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Missing the vinyl chloride link . . .

Very soon, Britain's Factory Inspectorate will decide whether workers in the chemical industry should be allowed to inhale a dangerous carcinogen—vinyl chloride monomer (see p 675). All the indications are that the inspectorate will favour the argument put forward by the chemical industry, that if exposure to VCM is limited to 25 parts per million, the risk of liver cancer caused by VCM will be acceptably low. The evidence for this reasoning is hardly convincing. It is that the incidence of liver cancer (in this case angiosarcomas) among workers in plants using VCM is very low (so far only 19 workers with angiosarcomas have been found compared with the 8000 or so workers in the US and Britain who are today exposed to VCM), and that most of the few people who have died from the disease worked in the industry 20 or more years ago, when the levels of VCM in the atmosphere of chemical plants were considerably higher than they are today.

There is, as yet, no evidence that would flatly contradict this reasoning. There is no "safe" limit of exposure to VCM. A limit can be defined only on the criterion of an "acceptable" risk. Of course, what is acceptable to BP, ICI, and the other large PVC manufacturers, may well not be acceptable to the workers at risk or their trade unions. The evidence now accumulating indicates that the risk of cancer (and other diseases) caused by VCM may be greater than the industry would have us believe. It is true that few deaths from angiosarcoma have been found so far. But this may well be because the people with angiosarcomas haven't died yet. The most complete US epidemiological survey (only two out of 257 ex-employees were not located) shows that three out of 24 deaths were from angiosarcoma. Given the fact that the latency period of the disease may be as long as 25 years, it seems certain that more deaths from angiosarcoma will be discovered in the population of workers exposed to VCM. (There has also been a suggestion that angiosarcoma can be misdiagnosed as cirrhosis of the liver.) Whatever the deadly statistic finally reveals, it will be higher than the 19 out of 8000 suggests. There is also every likelihood that VCM (like other carcinogens) causes tumours in more than one organ—indeed, nephroblastomas have already been found in rats exposed to VCM. Perhaps even more disturbing are unconfirmed reports in the New York Times that angiosarcomas have been found in four people not working in plants making polyvinyl chloride—implying a

mammoth increase in the population at risk. German researchers have suggested that the other disease linked with vinyl chloride—acro-osteolysis—may be clinically more serious and more prevalent than previously thought. A German union (IG Chemie-Papier-Keramik) estimates the incidence of the syndrome described by the German researchers as one in three.

All this is unfortunately tentative. It does indicate, however, that the VCM's carcinogenicity will prove a serious problem—much more than a rare, and rather historic, medical anomaly. The implication of this evidence is that workers should not be asked to breathe a substance which is almost weekly revealed to be more and more dangerous. The chemical industry rejects this course of action on the grounds that it would mean closing down PVC plants, with possibly disastrous consequences on employment and the economy. But one company, Dow Chemical, has already reduced levels of VCM in a polymerisation plant to 2 or 3 ppm. Certainly, putting a zero exposure limit into practice would be costly—perhaps immensely costly. But if VCM proves as hazardous as can be expected on the basis of preliminary research, that cost is justified.

There are also questions broader than the setting of safe limits for exposure to VCM. Vinyl chloride is only one of the myriad of new chemicals that have become commonplace in industry since the post-war boom in petrochemicals. As many as 500 to 600 new substances are introduced every year, and 25 000 chemicals already in use need to be screened. How many of these are carcinogenic? Irving Selikoff, an old campaigner for industrial safety, says, "We can't see them but we hear them moving about in the forest".

In April 1973, Professor Cesare Maltoni prophetically remarked: "Would such (liver cancers) unhappily be found in man . . . it would be a precise indication of the value of experimental testing in predicting the oncogenic potential of environmental agents and would strengthen the recommendation on the necessity of such bioassays before any new industrial compound is produced and widespread." The Health and Safety at Work Bill, currently before the British parliament, proposes some such pre-testing of potentially hazardous chemicals. The lethal consequences of breathing vinyl chloride should convince everyone, not least the Commission to be created by the Bill, that however expensive, screening, is an essential life-saver.

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. . . and seeking new safety thinking

Our inability to understand and control new technology before it goes into widespread use was dramatically illustrated by three items in the news in the past two weeks: the Flixborough explosion (see p 590 last week), the report on the Summerland fire (see p 684), and new worries about vinyl chloride monomer. But another event last week provided equally dramatic proof of our ability

to control our technology if we really want to—the experimental safety vehicle (ESV) conference in London (see p 680). When the US government, under pressure from Ralph Nader, set apparently arbitrary and extremely strict performance standards for cars, the manufacturers screamed that the standards were meaningless and could not, in any case, be met without building minitanks. But