5. Doubt remains as to the exact route of infection: if infection was established in the accepted way—by means of an infective stalk passing through the tympanic roof, through the dura, and then along the course of the vessels of the pia mater to their free bifurcation beyond the deep surface of the grey matter—the facts at least show how small may be the changes in these intermediate tissues for the establishment of a large abscess in the temporo-sphenoidal lobe.

I am indebted to Dr. Percy Jakins for his kindness in allowing me to write an account of this case, and also to Dr. Wyatt Wingrave, who has kindly allowed me to make use of his notes with regard to the necropsy and the pathological examination of the cerebro-spinal fluid.

TWO CASES OF OCULAR DISEASE ASSOCIATED WITH PYORRHOEA ALVEOLARIS.

By SYDNEY G. TIBBLES, L.R.C.S., L.R.C.P. EDIN.,

CLINICAL ASSISTANT, ROYAL WESTMINSTER OPHTHALMIC HOSPITAL; LATE SENIOR HOUSE-SURGEON, WESTERN OPHTHALMIC HOSPITAL, ETC.

In view of the increasing attention now being given to oral sepsis in the treatment of systemic diseases, the following reports of eye conditions associated with pyorrhoea alveolaris may be of interest:

CASE I.

W. D., aged 23, sought advice complaining that "his sight was becoming bad." He added that he had not been in good health for the past two months, and could not see so well as formerly with his left eye. There was no history of syphilis.

State on Examination.—His vision was found to be:

Right eye = $\frac{5}{6}$; with $\begin{matrix} + 0.5 \text{ D. spher.} \\ - 1 \text{ D. cyl. } 180^\circ \end{matrix}$ = $\frac{5}{6}$.

Left eye = $\frac{5}{6}$; with $\begin{matrix} + 1.75 \text{ D. spher.} \\ + 0.5 \text{ D. cyl. } 45^\circ \end{matrix}$ = $\frac{5}{6}$.

There was nothing abnormal to be seen externally, but on examining the right fundus the vitreous was found to be slightly hazy. The vitreous of the left eye, however, contained some opacities, and there was evidence of recent choroiditis. The mouth was in a bad state: the gums very unhealthy, while the teeth were carious and broken-down.

Treatment and Result.—The patient was advised to have the mouth attended to at once; he was ordered atropine and rest for the eye, and was given mercury and potassium iodide internally. Two months later the vitreous opacities had cleared up, and the choroidal trouble was better. With the correction already stated, which he was now allowed to wear, his vision was: Right eye = $\frac{5}{6}$; left eye = $\frac{5}{6}$, not improved. The patient admitted that he felt better for his dental treatment.

CASE II.

Mrs. G., aged 46, was sent for treatment with an irido-cyclitis in her right eye. She stated that it had become inflamed and irritable six weeks before seeking advice.

State on Examination.—Her left eye had previously been operated upon for cataract, but she had a secondary cataract which required needling. Her vision was: Right eye = $\frac{5}{6}$, not improved; left eye = perception of light, with a fair sense of projection. She had photophobia, well marked ciliary injection, a slight degree of keratitis punctata; in the anterior chamber lay a mass of lymph, while the iris was discoloured and showed some adhesions on dilating. In the fundus was a commencing choroiditis, while there were also some vitreous opacities. The mouth showed both gums and teeth to be in a most unhealthy state. Pus oozed up from the sockets of the teeth, which were practically all carious. In addition the general state of the patient was bad; she was thin, anaemic, and generally out of sorts.

Treatment and Result.—As the patient had only the one eye to depend upon, treatment was somewhat urgent. Accordingly, she had every tooth cleared, upper and lower, and was put upon a mouth wash. Internally, she was given mist. alba with mercury and potassium iodide. She was ordered complete rest and a nourishing liquid, later semi-liquid, diet was given. A fortnight later she said she "felt better than she had done for months." The eye was much quieter, and the iritic adhesions, with the exception of one, had all broken down under the atropin. The ciliary injection had nearly disappeared, while the effusion of lymph had shrunk in size. Two months later the patient's eye was perfectly quiet, and she then discontinued her shade and the treatment. Her vision then was:

Right eye = $\frac{5}{6}$; with $+ 0.5 \text{ D. spher.}$ = $\frac{5}{6}$ (compared with $\frac{5}{6}$ initially).

