REPORTS AND ENQUIRIES

Industrial Diseases :

Analysis of Factory Inspection Reports, 1920-1922: VI

EPITHELIOMATOUS ULCERATION

Great Britain

Of the 45 cases of epitheliomatous ulceration (with 1 death) reported in 1920, 33 were due to pitch, 9 to tar (net fixing, repairing barges, tar distilling, purification of anthracene, gas workers), and 3 to paraffin. Of these cases, 37 (82.2 per cent.) were over 40 years of age ; the duration of employment was over 10 years in 34 cases (75.6 per cent.) and over 20 years in 23 (51.1 per cent.) ; 26 cases (57.8 per cent.) were reported as slight.

The difficulty of securing a voluntary medical examination among the patent fuel workers of South Wales was considerable. The workers had at first asked for it themselves, as a preventive against pitch warts, but owing to the very slow onset of the incapacitating condition their interest evaporated. Efforts to modify their attitude were not very successful. Ultimately, with the help of the employers, the district inspectors were provided with lists of all workmen employed, together with the age, duration of employment, and precise occupation of each man. In view of the slow onset of the disease, it was decided to mark as " requiring examination now " only men over 30, with a duration of employment of over 10 years, engaged in an occupation exposed to risk. The total number of workers at Swansea and Port Talbot was about 1,900, and about 20 per cent. of these were marked for examination ; the corresponding figures for Cardiff and Newport were 767 and 28 per cent.

The organisation of the examination is left entirely to the trade union secretaries at Cardiff, Newport, and Swansea. Payment for the examination is made by the employers, who receive reports as to the general condition of the men, but without mention of individual names.

Dr. Scholberg, of Cardiff, after comparing various ways of treating pitch warts, prefers the use of carbonic acid snow, which does its work without danger of the septic poisoning which frequently follows cauterisation. Dr. Sladden, of Swansea, states that the weekly examination

of workers began in March, was interrupted in May, and resumed from November until Christmas. While there was still some hostility to the scheme, efforts to remove this opposition met with some degree of success. Many men with only short records as fuel workers presented themselves voluntarily for examination; this was probably due to greater willingness owing to their familiarity with such inspections in the Army or Navy, to a higher degree of interest among the new workers in the possible effects of pitch, and to the high proportion of new workers owing to recent expansion of the patent fuel trade.

In general the men are seen singly, stripped to the knee. Any abnormality is recorded on a special chart, together with notes as to period and type of occupation, age, address, and nationality. Not more than 8 to 10 cases can be thus dealt with in an hour.

A considerable number of remedies for pitch warts find favour with the men, including aromatic vinegar, soda, saliva, and herbalists' "cancer cures". When the warts are trivial treatment is not recommended unless requested. If they are more than, say, a quarter of an inch in diameter or show inflammatory changes, arrangements are made either for another special inspection after a short interval or for surgical excision at the hospital. Any warts or ulcers excised are submitted to histological examination in order to get the diagnosis as accurate as possible.

The following tables have been compiled to indicate the influence of age and duration of employment, but the numbers dealt with are not large enough to justify final conclusions. The cases are classified in four categories: (1) those showing no skin effects; (2) those showing definite skin erythema apparently associated with the occupation; (3) those showing warts regarded as "pitch warts"; (4) those with epithelioma. The flat papilloma, often very minute, was found to be by far the commonest type of pitch wart.

EFFECTS OF PITCH ON PATENT FUEL WORKERS: DISTRIBUTION BY AGE

Age (years)	Total workers seen	No effects	Erythema	Pitch warts	Epithelioma
15-20	2	2	—	—	—
20-25	7	7	—	—	—
25-30	16	11	2	3	—
30-35	17	3	3	3	—
35-40	25	15	3	7	—
40-45	19	7	4	8	—
45-50	21	11	3	7	—
50-55	20	3	—	14	3
55-60	17	5	1	9	2
60-65	10	2	—	6	2
65-70	1	—	1	—	—
70 and over	3	1	—	—	2
Total	158	75	17	57	9

EFFECTS OF PITCH ON PATENT FUEL WORKERS : DISTRIBUTION BY DURATION OF EMPLOYMENT

Years in fuel works	Total workers seen	No effects	Erythema	Pitch warts	Epithelioma
1-5	40	29	4	7	—
5-10	38	23	7	6	2
10-15	22	12	2	8	—
15-20	9	1	2	5	1
20-25	13	3	1	9	—
25-30	14	3	1	9	1
30-35	13	3	—	8	2
35-40	5	1	—	3	1
40 and over	4	—	—	1	2
Total	158	75	17	57	9

Malignancy was not seen below the age of 50. After that age about four-fifths of the men show some degree of skin lesion, most commonly wart formation. Skin erythema may occur in men of 30 and upwards, irrespective of much length of service. Pitch warts become common at about the age of 35. Of men with long service, about one-fifth of those who had been employed from 20 to 40 years showed no skin lesions. It is not yet possible to say whether the apparent freedom of this group of workers is due to more careful individual cleansing, less dusty conditions of work, or to some inherent individual immunity.

