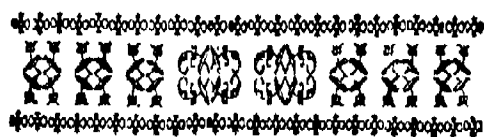


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C A N C E R

S C R O T I.

RAMAZINI has written a book de morbis artificum; the Colic of Poitou is a well known distemper; and every body is acquainted with the disorders to which painters, plumbers, glaziers, and the workers in white lead, are liable: but there is a disease as peculiar to a certain set of people, which has not, at least to my knowledge, been publicly noticed; I mean the chimney-sweepers' cancer.

It is a disease which always makes its first attack on, and its first appearance in, the inferior part of the scrotum; where it produces a superficial, painful, ragged, ill-looking sore, with hard and rising edges: the trade call it the foot-wart. I never saw it under the age

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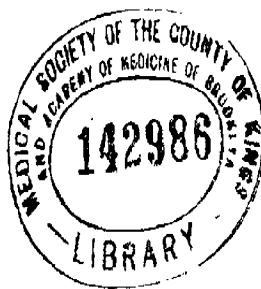
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Industrial Carcinogens

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At the time of the original pre-placement examination, the employee can be instructed by the physician on the nature of the hazard he will be working with. At this time he can be further educated in avoiding unnecessary contacts with the potentially carcinogenic streams, in the elements of personal hygiene, such as clean work clothes, protective equipment, and washing, and can be informed to report to the medical department any skin changes which he observes. Since some individuals may develop a dermatitis early after initial exposure, he can be instructed to return to the medical department if such develops. Individuals who have pre-cancerous changes of the skin should probably not be permitted to work where they may contact carcinogens. Such changes would include thickened, reddened, indurated skin (so-called "farmer's skin"), keratoses, hard warts (not verrucae vulgaris) and other similar lesions. The reason for excluding such people from such work is not necessarily because they are more susceptible to carcinogens, but because if they subsequently do develop skin cancer, confusion may exist as to whether the cancer developed "naturally" or as a result of the occupation.

Re-examination of the skin should be performed about one year following the initial examination if the worker is still employed in this work. The purpose of this examination is to check to see if any dermatitis has occurred which may not have been reported. If such has occurred, it is probably an indication, either that the worker is unusually susceptible or that he has not faithfully been observing the protective program. If the former is the case, the employee should probably be removed from this type work since he is likely to have recurrent disabling bouts of dermatitis. If the latter is the case, an opportunity is provided to re-enforce and re-educate the man and the other workers about the protective program. From this point on the employee's skin can probably be re-examined at the time of his regular periodic check-up. In many industries, attempts are being made to establish such check-ups on an annual or bi-annual basis. If no such program is in force, annual re-examination of the skin should be re-established after the employee has been on his job for five years. At the time of these periodic examinations, the employee should be encouraged to bring immediately to the attention of the physician any persistent skin lesions which develop in the intervals between examinations. Persistent lesions are arbitrarily defined as those which persist for two weeks or more.

The second purpose of a medical re-examination program is to insure

that if any lesions develop, they will receive prompt treatment. Excision of the lesion, with microscopic examination of the tissue removed, appears the treatment of choice. A representative slide of the tissue removed should be maintained as a part of the employee's individual medical record. Considerable debate has occurred as to whether or not an employee who has developed a pre-cancerous or a cancerous lesion should be removed from his work involving carcinogenic exposures and placed elsewhere. Those who advise against removal suggest that exposure has already been sufficient and the employee may go on to develop cancer after removal from the work (Case 2). Why, they ask, subject a new employee to the hazard? Those who advise removal from this type of work, are reminded of experimental work in animals and clinical observations in humans in which precancerous lesions disappear and no new cancers appear once the exposure has been terminated (Case 1). The individual industrial physician faced with this decision, will undoubtedly have to base it upon his own best judgment of the situation. He could support either decision, although it is likely that the majority of those who have had to make it have leaned in favor of removal from the carcinogenic exposure.

BLADDER

General Considerations

The protective program for individuals potentially exposed to bladder carcinogens is considerably more complicated than one for the skin. Of course the basic elements of good housekeeping and good personal hygiene apply here even more so than with skin carcinogens. It was originally believed that the absorption of these carcinogenic amino compounds occurred mainly through the inhalation of fumes or finely divided dusts. Present concepts, however, suggest that the principle route of absorption is directly through the skin. This, of course, considerably complicates the problem of control, because once the carcinogens escape from the unit, they may contaminate everything in a room, or even a whole building, leading to subsequent skin absorption in those who brush against the structures or equipment in the room or building. The problem of control is so severe that one chemical company, which had repackaged benzidine for many years, abandoned the operation completely when one of the individuals involved developed a bladder cancer.

