Albert S. Gray, Feb. 11, 1931. Personal communication.