In addition she had gained 6 lb. in weight, looked better, and said she felt better in health than she had been for some time.

D

The Milroy Lectures

ON

THE HYGIENIC ASPECT OF THE COAL-MINING INDUSTRY IN THE UNITED KINGDOM.

DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS OF LONDON.

By FRANK SHUFFLEBOTHAM, M.A.,

M.D. CANTAB., J.P.,

MEDICAL REFEREE UNDER THE WORKMEN'S COMPENSATION ACT FOR THE NORTH STAFFORDSHIRE DISTRICT.

LECTURE V.

BEAT HAND, KNEE, ELBOW AND BUTTOCK.

THESE terms were not known in some parts of the country, even in mining districts, until they were defined by the Departmental Committee on Industrial Diseases, which reported in 1907.

Beat Hand.

The term "beat hand" signifies an acute inflammation of the subcutaneous tissue of the hand involving its palmar aspect; it may affect the palmar side of the fingers and thumb.

As a rule, the hands of a miner show rough and thickened skin on the palmar side, undoubtedly due to the use of the pick. This condition is almost invariably found in miners past middle age. The areas of skin most often affected are: (1) Along the roots of the fingers; (2) over the ball of the thumb; and (3) over the hypothenar eminence on the inner side of the hand. The skin over the centre of the hand is generally softer than the skin over other parts of the hand, and consequently this part of the hand is less protected, and this is generally the seat of the trouble known as beat hand.

Although in cases of beat hand there is no history of any injury, inoculation probably takes place through an abrasion. In the ordinary course of a miner's work the hands are often knocked and the skin abraded. These injuries may be so trifling as to escape notice, and yet they may be sufficient to permit inoculation with an infective poison. One of the most prominent symptoms, as in other septic conditions, is local throbbing, or, as it is locally known in the North of England, "beating," hence the term "beat hand," and the same explanation applies to beat elbow, beat knee, and beat buttock.

In many cases inflammation goes on to suppuration, and the pus will track along the tendon sheaths, but most often to the back of the hand. The inflammation will be limited by the thickened skin over the palm, but there may be considerable swelling in the centre of the hand, and the skin will be hot and glazed.

The course of the disease will depend upon the treatment which the patient receives. If there be any considerable formation of pus and relief is not given, a general septic condition of the hand and fingers may result, but if early treatment be applied the inflammation clears up in a comparatively short time.

The frequency of the disease among miners may be judged from the statistics compiled by the Home Office of compensation and proceedings under the Workmen's Compensation Act. On the average, between 700 and 800 cases are reported each year in the colliery districts of this country. Beat hand is most frequently found in those districts where the coal seams are hard, and the majority of cases appear to be reported from Northumberland and Durham. The men who are actually coal-getters are most commonly affected, and this can be explained from the fact that it is they who use the pick at their work.

The disease attacks the soft part of the hand, and, speaking generally, soft hands are a predisposing cause of this disease; after a long strike, during which the skin over the hand has become softened, an unusual number of cases may arise when work is resumed.

The most important etiological point with regard to beat hand is the fact that there is no history of an accident in any case, and some colliery doctors call it idiopathic cellulitis of the hand.

The duration of the disease is, on the average, from three to six weeks; the statistics of the Northumberland

and Durham Miners' Permanent Relief Society show that in 1905 there were 55 cases of beat hand out of a membership of 37,000, and the average duration of incapacity for work of these cases was just over three weeks.

Complete recovery takes place in the vast majority of cases, but in some instances permanent deformities of the fingers or hands result.

Treatment.

It is important to recommend hot fomentations from the onset of the treatment. The hand and arm should be kept in a sling, and if there is any increase of temperature the patient should be kept indoors. If pus forms, an excision should be made at once so as to ensure free drainage, and the wound treated by hot antiseptic fomentations. In many cases pus has actually formed when the patient first consults the doctor, and in such cases an incision should be made without delay. Bier's treatment is of the greatest value in cases of beat hand, and should the joints of the fingers or of the hand become stiff as the result of septic infection, it may be necessary, to ensure a good result, that the patient should have an anaesthetic so that the adhesions can be broken down. In such cases massage and passive movement are of the greatest value, and I do not doubt that ionic medication will be of some service in treating obstinate cases. It is most important in all these cases not only to treat the acute septic inflammation, but also to ensure the function of the hand being restored in the shortest possible time.