Goldblatt and Goldblatt⁷ have listed the occupations involved as follows: Work in any building where alpha-naphthylamine, beta-naphthyl-

amine, benzidine, or any of their salts, or auramine or magenta are produced on a commercial scale. To this list should now be added para-aminobiphenyl. In addition, the use or handling of any of these substances or work in a process in which any of them are used, handled or liberated should also qualify for exposure. Finally, men who maintain or clean any plant or machinery involved in any of the above should be considered exposed.

Plant Housekeeping—The plant should be of modern design, with floors made of materials which do not absorb the amines, either physically or chemically. Thus, asphalt, porous brick or wood floors should be avoided. Glazed brick or some other non-porous material which can easily be cleaned, should be used. Nooks, crevices and other areas which may retain the amines should be eliminated wherever possible. Mechanical handling should replace manual handling wherever possible. If pumps, flanges or other areas may leak, they should be provided with exhaust ventilation if fumes or dusts are involved; if liquids, then they should be mounted on catch basins connected with a sewer so that all leaks can be promptly and thoroughly washed down. Unnecessary equipment, such as barrels, boxes, cartons, tools or worn equipment should not be left lying around the floor, but should be cleaned, if necessary, and promptly removed so they cannot act as dust catchers. As indicated by Hueper,⁹ "The elimination of this type of occupational tumor is not so much a matter of medical concern as it is a task of proper chemical engineering," and, it might be added, good maintenance and housekeeping. Although chemical engineering, good maintenance, and good housekeeping may not be matters for primary direct medical concern, nonetheless the medical department frequently brings a fresh perspective to these approaches, and hence the medical department can contribute in a team approach to a problem of this magnitude and severity.

Personal Hygiene—Workers in any of these operations should be provided with locker facilities well removed from the area of their work. The ideal locker facilities, of course, would be two separate locker rooms, one for work clothes and one for street clothes with a connecting automatic shower room. This would insure that street clothes did not become contaminated, and also that a shower would be taken at the end of a day's work. Work clothes should be laundered regularly, at least once a week, and the clothing worn next to the skin (underwear) probably daily. Rubberized protective clothing should be worn whenever the possibility of skin contact is high. Wooden-soled shoes have also

been recommended. Although nobody can deny Goldblatt and Goldblatt's statement that "The problem before the industry, therefore, is to apply every possible method to diagnose the condition as soon as it appears and to enlist every available means of treatment," still it would seem that with a disease as serious, and as difficult to detect as bladder cancer, more intensive efforts at prevention are warranted, and that early detection and treatment do not go far enough.

Worker Education—Workers should receive thorough instruction in the dangers associated with their work, and the necessity of keeping a clean work place and personal habits of cleanliness. It is often maintained that workers do not have the native intelligence to understand and carry out a protective program as complicated as this. That this is not the case is evidenced by the experience of the pharmaceutical manufacturers who have trained employees in the production of potent biologicals, or sterile preparations requiring far more complex procedures to be used by the workers. It may be true that the economics of production do not permit the employment of workers with this high a degree of native intelligence, but with the hourly rates prevailing today it should be possible to employ workers who will follow the precautions worked out for them. To my knowledge the hourly rates paid in the pharmaceutical industry for this type work are not so much higher as to be prohibitive. There is no justification, therefore, for the employer who maintains that he cannot get workers who will follow the work habits necessary to protect themselves from occupational hazards.

Medical Program—There is no intent in the preceding paragraphs to belittle the important direct role played by the medical department in the detection and early treatment of these tumors. Workers in these plants should receive a thorough preplacement examination. This should include a thorough occupational history, and a careful examination of the urine, particularly for the presence of red cells. Any urinary abnormality should be thoroughly investigated before permitting work in one of the exposed occupations. It would be highly desirable to have a cystoscopic examination if the work entails any risk of exposure. Whether this is practical, of course, will vary from place to place. It would seem that any urinary abnormality, and particularly the presence of conditions which lead to the presence of red cells in the urine, would be justification to exclude a man from this type work. This is so because of the confusion that red cells in the urine might introduce into any control program. It would probably also be advisable to have a