Pollution in the Operating Theatre

Though the occupational hazard to industrial workers from the inhalation of the noxious vapours of solvents such as trichloroethylene, benzene, or carbon tetrachloride is well known, the possibility of a similar risk for those working in the atmosphere of an operating theatre is less so. The suggestion that even this atmosphere might affect people's health has recently received some attention in Scandinavia and America.

The particular aspect of ill health studied in two recent reports concerned the incidence of spontaneous abortion among married women working in operating theatres. By means of a questionnaire V. Askrog and B. Harvald,1 in Copenhagen, found that among nurse anaesthetists there were 10 abortions plus perinatal deaths out of 85 pregnancies (12.5%) before they entered this employment, and there were 44 out of 229 (19%) after they entered it. The difference is not significant at the 5% level, but when similar figures for women anaesthetists and even the wives of men anaesthetists (which showed a similar disparity) were added in, the result was a significant difference at the 0.1% level. Out of 212 pregnancies before employment in anaesthetics 21 ended in abortion or perinatal death (10%), whereas out of 392 pregnancies afterwards 80 ended in abortion or perinatal death (21%). There was also a significantly greater number of premature deliveries among the women who gave birth after taking up anaesthetic work. A study at Stanford University School of Medicine in California gave similar results to the Danish one. E. N. Cohen and colleagues2 obtained information by personal interview from 67 operating-room nurses and 92 general duty nurses, and found that in 1966-70 30% of pregnancies in the first group ended in spontaneous miscarriage, while 9% in the control group did so. By means of questionnaires they obtained confirmatory figures in a comparison between practising anaesthetists and doctors in other specialties. In both these series the women at risk were a little more than three years older than the control group, and there may also have been undisclosed differences between them. Despite these doubts the statistical differences found between those exposed and those not exposed to the atmosphere of the theatre is notable.

Apart from these reports about specific effects many people who work in operating theatres experience the discomfort of a stuffy atmosphere. Anaesthetists in particular are well aware of the consequences of a long day spent in close proximity to their patients' expired breath. There is a widespread, if vague, feeling among them that headache and fatigue, resulting perhaps in inattention, are common in poorly ventilated theatres.3 In addition it is known that anaesthetists absorb measurable amounts of anaesthetics. Occasionally these may be sufficient to show up an existing illness. Two anaesthetists are reported to have developed sensitivity to halothane, suffering jaundice as a result of their occupational exposure.4 A nurse-anaesthetist developed signs of myasthenia gravis after administering methoxyflurane but was unaffected by some other drugs.5 There is also the possibility that the incidence of malignant tumours of lymphoid tissue is higher in anaesthetists than in the general population.6 Anaesthetic drugs are potent poisons. In experimental animals some of them are teratogenic, but only after long exposure to concentrations within the range used clinically in man. Similarly, fetal death can be produced in experimental animals. In man it has proved impossible to determine the incidence of teratogenic effects or abortion after anaesthesia and surgery.

The reports about abortion provide some evidence of a possible occupational hazard, but more information is needed and is being sought. Whatever conclusion is reached on the validity of these data, there seems to be enough evidence already to suggest that a general improvement in the standards of ventilation of operating theatres, with removal of anaesthetic and other gases or vapours, is urgently required. Perhaps in addition anaesthetists and nurses should spend only limited periods of time in the operating theatre.

Chondromalacia Patellae

The term chondromalacia patellae is used to denote a condition affecting fit persons in which pain arises from the posterior aspect of the patella. The earliest recognized account of the clinical condition7 described changes in the cartilage of the patella which were thought to be due to trauma, and despite a later account of 640 cases8 in which evidence for trauma was found in two-thirds the exact cause of the syndrome remains a mystery.

Disorders of the cartilage on the posterior aspect of the patella give rise to characteristic symptoms and physical signs. The main symptom is of pain in the region of the patella, sometimes associated with a sensation of "giving-way" or "locking"—though these seldom actually occur. The pain is worst when the quadriceps muscle contracts most strongly, notably when descending stairs or rising from a chair. The knee itself may look quite normal, though quadriceps wasting is frequent and joint effusions have been described. The range of movement is full. The postero-medial and postero-lateral aspects of the patella can be palpated when it is displaced and are tender, and clinical tests involving compression of the patella against the femoral condyles are painful. Radiographs are usually normal,
though osteoporosis may be seen, and an anteroposterior striping visible on "sky-line" views has been described. When the syndrome occurs in the presence of osteoarthrosis, radiographs will show the expected reduction of joint space, osteophytes, and sometimes cysts.

It is widely believed that a relatively mild variety of the syndrome occurs in adolescents and young adults, possibly more often in females than males. When this condition subsides spontaneously or with conservative treatment no information about its pathology exists. On the other hand much is known about the state of the cartilage at necropsy and at arthroscopy for severe chondromalacia patellae or unrelated knee disorders. In a series of 124 post-mortem examinations of the knee joint minor changes in the cartilage of the medial facet of the patella were found in 5 of 18 patients below the age of 20, and 27 of 32 between the ages of 20 and 30. In a parallel survey of 400 persons with "sound knee joints" a steadily increasing incidence of signs relating to the medial half of the patello-femoral joint was also found. Signs were less common on the lateral aspect. A study of the joint at arthroscopy confirmed these findings, showing that altered staining characteristics and dulling of the cartilage occurred early and were followed by the formation of fissures, flakes, ulcers, and osteophytes. In this study observations are also recorded on knee joints opened for other purposes, and the point is made that patients with mild or moderate "chondromalacia" can remain symptom-free at any rate for a few years.

In a further attempt to explain this syndrome a study has been made of the knee at 35 necropsies and 240 medial meniscectomies. A ridge was observed on the medial and to a lesser extent the lateral femoral condyles. The height of the ridge was related to the extent of degenerative changes both in itself and in the opposing portion of the patella. Changes were also related to body weight and were found to be more severe in women, but no positive correlation with the shape of the patella or the length of the patellar tendon was established. It might be conjectured that the formation of the medial condylar ridge in adolescence is a factor precipitating symptoms at that age, and perhaps some other transient factors occurring in girls at that age could combine to produce temporary patello-femoral symptoms. Indeed the medial condylar ridge has been observed to occur without degenerative changes.

Clearly damage to the articular surface of the patella may arise whenever the surface is insulted, whether it be by inflammatory or metabolic joint disease or by major or repeated minor trauma. The last of these could occur insidiously in fit young people with minor mechanical abnormalities such as recurrent subluxation of the patella or the kind of irregularity of the medial femoral condyle postulated. There is no question of chondromalacia patellae being related to a systemic joint disease, but recently its traumatic and degenerative nature has been questioned. In 4 of 11 patellae removed for the syndrome the superficial layers of cartilage were found to be normal, a surprising observation in view of the alleged pathology. The authors describe other pathological findings, and suggest that the initial changes may be in the trabecular bone. Clinical information is absent from this paper, and extension of the work would be of interest. One description regarded the main cartilage changes as not to be distinguished from those of early osteoarthrosis, though an unusual disturbance of the osteochondral junction was noted.

Treatment of chondromalacia patellae is problematic.

If all patients inevitably deteriorated there would be a strong argument for early patellectomy. However, they do not, so it is usual to advise the patient to avoid strenuous activity involving the knees and to have courses of static quadriceps exercises given with the knee slightly flexed to avoid patellar movement. These may be preceded by soothing short-wave diathermy. Occasionally a corticosteroid injection or manipulation under anaesthetic seems to give temporary relief, but if the condition deteriorates arthroscopy should be advised. It at arthroscopy a mild chondromalacia is found, it is possible merely to shave and smooth the affected cartilage, but results are not encouraging. It is usual to perform patellectomy, but even this cannot be relied upon to produce a normally functioning knee.

1 Büdingen, K., Deutsche Zeitschrift für Chirurgie, 1906, 84, 311.  
2 Hinricsson, H., Acta Orthopædica Scandinavica, 1939, 10, 312.  
9 Darsscott, J., and Vernon-Roberts, B., Rheumatology and Physical Medicine, 1971, 11, 175.  

Preclinical Detection of Dystrophia Myotonica

Much attention and sympathy are always focused on the victims of such conditions as Tay-Sachs and Weddington-Hoffman diseases, which cause death in childhood. As a result active genetic counselling is given to the parents. Dystrophia myotonica produces more social distress in a family than these diseases, since it may result in one parent becoming progressively more incapacitated by both physical and often mental deterioration. Moreover, by that time the patient may have had children whom the same disaster may overwhelm. The social degeneration of families with dystrophia myotonica, which F. W. Mott 60 years ago ascribed to degeneration of the germ plasm, is less frequently seen today with our present social services. But despite the effects on a family, the relatives of patients with the disease often show a lack of concern amounting to active neglect of the fact that it is heritable. Doctors have acquiesced in this attitude, partly to avoid arousing fears in potentially affected relatives when at present nothing can be done to prevent or cure the disease. But this approach may allow such persons unknowingly to have children, thus passing the disease on once more to the next generation.

To ignore these possibilities is surely unjustifiable, since it is now recognized that relatives of patients with dystrophia myotonica, who may appear clinically normal, may have some of the stigmata of the disease if subject to special investigations. Two of the best known features of dystrophia myotonica are the myotonia itself and the cataracts. In clinically normal relatives who bear the gene for the disease myotonia may be found on electromyography and cataracts on slit-lamp examination. A study of the efficacy of these...