Beat Elbow.

Beat elbow is acute inflammation round the olecranon. It may affect either the subcutaneous tissue round the elbow-joint or the olecranon bursa, or both these structures, and may spread both upwards and downwards from the elbow-joint and practically involve the whole limb. While complete recovery takes place in the majority of cases in from a month to six weeks, serious complications may set in which result in some permanent disability to the structures round the elbow-joint, causing stiffness of the elbow and weakness of the forearm, and the prognosis is undoubtedly more serious in elderly workers.

Treatment of beat elbow is similar to that of beat hand.

Beat Knee.

Beat knee is an acute inflammation in the subcutaneous tissues round the knee-joint, particularly below the patella. In this connexion it is important to remember the disposition of the bursae about the knee-joint. In the front of the joint there is one between the patella and the skin; there is a smaller one between the upper part of the tuberosity of the tibia and the ligamentum patellae, while a third is placed between the lower part of the tuberosity of the tibia and the skin. On the other side of the joint there are four bursae.

The history of cases of beat knee is similar to that of cases of beat elbow. A case which I saw a little time ago was that of a holer, aged 31, who had always worked in a coal-pit since leaving school, and who suddenly felt a pain in the right knee-joint and was compelled to give up work. He did not know how the trouble came on. I saw him four days after the onset, when there was considerable swelling about the knee, particularly below the patella. He was limping, and walked with a stick. The movement of the knee was good, there was no grating in the joint, and no swelling of the large patella bursa. The knee felt hot and was tender. This case was treated with hot fomentations, and in the course of three weeks the man was back at work again.

This was a simple and uncomplicated case, but one finds, as in beat hand and beat elbow, that there are cases of a severe type with constitutional disturbances and some permanent disability due to thickening and adhesions round the knee-joint. In these cases there may be some permanent lameness, even when the patient has had the knee moved under an anaesthetic.

In all cases of beat hand, beat elbow, and beat knee the importance of massage and passive movement cannot be overestimated in view of the possibility of the permanent deformities to which I have referred.

Beat Buttock.

This is an uncommon condition that is sometimes found due to irritation and friction over the gluteal region.

There may be subcutaneous inflammation as well as bursitis, and great pain and discomfort may arise from the nature and situation of the lesion. The symptoms, course, and treatment are identical with those of the foregoing conditions; but in cases of beat buttock there is never any permanent disability, owing to the fact that the trouble is not in the immediate region of any joint.

Workmen's Compensation Act.

According to the provisions of the Workmen's Compensation Act these conditions are regarded as industrial diseases in the occupation of mining only, but the same condition may be found in other occupations. It may be found among steel workers and agricultural labourers; it may also frequently occur among bricklayers and any workers employed in pick and shovel work. It is important to consider in any given case of beat hand whether the condition has been brought on by the nature of the man's employment—that is to say, whether it has been acquired through his working as a miner. It has been pointed out that, as a rule, the miner's hands are very rough, at all events in places, and that the palm of the hand is the least protected part, while small abrasions, perhaps of trifling nature, are almost of daily occurrence. These points are certainly incidental to the employment of mining; but, on the other hand, it is possible for infection to gain entrance into the hand when the man is at home, especially if he is engaged in gardening or following any hobby which involves manual labour. If, however, he has worked regularly as a miner and is suddenly incapacitated on account of beat hand, it would be very difficult for an employer to resist the man's claim for compensation, as the onus would be thrown upon the employer to prove that the beat hand was not due to mining work.

In any given case, the man first of all consults his doctor, who, after making a diagnosis, gives a certificate to the effect that the man is suffering from beat hand; the man is then sent to the certifying surgeon under the Factory Acts for the district, whose duty it is to certify whether the man is suffering or not from beat hand. Every case of beat hand that occurs among miners is one for which compensation is bound to be paid on account of the impossibility of tracing the cause to any other source outside that of the man's employment, but it can be seen that it is not impossible for compensation to be paid for cases of beat hand in which the trouble has been set up in carrying out some work outside that of mining. The same remarks will apply to beat elbow and beat knee.