Although the conditions which control the formation of pitch warts are not yet definitely established, Dr. Sladden considers that their development into epithelioma would be largely within practical control by means of regular and adequate medical inspections of all pitch workers over the age of 30 or of more than 10 years' service ; provided of course that individual workers will also permit the removal of warts when advised to do so. Granted certain conditions, " pitch cancer " can thus be considered a preventable disease.

The following tables show the results of the medical examination of patent fuel workers at Cardiff and Newport from November 1919 to November 1920, age and duration of employment being provisionally accepted as factors in the incidence of pitch warts and pitch cancer.

TOTAL NUMBER OF WORKERS EXAMINED, BY DURATION OF EMPLOYMENT

Factory	Duration of employment (years)							Total
	1-5	5-10	10-15	15-20	20-25	25-30	30 and over	
A	1	4	4	5	3	—	1	18
B	14	16	10	14	9	7	11	81
C	14	13	20	15	20	1	15	98
D	1	4	3	4	—	1	3	16
Total	30	37	37	38	32	9	30	213

The following table gives the number of men showing pitch warts, whether carcinomatous or not, and those men showing changes on the surface of their bodies due to their occupation. Those affected have the prefix " yes" , the contrary " no ".

NUMBER OF WORKERS AFFECTED BY PITCH, BY DURATION OF EMPLOYMENT

Factory	Yes or no	Duration of employment (years)							Total
		1-5	5-10	10-15	15-20	20-25	25-30	30 and over	
A	Yes	1	4	3	2	2	—	1	13
	No	—	—	1	3	1	—	—	5
B	Yes	—	2	1	5	3	3	6	20
	No	14	14	9	9	6	4	5	61
C	Yes	—	5	7	3	12	—	7	34
	No	14	8	13	12	8	1	8	64
D	Yes	—	—	1	—	—	1	—	2
	No	1	4	2	4	—	—	3	14
Total	Yes	1	11	12	10	17	4	14	69
	No	29	26	25	28	15	5	16	144
Total		30	37	37	38	32	9	30	213

The percentage incidence of pitch warts over the different five-year periods in the above table was as follows :

Years of employment	Percentage affected
1–5	3.33
5–10	29.72
10–15	32.43
15–20	26.31
20–25	53.12
25–30	44.44
30 and over	46.66

The number of men on which the results have been calculated is far too small to justify any conclusions.

General Remarks. The medical examinations carried out during 1919-1920 give a certain amount of interesting information, in spite of the difficulties caused by the suspicions of the men. These suspicions are not limited to patent fuel workers; a similar case is that of the Welsh colliers, who struck work when proposals were made for a medical examination.

The medical examinations show, first, the general physique of the

men ; this was for the most part good, and in view of the type of work the cleanliness of the men was most satisfactory. It also provides clinical observations on pitch warts. These are of two kinds :

(1) The pendulous papilloma, having a slender pedicle, which varies in length from about one-tenth to a quarter of an inch. These may be present for a long time but give rise to no trouble. They are often situated on the upper eyelids and give rise to inconvenience. These for the most part get rubbed off.

(2) The flattened papilloma, but slightly raised from the surface of the skin, having a broad base and a smooth top. They are often seen on the back or along the sternomastoids. These warts are as a rule no bigger than the head of a small pin, and therefore often go unnoticed for a long time. But they may increase rapidly in size and if left unexcised become epitheliomatous. But the percentage of warts requiring this treatment is relatively small.

The pitch wart papilloma, whether pendulous or flattened, can be removed when small by carbonic acid snow. Caustics of a chemical nature, like chromic acid or nitric acid, destroy the tissues too quickly and suppurate, and may thus contribute to the recurrence of the wart. The larger warts are best excised, after preliminary cleansing by fomentations, so as to prevent suppuration as far as possible.

