

All this costs money, real money, and unless we are willing to make this investment completely and properly, we should not attempt to protect at all, for only futility will result. You buy protection and human health — not a respiratory device.

Respiratory protection was not just invented. Some devices on display in the Dresden, Germany, Fire Museum are dated from 1875 to 1887. Even then, carbon adsorbents were used. For ammonia, a sponge soaked with vinegar was incorporated in a face piece, the ancestor of the chemical respirator. Ask about various devices — there is more background information than you might expect, and it is available if you insist on completeness.

In June 1969, students at a major university appeared in an academic procession wearing World War II surplus gas masks. This is a very serious matter; such masks are being sold in surplus stores all over the country, and they are essentially worthless. The same mistake occurred after World War I — thousands were sold or given away, and loss of life resulted from their misuse. If you come across such old equipment, destroy it at once before it kills.

Not all mask face pieces fit everyone properly. This is poorly appreciated, since we have a tendency to accept something offered without question. About 95 per cent of the adult population can be accommodated by the average full face piece if properly worn and adjusted. The various sizes and shapes of faces are well known; the Army and the Bureau of Mines are well aware of the problem of human variations, but most people who buy and wear masks are not.

Another confusing situation develops when the medical and nursing professions use the word "respirator" to indicate a device for inducing or modifying breathing. Two of these were recently condemned as unsafe by the Food and Drug Administration and ordered removed or recalled from the market. (Devices were manual bellows or bag-type blowers for introducing air into patients through a half-mask piece.)

Respirators are of many types, and the face pieces may not fit properly unless carefully adjusted. It should be noted that the

recent revival of beards, sideburns, and other surplus hair on the face is definitely contra-indicated, since all Bureau of Mines tests show that a clean-shaven face is essential for a proper respiratory face piece fit, and this is mentioned in the Z88.2 Code.

There are also specialized respirators, such as the ones for radioactive materials and unusually toxic substances such as beryllium. Even more care than usual is required if they are to perform their intended purpose.

Several chemicals are now definitely known as carcinogenic. A list of a few noted by the A.C.G.I.H. in the 1969 revision include: 2-acetylaminofluorene; 4-aminodiphenyl; benzidine and its salts; dichlorobenzidine; 4-dimethylaminoazobenzene; beta-naphthylamine; 4-nitrodiphenyl; n-nitrodiphenylamine; beta-propiolactone; and p-toluidine. These chemicals must be placed in a super-hazard classification, and leave no margin for error.

Another unresolved and very practical problem is the mechanism for wearing of corrective lenses inside full face pieces by persons who are virtually helpless without the lenses. All internally-mounted lenses are subject to improper optical alignment when a mask is donned in haste; all externally-mounted glasses, even with flat temples, permit or encourage leakage. Only an air-supplied hood accommodates glasses without sacrifice of safety due to leakage.

There appears to have been a serious lack of imagination and initiative over the years in the development and research into respiratory protection in this country. As I noted previously, gas masks, respirators, and even self-contained breathing apparatus (including the oxygen self-generating devices) were in a considerably advanced state of development in Germany and England, prior to the beginning of World War I, when the United States first began to look at the problem. In some ways, the tremendous potential for application of technology and engineering know-how seems to have largely escaped the respiratory protection field. Very few significant advances in respiratory devices during the last fifty years have originated in the United States. (Hopcalite, the mixture of metal oxides which, under favorably dry conditions, converts