If subcutaneous cellulitis in the hand or about the elbow or over the patella be due to direct injury, then there will be no question about compensation being paid if the disability for work continues for more than seven days, as the injury in such cases will be covered by the Workmen's Compensation Act as an accident, apart from the scheduled diseases.

SPRAINED TENOSYNOVITIS ABOUT THE WRIST.

Inflammation of the synovial membrane of the wrist-joint and of the tendon sheaths with exudation of lymph may occur among miners through the continued jerking and jarring of the pick in the hewing of hard coal. This condition is, according to Dr. James Anderson, more or less specific to the work of a coal-miner, and is, he says, never seen except among coal-hewers. It is most commonly found in Northumberland and Durham, where the coal seams, generally speaking, are hard; there is no evidence to show that it is found among men who work in soft coal. During the year 1911, 184 certificates of disablement were given by the certifying factory surgeons for this complaint in Northumberland and Durham.

The symptoms are swelling and thickening around the affected wrist-joint, stiffness of the joint, pain on movement, and crepitations in the joint due to deposits of lymph within the tendon sheaths. Owing to the laborious nature of a miner's work it is very difficult to say whether a slight accident has occurred or not, or whether a slight strain may not have taken place any day when he is employed in the mine, but speaking generally it may be said that the man suffering from this condition does not complain of a definite accident. He does not know exactly the time when the symptoms arose; at first he may think that a slight sprain has taken place, and may work with it for

weeks, but ultimately the symptoms become more acute, and he is obliged to discontinue his work. In other cases, when the miner is working with a heavy hammer or pick, the wrist may be sprained by a sudden jerk of his tool.

The duration of this disease is, on the average, from two to four weeks, but in those cases in which the workman has persisted in his occupation after the complaint has been definitely set up, the condition may last very much longer, and in some cases for several months. In cases that have become chronic, or in which there is a rheumatic predisposition, or which have been neglected, there may be permanent thickening around the flexor tendons of the wrist; the wrist-joint may be stiff to some extent, there may be pain on flexion of the wrist, and the power of grip may be diminished. Pain may be a prominent symptom apart from movement of the joint, and it may be impossible for the miner to button his clothes, lace his boots, and use a knife and fork.

Treatment.

In acute cases it is advisable either to blister the affected part or to paint the skin with tincture of iodine. Tight pressure by means of a bandage gives relief, and it is necessary to insist upon complete rest for the affected part. In chronic cases support should be given to the wrist by means of a strap, and if there be any thickening or stiffness of the joint massage and passive movements should be employed. In rheumatic or gouty subjects suitable remedies should be given internally, but in the majority of cases, if energetic local treatment be applied, there should be no permanent deformity, and even in those cases in which the treatment is most disappointing there should be nothing worse than weakness of the wrist-joint. When once this condition has been set up there is a tendency to recurrence, but this can be minimized if the miner wears a well-fitting wrist strap on return to work.

Diagnosis.

This depends upon the local symptoms, the absence of any definite injury, and upon the actual nature of the man's work, and, as in cases of beat hand and beat knee, it may be possible for the injury to be set up when carrying out some employment outside mining. Still, if the workman denies that he has been engaged in any work outside that of his ordinary occupation, the employer will be compelled to accept his statement and responsibility for compensation at the same time. Dr. Dickinson Leigh, who practises in the mining districts of Durham, says that he has found a good many of these cases among men who work in ship-yards and engine shops, so that it is possible for a man who has worked in these employments prior to going into the pit to have actually acquired the disease while working in another employment to which the provisions of the Workmen's Compensation Act with regard to this disease do not apply.

MINERS' ITCH OR MINERS' RASH.

In many colliery districts coal-miners working in certain pits or certain seams are known to be affected by skin eruptions which they attribute to their employment underground. These eruptions are known as miners' itch or miners' rash, or in some cases they may take their name from the pit where workers in that pit are commonly affected by them.

The lesion may be erythematous or may consist of boils, and the parts affected are generally those exposed to the greatest extent to the coal dust—that is, the lower part of the legs and the forearms, and also those parts where there is the greatest pressure, such as just round the ankles at the upper level of the clog or boot, and also round the waist at the level of the waist-belt. In my experience the disease generally begins as an erythema between the ankles and the knees; there is intense itching, not only while the men are at work, but also when they return home and have washed and gone to bed, and naturally the men endeavour to relieve themselves by scratching the affected part, or at all events rubbing it. The forearms are also affected frequently in the same way, and the erythema may spread to the thighs, the upper parts of the arms and all over the trunk. The feet, upper part of arms, and neck, as a rule, escape. The amount of irritation is so great that the patients are unable to sleep and they are not able to follow their employment. Following the erythema, we frequently find the patient affected by boils; these are most frequently

found on the legs and forearms, but may also occur on the back, the chest, and the back of the neck. In some cases, when the boils are small, they may be very numerous, but in other cases they may be very large, almost like small carbuncles, and when this occurs there may be only two or three. I have frequently found the glands in the axilla and the groins enlarged as a result of these boils, and when the latter have been neglected distinct lymphangitis has been set up.

In some cases one finds erythema alone, in others erythema and boils, and in others again boils alone. When the boils appear round the waist at the level of the waist-belt the condition at first sight may look like shingles, but the character of the primary lesion, as well as the absence of the acute neuralgic pains, will enable the diagnosis to be made. The only pain experienced in miners' rash is when the patient is suffering from the discomfort of large boils and from any affection of the lymphatic vessels or glands which may follow.

This disease occurs with considerable frequency, and during the last twelve months I have seen forty such cases. Its course depends entirely upon whether the man gives up work from the onset or not, and the nature of the treatment. If the patient is properly treated and rests at home recovery takes place in from two to four or five weeks, depending upon the severity of the symptoms and whether he is suffering from large boils or lymphatic trouble, and the incapacity for work depends entirely upon the same factors. It should be clearly understood that in many of these cases the patient is totally incapacitated for work for a period of several weeks. Even under treatment the miner may be away from work for as long as six weeks.

Diagnosis.

The diagnosis is generally made correctly by the patients themselves. They are aware that certain pits or seams are known to be places where the rash is commonly contracted, and in no case I have seen has a mistake been made in this direction. If no history were given of the onset of the case or the conditions under which the men worked were not known, the erythema when it appears on the chest is not unlike a mild scarlatiniform rash, but a little less bright; but it is diagnosed from scarlet fever by the fact that the temperature is normal, the fauces and tonsils are not inflamed, and there are no such constitutional symptoms as pains in the limbs, back, and vomiting. Crops of small boils may be diagnosed from drug rashes by their distribution and by the history of the case, and the large boils to which I have referred are, as far as my experience goes, never associated with glycosuria, so that a diabetic origin can be eliminated. We have seen with what frequency accidents occur in mines, and trivial accidents, such as small scratches and bruises, are almost a daily experience of each miner, but in the cases to which I refer there is no history of any such injury. It is important not to overlook the possibility of skin affections in miners being due to ankylostomiasis, and it is necessary, therefore, to distinguish miners' itch from "bunches," the name given to the inflamed skin produced by worm disease.

Treatment.

The treatment will depend upon the character of the symptoms, but in all cases it is advisable for the man to keep away from work until he has recovered. If there be no more than simple erythema, ordinary cleanliness and a dusting powder such as borated talcum or finely powdered boracic acid may be sufficient, but in cases of great irritation liquor carbonis detergens is a useful application, as also is a menthol ointment. Large boils may require opening and treating antiseptically, and in severe cases it may be necessary to open abscesses in the axilla and the groin, and treat them in the same way. For the general debility which follows serious cases quinine, arsenic, and iron are found to be of the greatest value, combined with nourishing food and fresh air.

Etiology.

The cause of this trouble is a matter of great complexity. I have heard from miners working in different pits various accounts. Some attribute it to the high temperature of the workings and the irritation of the coal dust with profuse sweating. Others attribute it to the excessive amount of liquid taken in consequence of the great heat

of the workings, while a third theory is that the complaint is caused through drinking the pit water.

I have investigated this subject to some little extent, and have found that the seams of coal in which the men work who are liable to this disease are invariably of a bituminous nature; in other words, the coal is used for the formation of coke. Again, the seams are invariably hot, with temperatures varying from 80° to 90° and 95° F., and under such conditions there will be to some slight extent continual though slow distillation of the bituminous coal with the formation of not exactly coal-tar products, but at all events bodies which are the result of decomposition of this coal. I believe that the coal dust in these seams may contain some product of distillation which has the same irritating effect on the coal-miner's skin as coal-tar products are well known to have. This explanation may account both for the erythema and for the boils, but when the effect of the high temperature in producing profuse perspiration is taken into consideration, it is easy to see that the tendency for these eruptions to form and develop is increased. As soon as irritation is produced I feel sure that the mechanical irritation of the coal dust itself is also another factor in the aggravation of the complaint. I have had coal dust taken from these seams examined bacteriologically, and have invariably found that it is infected to a considerable extent with staphylococci. This would explain the formation of boils, and I have found the pus taken from the boils to contain the same micro-organism.

There is, however, another explanation. Professor Cadman has pointed out to me that in the seams in which this disease is found iron sulphate is present to a considerable extent; it can be seen on the sides of the roadways, and the dust covering the roadways contains small particles. During the process of oxidation and in the presence of water, free sulphuric acid may be produced, and the mine water in some of these seams is most irritating and acid to the taste. Sulphate of iron is known to be an irritant, and smarting of the eyes may come on immediately after exposure to the dust. Cadman and Walley have noticed that pit water may produce an irritable rash and ulcers upon the skin, and in one pit the water upon analysis was shown to contain

Alumina and oxide of iron	...	0.02 per cent.
Barium chloride	...	0.15 "
Calcium chloride	...	2.38 "
Magnesium chloride	...	0.86 "
Sodium chloride	...	12.93 "

As these skin affections have not before been recognized they are not covered by the Workmen's Compensation Act, but in view of the trouble being undoubtedly occupational in nature and causing in many cases complete incapacity for work it seems that they should be included in the schedule to this Act in the same way that eczematous eruptions acquired by workpeople owing to the nature of their employment.

THE INFLUENCE OF LEGISLATION UPON THE HEALTH OF MINERS.

From the time that coal-mining came to be recognized as an industry in this country laws were passed to regulate it, but they had special reference to the possession of mining property and for the protection of owners against the violence of their workpeople, and it was not until the year 1842 that any legislation was passed that had a direct bearing upon the health of those employed. In this year the employment of female labour underground was forbidden, and regulations were made to improve the conditions of the boys who were engaged in underground workings. From this time onwards many Acts of Parliament have been passed with the object of improving the conditions of labour, and in this way bettering the health of the workers. In 1850 the law provided for the inspection of coal mines; inspectors were appointed by the Home Secretary, and were given power to enter and inspect the works of any colliery both above and below ground and to inquire into all matters relating to the safety of the persons employed. For the first time it was made necessary that notices of accidents causing loss of life should be sent within twenty-four hours to the Home Office, and it was made incumbent upon the owners of pits to provide proper plans of the workings and to maintain them in an accurate condition. Subsequent legislation provided for

improved ventilation of the workings and that all pits should have two exits.

The laws with regard to the regulation of coal mines were revised and consolidated in the Coal Mines Regulation Act, 1911, which makes special provisions for increased protection for the workmen by a more systematic method of timbering, by regulations which control the use of electricity in the mines, the use of explosives and the methods of firing shots, and mitigate the risk of haulage and shaft accidents.

Provision is also made for improved ventilation in the mine. Working places where firedamp is present to a greater extent than 2.5 per cent. are deemed to be dangerous, and it is not permissible for men to be employed in an atmosphere charged with firedamp to this extent. Steps have to be taken for the prevention of coal dust. It is now necessary for all colliery owners to provide a sufficient supply of ambulance requisites at convenient places in the mine, and the organization of rescue brigades is compulsory in all the colliery districts not only for the purpose of saving life in cases of explosions, but for recovering the bodies, and helping to put into proper order working places that have been destroyed by the explosion. Facilities have been increased for investigating a mine after an explosion, owing to the fact that it is now incumbent upon colliery proprietors to be able to reverse the ventilating current by means of their machinery on the surface. It is now necessary also for coal owners to provide proper sanitary convenience for the use of the men near the pit bottom and at central places along the roadways, and a clause in the Act enables the workpeople to be provided with baths and washing accommodation on the surface, the cost being defrayed jointly by the employers and the workmen.

