



C A N C E R  
S C R O T U M

**R**AMAZINI 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-sweeper's 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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Industrial Carcinogens

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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-aminodiphenyl. 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,<sup>9</sup> "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

due to changes in operations or failure of control measures and would permit the early introduction of additional personal or unit control measures or maintenance.

### Nickel Refining

If nickel carbonyl is responsible for the sinus and lung cancer cases seen in the nickel refining industry, exposure in this case would be to a gas. Control of this cancer would be facilitated by more precise knowledge of the causative agent. Until such knowledge has been developed, control measures must be general in nature, designed to contain within the process by engineering methods, any inhalable materials, gaseous or particulate. Housekeeping should be of the best, and wherever gaseous or particulate materials cannot be contained or ventilated, use of respirators should be insisted upon. Since nickel carbonyl decomposes on contact with water, advantage of this principle might be taken in designing respirators, and other protective or control equipment.

The establishment of a medical program in this industry should be designed for the detection of early nose and lung cancers. A thorough and careful examination of the nose and nasopharynx, performed prior to entry into this work and repeated at periodic intervals, should be done. This should be done by someone thoroughly familiar with the pathology of the nose and nasopharynx, and preferably the periodic repetition of the examination should be done by the same individual in order that changes will be evident. X-rays of the sinuses and chest should be done at the time of this examination and interpreted by someone thoroughly familiar with the problem. Any changes observed should be followed up rigorously until a definitive diagnosis has been made. It would probably be desirable to attempt to correlate urine or blood nickel levels with exposure patterns and atmospheric nickel concentrations in an effort to provide an additional check of exposures. Whenever exposures cannot be controlled by other means, the men should be provided with adequate respirators and instructed adequately in the importance of their use. Re-education of the men in the importance of all protective measures can be done at the time of the periodic re-examinations.

### Asbestos Handling

The solution of the problem of lung cancer resulting from asbestos lies in the control of the problem of asbestosis. The disease is the result

of the prolonged inhalation of asbestos dust, so that its control lies in the control of the dustiness of the operation. Enclosure of equipment with the provision of exhaust ventilation should eliminate much of the dustiness. Use of wet processes wherever possible, and the establishment of good housekeeping routines to clean up accumulated dust will help. Elimination of all unnecessary ledges, nooks and areas where asbestos dust may settle will also help control this operation. Wherever dustiness cannot be controlled by any of these means, adequate dust respirators should be provided. The use of double lockers, one for street clothes and one for work clothes, seems warranted in this industry, but no special washing or showering facilities seem necessary. Periodic dust measurements in the working environments should be undertaken and if levels are increasing, the reasons for this should be sought.

Individuals selected for this work should have a careful pre-placement examination. This should be designed specifically to detect any pulmonary abnormalities, or any encroachment on the pulmonary reserve. A pre-placement chest X-ray should be included as a part of this examination. Any pulmonary abnormalities found should be carefully evaluated before the individual is permitted to work in this occupation. These examinations should be repeated at yearly intervals, at which time sputum examinations for asbestos bodies should be done. The absence of such bodies from the sputum has no special significance, but their presence in the sputum should serve to alert the physician to the possibility of excessive exposures. The technique of examining the sputum for asbestos bodies includes digestion of the sputum by warm sodium hydroxide, followed by centrifugation and decanting. The decanted residues are spread over several slides, mounted in Canada balsam and examined. The electron microscope can also be used for examining these bodies more carefully, but great care must be exercised or they may fracture.

It should be remembered that asbestos is widely used in a large variety of other occupations and industries. Whenever it is used in such a way that dust can be produced, and the work is of such a nature as to permit prolonged, repeated inhalation of the dust, a potential asbestosis hazard exists. Each such use must be carefully evaluated in terms of the potential hazard. There seems to be a considerable individual variation in the susceptibility to asbestosis, some people developing it rapidly, while others may have comparable exposures with no signs of the disease, even after considerable periods of exposure.