screening plants for upwards of ten years, and of
104 gasfitters and meter inspectors, is described.
Dust counts were carried out at selected points
in a retort house and a coke screening plant;
samples taken from the retort house showed 25-75
particles between 1 and 5μ c.c. of air, and from
the coke screening plant 600-1,300 particles per c.c.
of air. 90% of the particles in a sample taken from
the coke screens were less than 1μ in
diameter. Other samples of this dust contained
0.70% and 0.80% of free silica, and in the
fractions of these samples below 10μ in diameter
the figures were 0.64% and 0.72% respectively.

Three cases of pneumoconiosis were found
among the nine coke screen attendants examined,
and none among the other occupational groups.

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Coal Miners' Pneumoconiosis in County Durham*

By

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Pneumoconiosis in the coal miner was first
recognised in Great Britain in the Scottish
coalfield in 1831, and in the Newcastle area in
1838. Coal has been mined in the north east of
England since the 13th century at least, and
by the 17th century large pits had been developed
near the rivers Tyne and Tees, which allowed
easy transportation of the coal. The use of
steam power for pumping and haulage in the first
half of the 18th century permitted deeper shafts
to be sunk, whilst the growth of railways led to
the opening of collieries over a wider area of the
coalfield. Although mechanical ventilation was
introduced between 1840 and 1860, during the
next thirty years according to Sir Thomas Oliver,
"miners phthisis" was commonly seen in New-
castle. Hand picks were in use at this time so
that inadequate ventilation was probably an
important contributing factor in the causation of
pneumoconiosis. However, as a result of
improvements in ventilation, the disease had become
rare by the beginning of the present century.

From then until the 1930s the north east coal-
field was apparently free from pneumoconiosis,
although it is likely that it still occurred to some
extent. At that time it was thought that black
lungs were unremarkable in a miner, and that
only chronic pulmonary tuberculosis was present

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on 1st July, 1953.

where there was, in fact, progressive massive
fibrosis. Even after all underground workers
became eligible for compensation under the
Workmen's Compensation Acts in 1934, there
were no more than four or five certifications each
year from Northumberland, Durham and Cumber-
land together.

The large numbers of miners with abnormal
lung radiographs in South Wales led to new
legislation in 1943, and a change in diagnostic
standard. The yearly certifications began to rise
all over the country, most strikingly in South
Wales, but also in the Durham coalfield, although
the numbers certified there were relatively small.
Fletcher suggests that there was a true increase
in the prevalence of the disease in South Wales
and that various social and economic factors led
more men to apply for compensation. There has
probably been a true increase in prevalence in the
Durham coalfield also over the last 20 or 30
years, but the recent social and economic pressure
has been less intense. On the other hand, there
has been more opportunity for chest radiography,
better quality radiographs since Gough's
description of the lung changes due to coal dust and
a better appreciation of the pathology of the
disease. In Durham coal mines it is more
likely that gradual mechanisation has increased
the amount of dust underground beyond the
capacity of existing ventilation to remove it.
When a medical clinic was opened in Newcastle by the Nuffield Department of Industrial Health in 1947, it was found that pneumoconiosis was a major problem in the Durham coalfield, and some confirmation of this was obtained from the work of a mass miniature radiography Unit in County Durham during 1948-1949. The Department of Industrial Health had the opportunity of studying nearly 1,500 large radiographs, representing about 10 per cent. of the total working population of eight Durham collieries, taken during the course of the work of this unit. From a study of these films it was concluded that a minimum of 3 to 6 per cent. of the men at these pits showed evidence of dust in their lungs. These were men with radiological changes of Category 2 or more according to the Pneumoconiosis Research Unit classification. This estimate is low because of the poor voluntary attendance at the M.M.R. unit, which was never more than 60 per cent. of the men, and because all men were first examined by means of a miniature film and it is likely that many of the lower categories of dust changes were missed. In spite of the likelihood that miniature films do not detect pneumoconiosis in its earliest stages, mass miniature radiography has the great advantages of rapidity and cheapness. It will detect men with pulmonary tuberculosis and progressive massive fibrosis and might suffice as a measure of control if used as a routine together with random sample of large films.

There is clearly a need for a radiological survey of the Durham coalfield, and also of the Northumbrian coalfield to determine the prevalence of pneumoconiosis, and to further the prevention of the disease. The task of deciding how much disability results from the lung changes is much more difficult and I do not propose to discuss it here.

The main problem of the disease is in the larger Durham field where there are about 100,000 miners, compared with about 40,000 in Northumberland. The working methods differ in the two areas; in Durham the traditional board and pillar system has been retained to a greater extent than elsewhere, and ventilation has been bad. In the west of Durham coking coals are found, while to the east, lying more deeply under the Permian rocks, are steam, gas and house coals. In Northumberland there are chiefly steam and gas coals and the best coals are not at great depth. In both Durham and Northumberland certified cases of pneumoconiosis have come from all over the country and have not been confined to any one area.