The time has, as yet, been too short to appraise the benefits of this Act of Parliament, but, as far as legislation goes, it is certainly a great step in the right direction. But the occurrence of accidents and the prevalence of disease peculiar to the coal-miner does not depend altogether on conditions legislation can effect. The long death roll year by year and the tremendous number of non-fatal accidents are in some instances, perhaps a large number, due to the fact that the human factor enters into these occurrences.

Just as it is impossible to free a nation from drunkenness by Act of Parliament, so it is and will be impossible to free the collier's life from risk of injury. Carelessness or callousness on the part of either the workman or his employer may result in the greatest disasters, and it is a significant fact that if the number of deaths and non-fatal accidents be estimated not as a percentage of the total number of employed, but in relation to each million tons of coal brought to the surface, we find that in the last ten or twelve years no improvement has taken place in this respect.

Time will show what effect the Act will have upon the health of miners, but even if the results are as disappointing in the future as they have been in the past, we should not regard ourselves as at the end of our resources. Something must still be done to reduce the yearly death roll and the large number of non-fatal injuries. It might be necessary to have a more thorough and systematic inspection of mines in order that all the provisions which have been made with the object of diminishing these accidents should be strictly observed, so as to reduce the number of falls of roof, haulage accidents, and the various other accidents which at the present time are regarded as incidental to the miner's daily work, and to see that the law is carried out to the very letter. It may be necessary to consider whether the ordinary mining engineer who has the sole management and control of any given pit is sufficiently trained in modern scientific methods to deal with all the problems with which he may be brought into daily contact. Medical men are inclined to believe that their own profession covers as much if not more ground in the realm of knowledge than any of the other learned professions, but the competent mining engineer is daily brought in contact with problems of geology, of chemistry, of physics, of engineering, of electricity, as well as of the commercial side of his business, and perhaps the time has come for the heads of the mining profession to realize that specialization in mining may be the means not only of working the pits to a greater financial benefit, but also of diminishing to a very large extent the number of injuries

which daily take place. Greater advantage should be taken of the facilities for special training given at such universities as Birmingham and Sheffield, and it seems incredible that, in view of the importance of the profession of mining engineering, comparatively so few students pass through these institutions for the purposes of graduation, although I am happy to say that the numbers now increase year by year.

We have seen that the only hope of diminishing the number of cases of miners' nystagmus is by improving the illumination of the mines, and in my opinion it should be obligatory on colliery owners to supply better illumination along the roadways and at the working face, so that the incidence of this disease in the future shall be materially diminished. Expense will undoubtedly be incurred by the inauguration, say, of electrical lamps in addition to the ordinary safety lamp, but I am confident that the owner will be well repaid for his money, not only by the improved health conditions of the workers, but also because the men will be able to see what they are doing, and it is obvious that they can do their work very much better in a good light than in the wretched light to which they are subjected at the present time.

Great Britain is the only European country in which there is no legislation to regulate the temperature at which men work in coal mines, and I think that this country should be brought into line with the other principal European countries, and employment forbidden in workings where the wet-bulb thermometer reading is so high as to be injurious to health. I am not going to lay down what the limit shall be. That should be a matter for full consideration. But when we realize that the Lancashire weaver, the Staffordshire potter, and the colliers in France, Germany, and Belgium are protected against working in temperatures recognized to be injurious to the health, I do not think it is unreasonable to suggest that legislation should do at least as much for the coal-miner in this country.

I believe that the law should provide for a compulsory medical examination of all applicants for work in coal mines who have been in the tropics or in the colonies or who have worked in European mines or even in the tin mines of Cornwall where ankylostomiasis may prevail. It is only from such sources that the coal mines of this country can be infected, and every means should be taken to prevent any infection ever occurring.

CONCLUSION.

So much for legislation. Something further can be done and that by the medical profession. It seems strange that industrial diseases should have been neglected in the medical schools of this country and by the vast majority of the leaders of the profession, and that the researches in this branch of medical science have been left to individual effort. There are thousands of medical men working in the industrial districts of England who have never received any training in the medical schools on the diseases which they may be called upon at a moment's notice to diagnose and to treat. Young medical men who go straight from the hospitals to practise in these districts undoubtedly fail in many instances to realize what these industrial diseases are, and their experience, the experience of all medical men in those districts, is gained at the expense of the patient. I think that a great deal can be done to improve the health conditions of coal-miners, and other workers too, if instruction be given at the universities and medical schools in this important branch of medical science. When we think of the tens of thousands of pounds that have been expended in this country upon tropical diseases (with very good results) we cannot but realize how industrial diseases have been neglected, and feel how imperative it is that this matter should have greater attention, and that young men who know that they are going to practise in these industrial districts should have opportunities of making themselves conversant with those diseases and conditions with which they will be brought into daily contact.

THE Governor of New Caledonia has issued an order forbidding lepers to carry on any of the following trades: Baker, cook, pastrycook, inn or restaurant keeper, butcher, retail merchant, tailor, old clothes dealer, coach driver, sailor, dock labourer, hairdresser, barber, and domestic servant.

E

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

DERMATITIS VENENATA DUE TO RUNGUS.

In British North Borneo, and especially in the district of Marudu Bay, is found a tree which is called by the natives rungus, or ringus.

The contact of any part of this tree with the skin produces so severe a type of dermatitis that it is worthy of special description.

Within twenty-four hours of handling it, and generally towards nightfall, when it is customary for the natives to go down to the river to bathe, the skin of susceptible persons is affected with a most intolerable itching.

This is followed by the appearance of a rash consisting of clusters of raised red papules, which are noticed first on those parts of the body which have actually come into contact with the poisonous plant, and later spreads over the rest of the body. The appearance of the rash is usually accompanied with some elevation of body temperature and a general sensation of malaise. Within another twenty-four hours these papules have become vesicles, or even large bullae, filled with a clear serous fluid. These tend to become confluent and then burst, their serous contents becoming inspissated and forming yellow crusts. In other more severe cases the bullae become secondarily infected with pyogenic skin organisms—staphylococci, etc.—and when these break the body is covered with foul ulcers.

In such cases there may be considerable fever. The lesions are especially noticeable where skin and mucous membranes meet, as around the lips and the nostrils. The ears also are usually severely attacked.

The disease, if left untreated, generally runs a course of about five to seven days in mild cases, and healing takes place naturally with very little permanent disfiguration, unless the patient has scratched the lesions or otherwise infected them with pus-forming organisms, in which case permanent scars may be left. So far I have not seen or heard of a case of death from simple rungus poisoning, but pneumonia is occasionally a sequel, especially in those cases in which the mouth and nostrils are affected.

The incidence of this type of poisoning is considerable amongst the coolies engaged in cutting jungle with their parangs (short heavy swords used in Malaya). Amongst some 3,000 tobacco and rubber coolies under my observation, there have been about 20 admissions to the various estate hospitals from this cause during the past year. Nearly all the affected persons were Javanese.

These coolies know this tree quite well and its effects upon the skin. They say that it is the contact of the fresh juice which exudes from the cut tree with the body which produces the sores; but this I am inclined to discredit, for Mr. Carlton P. Brooke, the manager of Bongon Tobacco Estate (by whose courtesy I have been enabled to obtain and examine specimens of this tree), assures me that he has known cases of rungus poisoning acquired by sitting upon a heap of the branches which have been cut and dried for months.

The juice from the cut surface of the tree is clear, and exudes between the cortex and the wood. When dry, it is of a dull, pitch-black appearance. The tree itself attains a considerable size. Some of the branches brought to me were three inches in diameter.

The leaves resemble those of the jaborandi. On macerating them in rectified spirit for several days I obtained a chlorophyll-coloured tincture, which, when unfiltered, showed a powdery deposit; this, on microscopic examination, was found to contain many spherules of an intense blue-black colour, some of which possessed a single spicule. These were by far the most noticeable objects. Whether they were the spores of some fungus washed off the surface of the leaves, or droplets of an oleo-resin extracted by the spirit from the leaves I am at present unable to say. One thing is, however, certain—that they cannot produce the disease by mechanical irritation of the skin inasmuch as the filtered tincture, which was free from these bodies, reproduced the lesions in a mild form when painted on the skin experimentally. For the same reason the remainder of the insoluble debris can be excluded as being the causative factor.