AFFECTIONS OF THE EYE

Austria

In 1921 numerous cases of eye diseases were observed in the spinning rooms of an artificial silk factory. In particular, there were several slight cases of conjunctivitis lasting two or three days, due to the presence of sulphuretted hydrogen fumes. In spite of the existence of a very effective ventilation system (which used up nearly a third of the power available for the factory), further apparatus was installed which forced a current of fresh air under the spinning machines. In addition, an exhaust apparatus was fitted which drew off the fumes from above. It was noted that the number of cases increased when the weather changed.

Belgium

In 1920 it was noted that the workers in a foundry were wearing helmets fitted with opaque glass eye-pieces, which made vision difficult and quickly fatigued the eyes.

In 1921 an inspector observed that in an incandescent lamp factory the dazzling light produced by the burning of the mantles made the workers suffer from cephalalgia and even temporary dizziness ; the empyreumatic fumes given off also caused irritation of the eyes. Some cases of irritation of the eyes caused by the naphthol used for impregnating foreign rabbit skins were also reported.

Germany

Prussia

In the Stade district, in 1920, a workman had his eyes injured who looked on with unprotected eyes while a job of autogenous welding was being done. Many of the other workers were guilty of the same imprudence.

In the same year, several serious cases of irritation of the eyes were observed in the Minden district among the workers in a celluloid factory where a substance called tetraline was used as a substitute for denatured alcohol for dissolving waste celluloid. This substance was found to contain about 75 per cent. by volume of alcohol, the remainder consisting of acetone, amyl acetate, and pyridine bases.

In 1921 cases of eye trouble were observed among the actors and workmen in a cinema studio. These were due to the action of unprotected electric lamps (" jupiter " lamps) and searchlights. Anti-dazzle protectors of opaque glass are the best preventive, but for technical reasons they cannot always be used.

Bavaria

Zapon lacquer caused two cases of eye trouble with headache and weakness in 1920, and in 1921 two cases of lesion of the cornea and two cases of lachrymation among the women workers in a pencil factory. Cases were also observed of irritation of the eyes due to the use of lacquers containing methyl alcohol. Adequate ventilation and temporary transfer to other work were found successful in stopping this.

In 1922 three cases were reported of inflammation of the eyes and slight caustication of the hands caused by gases and acids (Nuremberg-Fürth).

In an artificial silk factory in Swabia the workers complained of inflammation of the conjunctiva. Conditions were improved by ensuring an adequate exhaust of the gases.

Other German States

In 1920 there was one case of inflammation of the eyes caused by almond oil ; in 1921 there were several cases in Thuringia in an artificial silk factory where the exhaust installation was defective; in 1922 there was one case in the State of Hesse in a worker in a lamp-black factory who got some tar into his eye while emptying a tar-bucket.

In Saxony, in 1922, in an apparatus factory a worker got some turpentine substitute into his eye, which was so seriously injured that it had to be removed. The noxious substance was said to have a strong odour of acetone.

Great Britain

Conjunctivitis

In 1920, Dr. Bridge observed some cases of conjunctivitis in a factory where cracker snaps were being manufactured with fulminate of silver. The inflammation was slight. Eight other similar factories were visited, but no further cases were found, though much of the

work is done in small domestic workshops where precautionary measures are disregarded and the workers have often a low standard of personal cleanliness.

A very severe case of conjunctivitis was seen the same year in a man employed in sifting gallic acid. Inflammation of the conjunctiva was also seen in linoleum works among workers engaged in oxidising linseed oil. Blurring of vision was complained of by men making sulphate of atropin.

Cataract

Investigations carried out in 1920 by the Glassworkers' Cataract Committee led to the following conclusions as to the cause of cataract :

(1) The luminous rays are not the cause of the disease.

(2) Ultra-violet radiation is not the cause in so far as any direct action upon the lens is concerned.

(3) The evidence is strongly in favour of the view that heat is the active agent.

(4) It is uncertain whether the heat radiation acts directly on the substance of the lens, or indirectly by disturbing the nutrition of the lens.

(5) Possibly ultra-violet radiation may play some part in the causation by indirect action on the nutrition of the lens.

As regards prevention, experiments have been made with a view to preparing glasses containing salts of various metals capable of cutting off as much as possible of the ultra-violet and infra-red radiation from the eye. Some of these which absorb ultra-violet radiation are already on the market under the name of " Crookes's glass ". The wearing of spectacles made of these glasses is recommended. Satisfactory results in the domain of prevention have already been obtained, but further research on the manufacture of glasses which absorb the heat radiation is required.

Dangers from Electric Arc Welding

In 1920, Dr. Bridge submitted a report on an enquiry into the danger to the eyes of workmen employed in the process of electric arc welding. The additional metal is fused by electric current in one of two ways : either a metal electrode, held in a suitable holder, itself forms the additional metal, or a carbon electrode is used and the additional metal laid on by hand. In both cases the metal work to be welded is connected to the other pole of the circuit, and the arc is formed between these electrodes and the metal to be welded.

Dr. Bridge found that the eyes of electric welders were affected when exposed to the rays of the arc so formed. Skill is needed to interpose at the right moment the screen used to protect the eyes, so that learners suffer more than experienced men.

The symptoms, which occur from four to eight hours after the exposure, are feeling of sand in the eyes accompanied by intense pain, conjunctivitis, photophobia, lachrymation, with blurring or temporary loss of vision. Severe headache is also frequent. The symptoms gradually subside, recovery being usually complete in 24 to 48 hours,

the time varying according to the intensity of, and length of exposure to, the arc. The rays also affect the exposed parts of the skin ; the effects closely resemble severe sunburn. Slight pigmentation of the skin has been observed on those affected, but no evidence of ulceration or cell proliferation.

It is difficult to determine the length of exposure needed to produce the eye symptoms described above, but it seems to be a matter of seconds. The exact distance at which it is safe to receive a flash or look at the arc is also difficult to estimate, but at a distance of 15-20 feet a flash does not appear to produce symptoms and the arc itself can be looked at for a few seconds.

No evidence was obtained of permanent injury to the eyes from exposure to these rays. It was suggested that cataract might be produced by the rays given off from the arc ; experiments, however, seem to demonstrate clearly that cataract is not produced by the light from welding, or from flashes from a short circuit, but that it may follow injuries by short circuit when the current passes through the body of the injured person.

In almost all the works visited the precautions taken consisted of the use of a hand screen to protect the face and eyes, and gloves or gauntlets to protect the hands. The screen is provided with an insulating handle and a window of coloured glass, an effective combination being a ruby glass between two blue glasses. Helmets of various types were also seen ; these have the advantage of screening the worker from side flashes from adjacent arcs on either side. Ordinary clear glass spectacles fitted with side pieces are also used, and protect the eyes when the slag is chipped from the weld.

In 1921 a case of amblyopia was reported in a woman who had been exposed for 25 years to inhalation of pure tobacco dust.

NETHERLANDS

Conjunctivitis

The number of cases reported was 10 in 1920, 16 in 1921, and 2 in 1922. The causes were as follows : patent fuel (pitch), 6 cases in 1920 16 in 1921, 1 in 1922 ; sulphur dioxide (paper factory), 1 in 1920 ; lime, 1 worker in a sugar factory, 1 bricklayer, and 1 cleaner of cattle stalls in 1920, and 1 solderer in 1922.

Ulcer of the Cornea

Two cases were reported in 1920 affecting 2 agricultural workers who were handling artificial manure.

Nystagmus

In 1925, 5 cases were notified among miners (hewers).

AFFECTIONS OF THE EAR

BELGIUM

In 1921 in two nail factories it was found that the work was extremely trying on account of the intense noise made by the machines.

The work is especially trying for the workers employed on the machine which flattens the heads of the nails. In a workshop for preparing and finishing cloth the deafening noise of the beetling machines caused temporary deafness after work.

OVER-FATIGUE (STRAIN, FAULTY POSITION, ETC.)

Belgium

In 1920 the medical inspectors called attention to the fatiguing work of table casting in pottery works. Some of the workmen have to move the moulds and their contents, weighing about 60 kilogrammes, across the table with a rapid and continuous motion ; others continually execute a rapid movement tranferring the full moulds from the table to the press.

In 1921, in a workshop where rabbit skins were prepared and plucked, cases were reported of inflammation of the tendon sheaths of the wrist caused by excessive fatigue, the workers having to make 75 to 100 movements of the hand per minute. The work on the milling machines in a screw factory was also very fatiguing. The women operatives sit on a seat tilted against the lever which works the machine ; in order to work the lever they have to make a rocking movement which is repeated about 12,000 times a day.

Germany

Only one case coming under this heading was reported in Germany. This happened in 1921, to a cooper, who suffered from internal suppuration of the palm of the left hand, apparently due to continuous work with the hammer. He was obliged to give up work for some time.

Netherlands

Arthritis

One case (elbow) was reported in 1920 in a navvy.

Inflammation of the Tendon Sheaths of the Wrist

There were 16 cases in 1920 and 96 in 1921. Of these, 7 in 1920 and 25 in 1921 affected workers in shipyards, 5 in 1920 and 11 in 1921 affected agricultural workers. The other cases affected bricklayers, stone and wood cutters, navvies, miners, carpenters, iron-founders, blacksmiths, etc.

Inflammation of the Dermic and Hypodermic Cell Tissue

10 cases were notified in 1920, 10 of these among miners and the other 3 affecting a bricklayer, a worker in a brick factory, and a worker in a mechanical workshop.

Purulent Inflammation of the Synovial Bursa of the Knee

5 cases were reported in 1921 and 10 in 1922, distributed as follows : miners, 4 in 1921 and 5 in 1922 ; agricultural workers, 1 in 1921 and 4 in 1922 ; 1 woman office worker in 1921. There were also 11 cases of non-purulent inflammation in 1921 and 9 in 1922.

Puruent Inflammation of the Synovial Bursa of the Elbow

There was 1 case in 1921 affecting a coppersmith and 2 in 1922 among miners.

There was also in 1921 a case of inflammation of the synovial bursa of the metacarpal joint of the left thumb of a flax dresser, and in 1922 a case of occupational cramp in a worker in a shipyard.

NERVOUS DISEASES

Austria

In 1922 several attacks of hysteria were reported among the women workers in an incandescent lamp factory, which were supposed to be connected with the method of calculating wages (probably piece rates). A medical examination showed that several of the women affected had heart trouble, or were very delicate, and many of them were typical hysterical subjects.

In the same year in an electrical machine factory there was a case of a mass-psychosis which took the the form of cramp in several workers. This phenomenon seems to have been indirectly due to the effects of tar distillation products (benzene and its derivatives) or carbon monoxide, both of which could have been given off in heating asphalt over a coke fire.

COMPRESSED AIR

Germany

Bavaria

In 1920, 42 slight cases were reported ; the principal symptoms were pains in the ears, joints, and limbs, general feeling of fatigue, palpitation, giddiness, etc. Many of the cases were not really caisson disease in the strict sense of the term.

In 1921 only 2 cases were reported, but it should be pointed out that very little compressed air work was done that year.

In 1922 there were only some slight cases (pains in the joints and limbs). In several cases the trouble was not due to compressed air, but was influenza. These satisfactory conditions were probably due to the almost total abstinence of the men, combined with the fact that the work was being done at a depth of 8 to 10 metres, and therefore above the critical zone, which is at a depth of about 13 metres.

ELECTRICITY

Austria

In 1921, in a nitric acid factory, a fatal case was reported due to a 500-volt current. A locksmith who had to fix an aluminium pipe between two acid towers touched an electric circuit by accident. The shock upset him so that he fell with his feet in contact with the outer refractory coating of the tower and his left ear and hand touching the aluminium pipe. Although he had only been in contact with one pole of the circuit, all efforts to restore him to life failed.

GERMANY

Prussia

In the Breslau district there were 15 accidents (including 3 deaths) due to electric current in 1920. In a paper factory a workman died of paralysis of the heart. On entering the pump room, where he had some cleaning to do, he came into contact with the wires of a 220-volt portable lamp, which had been installed in a damp room without proper precautions, against the instructions of the Association of German Electrotechnicians. The dampness explains why a 220-volt current was able to cause paralysis of the heart.

In the Münster district a young apprentice was electrocuted in consequence of the carelessness of an electric fitter. The latter had been doing some work in the damp cellar of a dairy and in order to have light to work by had brought an electric wire down to the cellar and left it there one day when he was not at work, with the ends of the wires, which were not insulated for 1 ½ cm., hanging from the ceiling. The apprentice, who had gone down to clean out the cellar, was found dead, with one end of the wire in his hand. His boots were wet and so helped the current to pass through his body.

In 1922 a boy who was holding a portable electric lamp to give light to a locksmith engaged on repairs to a drying drum was badly burnt by an accident. Thinking that the lamp was not properly fixed, he passed his fingers through the wires of the protecting cage round it. His hand came into contact with the metal support and the current passed through his body to the iron walls of the drum. The firm must be considered responsible for this accident for not having fitted the lamps with a porcelain ring large enough to cover the metal base.

In the Düsseldorf district 10 fatal accidents due to electricity were reported, 3 of them due to the use of insufficiently insulated portable electric lamps. In one case the accident was caused by an alternating current at only 120 volts.

Bavaria

At Munich in 1921 the case was reported of a worker in a caisson who was electrocuted by contact with a 220-volt electric circuit. As another workman was uninjured by the same current, it appeared that the victim of the accident was particularly susceptible to the effects of electric current.

GREAT BRITAIN

Of the medium and low pressure accidents in 1922, 10 fatal cases were due to shock from alternating current at 250 volts or less. There were no cases caused by direct current. This was entirely in accordance with the experience of previous years. Two of these cases were due to the use of ordinary metal lampholders, unearthed, as portable lamps,

another to an unearthed pendant lamp fitting. Another case indicates a risk not generally appreciated, and shows how small a contact may be sufficient to produce a fatal result. A man working in the pit in a garage had broken the lamp he was using, and in attempting to remove the broken base of the lamp from the lampholder, the live leading-in wires of the lamp touched the palm of his hand, causing his muscles to contract so that he was unable to let go. He was able to call out to his mate to switch off the current, but he succumbed in spite of artificial respiration carried on for two hours. Incidentally, the single-pole switch for the circuit was in the wrong wire, i.e. in the earthed wire of the circuit instead of the live wire, but this had no bearing on the accident, as the other man switched off at the main double-pole switch.

The importance of attempting to restore persons rendered insensible by electric shock by means of artificial respiration, applied immediately and continued an hour or two if necessary, is still not realised in many works, and even in public supply stations.

In 3 high-tension cases of electrocution, the injuries from burns were so severe that artificial respiration was impracticable. In other cases it was carried on for periods varying from a few minutes to over two hours. In several instances, after both high and low tension shocks, it was successful.

Most of the fatal cases were due to alternating low pressure circuits.

In addition, many workers receive electric shocks of more or less severity, particularly from low pressure circuits, but not sufficient to cause them to be absent from work for at least one whole day. Such accidents are not notifiable.

The question naturally arises whether there is any treatment other than or in addition to artificial respiration for the treatment of persons rendered insensible by electric shock. It appears to be established that electric shock may cause death by paralysis of the respiratory centre or by arresting the proper action of the heart by putting it into a state of " fibrillation ". The latter result appears to be readily brought about by alternating current low-pressure shocks. Artificial treatment seems to have no effect in this case, but is accepted as the proper treatment when the respiratory centre is affected.

It is stated that where a man has had a severe and prolonged electric shock and has then had a bad fall, the fall has in some cases apparently favoured recovery from the shock.

RADIANT HEAT

GERMANY

In 1920, in a machine factory in the State of Baden, where an electric welding apparatus was being installed, several workmen who came to look on without properly protecting their eyes were attacked by burns on the face and hands, and some of them also by inflammation of the eyes. The radiation is so powerful that the very greatest precautions must be taken to protect the eyes.

Netherlands

In a diamond-polishing workshop in 1920 a certain number of workers complained of heaviness and headache, which they thought were due to copper poisoning caused by handling the copper implements, containing lead and tin solder, in which the diamond is placed in a constantly changing position for polishing. These were inserted by means of a steel handle into the opening of an apparatus heated by gas and electricity. This was placed so near the workers' faces that they inevitably caught the full heat of the apparatus, and in addition any gas which might escape from defective piping. As a result of these complaints it was recommended that the heating apparatus should be placed higher up and to one side and that new gas pipes should be fitted.

Electric welding also caused two cases of violent irritation of both eyes (conjunctiva and cornea) among workers carrying out electric arc welding with current of 50-100 ampères at a tension of 110 volts. Six other men working close by also suffered from inflammation of the eyes accompanied by severe pain. It was recommended that all workers working in the neighbourhood of the arc should wear spectacles with coloured glasses.

EXTREME TEMPERATURES

Germany

In 1920 several women workers in a flax dressing undertaking were attacked by gastric and intestinal catarrh and bronchitis. This was probably due to night work during the period of extreme cold, which was afterwards prohibited.

In the State of Hesse the kitchen staff of some large hotels suffered very much in summer from the excessive radiant heat of the stoves, especially where the kitchens were in the basement. The removal of the hot air by ventilators in the walls and ceiling gave only slight relief.

DUST

Austria

In the course of inspections made during 1921 it was found that the dust exhaust apparatus was frequently out of order, usually owing to the driving belt being broken or to some other mechanical defect. The real cause was in most cases found to be either the wish to save electric current, or the request of the workers themselves, who considered that the rheumatic pains in their fingers and hands were due to the draught set up by the exhaust. This prejudice is not without foundation. In order to get over this difficulty, a large incandescent lamp factory and a machine factory have fitted a sliding valve behind each exhaust, so making it possible to regulate the draught.

In 1921 complaints were made in a large metal goods factory that 500 persons were working in the spoon and fork polishing workroom

with no provision for the removal of dust. After long negotiations the firm arranged to divide these workers into two shifts and to improve the ventilation by making skylights and installing ventilators.

In a large metal works the polishing room, in which about 50 persons were employed, was dark and very small, and with no arrangements for the removal of dust, until the industrial inspectors ordered all these conditions to be changed.

A worker employed on sand blasting in the body-building workshop of a motor-car factory died of pulmonary trouble. It is true that this worker had for some time worn a sort of helmet, fitting closely round the neck and artificially supplied with air, intended to protect the wearer against sand and dust ; but when this was continuously worn for a long time the strain on the respiratory organs became dangerous to health. The factory subsequently adopted a system of shifts which gave the workers two hours' rest after each period of two hours' work on sand blasting.

Sand blasting also gave rise to complaints in a motor-car factory in the Linz district.

BELGIUM

In 1920 slate workers were seen to have a chronic affection of the respiratory passages characterised by asthma, emphysema, and chronic bronchitis. This affection strongly resembles pulmonary tuberculosis, but there is no tubercular infection. The average expectation of life of these workers is, however, 50, 55, or 60 years, thanks to the reduction of alcoholism, the improved ventilation of the mines, and the substitution of carbide lamps for smoky oil lamps.

GERMANY

The health conditions in the four Thomas slag mills in the Düsseldorf district during 1920 and 1921 were as follows.

HEALTH CONDITIONS IN FOUR SLAG MILLS, 1920 AND 1921

Mill	Year	Number of workmen employed		All diseases		Respiratory diseases		Deaths from pneumonia
		Total	Average	Cases	Days' sickness	Cases	Days' sickness	
I	1920	1,092	91	107	2,632	40	1,077	—
	1921	1,907	159	135	2,390	60	1,133	7
II	1920	443	157	169	2,710	27	1,025	4
	1921	289	135	105	1,119	20	506	1
III	1920	175	142	41	494	16	275	—
	1921	159	151	101	1,466	35	609	2
IV	1920	266	162	110	2,383	28	642	2
	1921	189	114	195	2,632	23	581	2
Total	1920	1,976	552	427	8,219	111	3,019	6
	1921	2,544	559	536	7,607	138	1,829	12

The total number of cases of sickness was thus 77 per cent. of the average number of workers employed in 1920, 96 per cent. in 1921, and 72 per cent. in 1922.

As it was found that woven paper bags were not close enough and let the dust through, they were replaced by bags made of several layers of paper stuck together.

In 1922, with the support of the Ministry of Finance, the "Blaufarbenwerkkonsortium", and the authorities of Schwarzenberg, an investigation was carried out into the causes and prevention of miners' cancer.

In spite of the well-known dampness of the Schneeberg mines, several cases of pneumoconiosis were observed in them; this is perhaps one of the causes of the "lung cancer" which attacks the workers in these mines.

Statistics collected in the Breslau district in 1921 show the frequency of pulmonary disease among polishers in glass works. Out of 88 deaths recorded in the last seven years, 58 were directly due to pulmonary diseases.

In Bavaria in 1922 some cases were reported of acute catarrh of the respiratory passages among the polishers in a boot and shoe factory.

In 1922, in a glass works in Thuringia, it was found that, in spite of the installation of an excellent dust exhaust system, out of the 12 workers on an average employed in the mixing room one man had died of pulmonary tuberculosis almost every year for some years past.

In a large bookbinding and showcard factory in Saxony it was found in 1922 that the workers suffered from continual attacks of coughing and complained of an unpleasant metallic taste in the mouth. These symptoms were due to the inhalation of bronze dust.

In 1922 the workers in a carbon disulphide factory in the Potsdam district engaged in unloading raw sulphur complained of painful irritation of the eyes caused by the very fine and sharp dust. The trouble was completely prevented by wearing spectacles and washing the eyes after work.

In 1922 3 cases of sickness caused by dust containing verdigris were reported in an artistic locksmithing works, where a mixture of liver of sulphur and ammonia was used to give a patina to brass fencing.

In 1921 25 cases of bronchitis due to flax were reported in the State of Thuringia. These cases could have been prevented by improving the dust exhaust system, as was afterwards done. Cases of bronchitis also occurred in Bavaria.

In the same year in the State of Anhalt an upholsterer engaged in stuffing mattresses with palmleaf fibre died of erysipelas. Several cases of bronchitis due to fine wood dust were reported in 1922 in a cellulose factory in Bavaria.

In 1922 an elderly woman worker in a Bavarian tobacco factory complained of headache, palpitation, sleeplessness, and irritability. All these symptoms were probably due to the effects of nicotine consequent on the inhalation of tobacco dust.

In the State of Hesse in the same year it was found that the rag sorters suffered principally from diseases of the respiratory passages,

which, together with pulmonary tuberculosis, make up almost a third of the total number of cases of sickness. The exhaust apparatus fitted below the wire netting of the tables was insufficient to carry away all the dust formed on opening the bales and sorting and carrying the rags. In the rag-sorting workshops of the Lüneburg district there also occurred numerous cases of irritation of the skin which often resulted in infected wounds. It was remarked that the workers were very negligent about cleanliness.

In Bavaria in 1921 a woman worker in a flour mill had a cutaneous eruption on the face caused by the flour dust.

In the Liegnitz district a case of sickness due to malt dust was reported in 1922.

In the State of Mecklenburg-Schwerin in 1922 a certain number of cases of diseases of the respiratory passages were reported in the press room of a plate factory employing a staff of about 40. In the same district the gilders in a gilt moulding factory always wear respirators when at work.

Great Britain

In 1920, following the report of the death from pulmonary tuberculosis of a man engaged in sand blasting in an engineering works, an enquiry into the conditions under which this work was carried out was made by Dr. Bridge. It was found that in the works in question sand blasting was extensively used during the war for cleaning castings and other articles. At the time of the enquiry, the work had fallen off, and only 2 workers were employed, as against 10 during the war. The work is of an unskilled character, and the men usually pass on to other work, three or four years being the maximum spent at it.

In addition to the above case of tuberculosis, 2 other cases were found, and 1 case of fibrosis of the lung. At these works the usual type of compressed air sand-blast apparatus was in use with enclosed cabinets of wood lined with metal. The sand was used over and over again until too finely powdered to be of value as an abrading material. The apparatus examined was generally in need of repair and allowed an excessive escape of fine dust. The floor of the workroom was covered with sand and dust. The variety of sand used contained a high percentage of free silica. The acute character of the cases, all of which occurred within the first three years of work, suggested a primary infection by tubercle, and the incidence of three cases in one workroom suggests direct infection from the sputum expectorated into the sand and disseminated among the machines. More probably, though, the dust, without producing definite fibrotic changes in the lung, set up irritation of the lung tissue and lighted up an already existing focus of tubercle.

The conditions in many of the other works visited in course of the enquiry also called for improvement.

Of 27 men examined, whose average lengh of employment was 5.8 years, 9 showed some departure from the normal condition of the lung — either areas of impaired resonance or altered breath sounds.

These signs, however, were quite compatible with a temporary condition, and could not be differentiated from such a condition without a more detailed examination than could be made at the works.

NETHERLANDS

In 1921 there were 15 cases of pulmonary disease due to dust in undertakings in which notification is compulsory : 8 cases due to mineral dust (stone, brick, cement, sand, lime, iron ore), 5 due to vegetable dust (cotton, flax, wood), one case affecting a ship-breaker and one a fuel dealer.

(Concluded.)

The Position of Private Employees in Sweden.

The Swedish Social Board has published a report of its investigation into the position of administrative staffs employed in private undertakings[1]. This investigation (which was undertaken in obedience to a Royal Command dated 9 August 1920) was planned in agreement with a special committee of competent representatives of managers and subordinate employees respectively. A questionnaire drafted for the purpose, accompanied by a supplement dealing with wages, was circulated to the largest possible number of undertakings employing office, shop, and warehouse employees, or technical staff. A questionnaire in card form was circulated to a limited number of employees — selected upon a basis of proportional representation — with the object of studying the problems which arise from individual conditions of life and labour of private employees, in view of the general conditions of wages and employment of this particular social class.

The questionnaires were despatched at the close of 1920 and a preliminary report on the results appeared in 1921 in *Sociala Meddelanden*. However, the changes to which the economic depression of succeeding years have given rise have been so far-reaching that it has seemed necessary, before issuing the final report, to complete the initial enquiry by information covering the year 1924, when the position appeared more settled.

The data supplied by employers in response to the 1920 enquiry related to 52,652 employees, while that supplied by the employees related to 4,475 of their number. Of the latter 2,574 also gave information relating to the year 1924.

---

[1] K. SOCIALSTYRELSEN. *Arbets- och Löneförhallandena för affärsanställda.* Sveriges officiella statistik, Socialstatistik. Stockholm, Centraltryckeriet, 1925. 161 pp.