Apart from a probable difference in the proportions of men affected with the various stages of the disease, pneumoconiosis in the north east of England is similar to that in South Wales clinically, radiologically and pathologically, and the Pneumoconiosis Research Unit classification of radiographs has been used since 1949.

In clinical work in Newcastle simple radiological pneumoconiosis is a common finding in faceworkers, and the more disabling progressive massive fibrosis, though often seen, is probably less common than in South Wales' miners. Pneumoconiosis may occur as a chance finding in a truly symptomless stage; it may be present as breathlessness with or without signs of bronchitis; or it may be found with unrelated cardiac or pulmonary disease, when it is impossible to determine its part in producing disability. In Durham miners we have found that while the tendency to withdraw from the face to work outside increases with advancing age, this transfer is most marked in men suffering from progressive massive fibrosis and does not accompany an increase in category of simple pneumoconiosis. We have found only a small number of men with complicated pneumoconiosis who have tubercle bacilli in their sputum, and these cases usually progress relatively quickly. The treatment of pneumoconiosis is symptomatic, except perhaps in cases with progressive massive fibrosis in whom there is often subjective improvement during a course of streptomycin and isoniazid. However, this may not last after withdrawal of the drugs and the sputum may still be positive.

In giving men advice about their pneumoconiosis, it must be remembered that there are many men at work with radiographic abnormality, but without disability. In simple pneumoconiosis progression is slow, but the change to complicated disease, or within the complicated categories, may occur within a relatively short period. Thus the main danger to the miner is tuberculous infection of the lungs, and the prevention of this is part of a larger national problem.

Social and economic factors tend to overshadow all others in pneumoconiosis of coal miners for the man may be too old to learn a new trade and there is usually no alternative to work in or around the pit. This is, therefore, a problem for the coal industry but there are at present only a limited number of jobs available for men debarred from working at the face or elsewhere underground. Where lung changes are present without symptoms, there is often difficulty in leaving dusty work. It has been suggested that men with early radiographic changes (Category 2) should be advised to leave the industry on the grounds that they will not then progress to the stage in which progressive massive fibrosis may arise. To a series of twenty men of 35 years of age or under, all with pneumoconiosis of Category 2, and without disability, the position was explained as clearly as possible so that they might make a choice between remaining at facework, or changing to work away from the face, or leaving the industry. In every case they elected to remain at facework for various reasons, which included the loss of income involved by changing their work, family responsibilities, and the difficulty of obtaining
a house on moving to another area. It is often justifiable to advise a man to continue with dusty work if he is physically able to do it, if after full explanation of the risks he chooses to continue and if one is certain that measures to suppress dust are being taken.

The determination of the true prevalence of pneumoconiosis in the Durham coalfield will be a stimulus to prevention of the disease but there still remains the problem of the amount of disability that exists with it, and also the relation to dustiness of the chronic bronchitis which is so frequently present in miners with and without radiological pneumoconiosis. It is impossible to make coal mines completely dust free, but if more were known about the marked individual differences in susceptibility to dust, employment at facework of the less susceptible men, together with a low level of dustiness, might lead to only a negligible amount of pneumoconiosis in our pits.

A Recent Advance in Sanitary Equipment for Use in Coal Mines and Underground Workings

The H. & H. Mobile Latrine

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The Regulations and Orders relating to Safety and Health made under the Coal Mines Act 1911 prescribe the standards of sanitation to be provided on the surface and underground in coal and metalliferous mines.

There has been no lack of enthusiasm by the Mine Managements to comply with the statutory regulations, but the provision and maintenance of adequate underground facilities is probably one of the most difficult problems of underground mining management.

The reasons for the difficulties in maintaining adequate sanitation in the mines are:

1. The underground strata are constantly moving so that the installation of a pipeline sewage system is not a practical proposition.

2. As areas of coal are extracted the concentrations of men working at the coal faces constantly change. The sanitary convenience, if provided for the use of coal face workers, should move forward as the coal face advances. (See Figure 1).

Up to the present the provision of underground sanitary facilities has consisted mainly in the installation of bucket type receptacles in the form of earth or chemical closets. The installation of bucket type receptacles is easily accomplished, but the practical difficulties of maintaining them in a sanitary state are enormous. The chief difficulties are as follows:

1. The appointment of a suitable person willing to handle a bucket type receptacle in a foul and occasionally damaged condition. Failure to appoint such a person causes rapid deterioration and finally a complete breakdown in sanitary arrangements.

2. To ensure that the receptacles are taken out of the pit to a central cleansing point to be efficiently cleansed and serviced.

3. To ensure that the receptacles are returned to their proper sites underground.

4. To prevent spillage of the contents of the receptacles during transit from the site underground to the cleansing point.

5. To design and establish an effective cleansing point.

6. To ensure satisfactory re-siting of sanitary conveniences as coal faces advance, and the man concentration changes.

7. The provision of a seat on a receptacle is a disadvantage. Very few workers will sit on it, and consequently the risk of soiling the seat and surround is very great. Once the seat area of the receptacle is soiled with faeces, men will not use the receptacle and find other areas in which to function.

The concentrations of men underground at any one time of the day may be represented diagrammatically as follows: