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COMMUNICATIONS

TRAUMATIC ULCER OF THE CORNEA WITH SPECIAL REFERENCE TO COAL MINERS*

BY

COLONEL R. M. DICKSON

DIRECTOR, THE W. H. ROSS FOUNDATION (SCOTLAND)
FOR THE STUDY OF PREVENTION OF BLINDNESS

TRAUMATIC ulcer of the cornea is very common in the eye wards of the Royal Infirmary, Edinburgh, and the Ross Foundation decided that this would be the subject of its first investigation into industrial eye injuries.

A survey of the hospital cases showed that more than half occurred in coal miners, and on that account an enquiry was made into the bacteriology of the eyes of miners under working conditions at the colliery.

The high percentage of miners admitted to hospital is explained by the large number of collieries in Fife and the Lothians, the area of which Edinburgh is the hospital centre.

The miner is the man who "gets" the coal from the coal face. Where a mechanical coal cutting machine is used the miner is known as a stripper, and he uses a pick to break up the coal dislodged by the cutter. Where all the work is done by hand the miner is called a hewer. Brushers and packers are not primarily concerned with coal at all, but use the pick to trim up the rock exposed by the miner. These groups of workers are more liable than others to injury of the cornea from flying fragments of coal or stone and consequently they provide the majority of corneal ulcers amongst miners.

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The conjunctival flora of 658 healthy coal miners was examined, representing four different collieries and all classes of workmen.

It was found that the following pathogenic organisms may be present in significant quantity in all groups of workers: *Streptococcus viridans*, pneumococcus, diplobacillus of Morax, haemophilic bacilli and *B. coli*.

It is considered that the conjunctival flora of coal miners is potentially dangerous and that the infection in corneal ulcer is from organisms already present in the conjunctival sac.

By far the commonest organisms found were diphtheroids and staphylococcus albus. Diphtheroids were widely prevalent and varied from 11.6 to 56 per cent, but usually from 30 to 50 per cent. Staphylococcus albus was found in 18 to 60 per cent. of cases but the commonest figure was between 30 and 40 per cent.

Cultures were made from the coal in the pit. It was sterile at the coal face, but heavily contaminated by the time it reached the trucks.

The detailed bacteriological results of this investigation were published in the British Journal of Ophthalmology in 1939.¹

Ulcer of the Cornea

During the same year (1938) a clinical and bacteriological examination was commenced of every case of ulcer of the cornea admitted to the Eye Department, Royal Infirmary, Edinburgh.

A special index card was used to record the clinical particulars and other information considered necessary, and this report deals with a series of 350 cases, the total number examined up to March 1941.

All ulcers were traumatic in origin. Hypopyon was present in 178, was absent in 172, and 249 cases were examined bacteriologically.

From the cards it was possible to classify the ulcers as slight, moderate or severe.

TABLE I—Total Cases 350

OCCUPATION				
Miner ...	...	...	...	234 = 66.8 per cent.
Engineer ...	...	...	...	23
Housewife ...	...	...	...	13
Labourer ...	...	...	...	21
Farm worker ...	...	...	...	10
Quarryman ...	...	...	...	5
Unemployed ...	...	...	...	5
Railwayman ...	...	...	...	4

28 other occupations are represented

The occupational incidence shows a great preponderance of miners.

Two hundred and twenty-one coal miners were affected and 13 shale miners. Of the coal miners, 75 per cent. occurred amongst the men who use the pick.

Bacteriology.—Bacteriological examination showed that diphtheroids, staphylococcus albus and pneumococcus were the only organisms present in any considerable number of cases.

TABLE II—*Bacteriology of 249 Cases*

(In cultures from 60 ulcers there was no growth=24 per cent.)

Organism	Slight	Moderate	Severe	Total	Per cent.
Diphtheroids ..	36	27	4	67	26'9
Staph. albus ...	21	16		37	14'8
S. Alb.+ Diph.	8	9	2	19	7'6
Pneumococcus	14	14	7	35	14'0
Others ...	9	12		31	12'4
No growth ...	35	25	0	60	24'0

TABLE III

Comparison of Bacteriology of Healthy Eyes and Corneal Ulcers

Organism	Healthy Eyes	Corneal Ulcers
Diphtheroids ...	40 per cent.	26'9 per cent.
Staph. Albus ...	35 per cent.	14'8 per cent.
S. Alb.+ Diph. ...	—	7'6 per cent.
Pneumococcus ...	8'1 per cent.	14'0 per cent.

The presence of diphtheroids and staphylococcus albus is probably of no consequence.

Pneumococcus, on the other hand, is the most serious cause of infection and the commonest organism in the severe type of ulcer.

Twelve types of pneumococcus were isolated and it is evident that any type may be the infective agent.

The type of ulcer classified as severe approximated to the description of the typical hypopyon ulcer given in the text books.

The detailed bacteriology, showing the types of pneumococcus met with, is given in Table IV.

TABLE IV—249 Cases
Bacteriology—Severity—Lacrimal Sac

Organism	No.	Slight	Moderate	Severe	Sac
No growth ...	60	35	25	—	3
Diphtheroids...	67	36	27	4	4
Staph. albus ...	36	20	16	—	—
Staph. aureus ...	5	3	2	—	—
S. alb. + diph.	19	8	9	2	1
Pneumococcus—					
Type 3 ...	3	—	1	2	1
Group 4...	12	7	3	2	1
" H ...	1	1	—	—	1
Type 6...	2	—	2	—	1
" 7...	1	—	1	—	—
" 10...	1	1	—	—	—
" 11...	1	—	1	—	—
" 13...	1	1	—	—	—
" 20...	1	—	1	—	—
" 23...	1	—	1	—	—
" 28...	1	—	—	1	1
" 29...	2	1	—	1	—
Untypeable	7	3	3	1	—
Pneu. + Morax	1	—	1	—	—
Strep. + Pneu.	2	2	—	—	—
Strep. viridans	9	5	4	—	—
Strep. non-haem.	1	1	—	—	—
S. Alb. + haem. strep.	1	1	—	—	—
Diplobac. Morax	6	3	3	—	—
S. alb. + Morax	1	1	—	—	—
S. alb. + K. Weeks	1	—	1	—	1
Bac. subtilis ...	1	1	—	—	—
Bac. proteus ...	1	—	1	—	—
Anthracoïds ...	4	3	1	—	—

In comparing the distribution of bacteriological findings in relation to severity of ulcer, it is found that the slight differences occurring might well have arisen by chance,

Lacrimal Sac.—It has generally been accepted that the lacrimal sac is the reservoir of the pneumococcus and that the typical hypopyon ulcer is commonly associated with dacryocystitis. In this series of 178 hypopyon ulcers dacryocystitis was present in only 7·8 per cent., and from a total of 14 cases the pneumococcus was recovered in only five.

The diagnosis of dacryocystitis was based on the regurgitation of fluid on pressure and it was treated by the Toti operation or by excision of the sac.

Including the ulcers with no hypopyon, the sac was infected in 21 cases.

The condition showed a marked increase with age.

TABLE V—*Dacryocystitis*

Age Groups	Cases	Percentage
-25	0	0
25-	6	8·33
45-	8	11·27
65-	7	31·82

Negative Bacteriology Results.—A considerable number of scrapings from the ulcers yielded no growth on blood agar (60 were negative out of 249 cases, or 24 per cent.).

Various suggestions have been made to explain this, *e.g.* the collection of material from the ulcer in most cases was in the hands of the bacteriologist, and it is probable that the undermined margin was not always sufficiently searched. In a number of cases there was an interval of some hours between the scraping of the ulcer and the arrival of the medium at the laboratory. This was not considered important, but an incubator has been provided in order to eliminate this possible cause in a further series of cases.

In dealing with very small ulcers it is probable that inadequate material was obtained in many cases, *i.e.*, the threshold value for quantity of organisms had not been reached.

The percentage of negative cases according to severity of ulcer is: Slight 28·4 per cent., Moderate 24·5 per cent., Severe 0.

Days in Hospital.—The number of days in hospital in relation to age and severity is shown in Table VI.

The occupation of hospital beds is a very important aspect of the incidence of corneal ulcer.

The number of beds in the Eye Department, Royal Infirmary, Edinburgh, is 54, and during 1939-1940 the number of patients admitted for corneal ulcer was 112. In hospitals where the total number of beds for eye patients is inadequate, any preventive measures that will reduce the number of corneal ulcers admitted, and any form of treatment that will reduce the length of stay in hospital means a very welcome reduction in a long waiting list.

TABLE VI
Days in Hospital in Relation to Age and Severity

Age	No.	SEVERITY			DAYS IN HOSPITAL															
		Sl.	Mod.	Sev.	0	5	10	15	20	25	30	35	40	45	50	55	70	80	90	
5	1	—	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	
10	4	1	1	—	1	2	—	—	—	—	1	—	—	—	—	—	—	—	—	
15	16	4	5	—	3	6	3	1	1	—	—	2	—	—	—	—	—	—	—	
20	5	3	—	—	3	2	1	1	—	—	—	—	—	—	—	—	—	—	—	
25	32	7	5	1	9	11	7	1	4	—	1	1	—	—	—	—	—	—	—	
30	30	10	11	—	7	11	6	3	2	—	1	—	2	—	—	1	—	—	—	
35	36	20	13	—	2	11	11	6	3	2	1	—	—	—	—	—	—	—	—	
40	37	15	12	—	6	12	7	5	4	2	2	1	—	—	1	—	—	—	—	
45	40	9	11	1	5	14	7	8	5	—	1	—	—	—	—	1	—	—	1	
50	30	11	15	1	4	6	8	5	1	2	3	2	1	1	1	1	—	—	1	
55	24	5	9	3	1	7	4	5	—	1	1	2	1	—	2	—	1	—	—	
60	22	7	14	4	1	2	3	6	6	2	—	3	—	2	—	—	—	1	1	
65	17	2	8	3	—	2	4	2	—	3	2	2	—	1	2	—	—	—	—	
70	8	1	3	2	—	—	3	1	1	2	2	—	—	—	—	—	—	—	—	
75	2	—	—	2	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	
80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
85	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	
90	1	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	

It will be seen from the graph below (Fig. 7) that the average days in hospital mounts rapidly with increasing age.

There is a similar relationship with age and severity of the ulcer which is a probable cause of the increased hospital days in older life. Thus, the percentage classified as "severe" in the age groups are these:—

$-25 = 0$
 $25- = 1.75$
 $45- = 10.23$
 $65- = 31.82$

the average percentage irrespective of age being 9.34.

FIG. 7

Average days in hospital in relation to age groups

In this series of 306 cases the average stay in hospital was 16.29 days.

Visual Results.—A postcard was sent to every patient giving him sufficient notice to report for examination six months after discharge from hospital.

Two hundred and twenty-nine men reported, and the particulars noted were:—

Vision.

Condition of the eye.

Time off work.

Earning capacity.

The visual results are detailed in Table VIII. The three columns at each end of the table are worthy of note; *i.e.*, the good results at one end and the very bad results at the other end.

In 31 cases the vision was not interfered with at all, and a total of 122 cases (53.2 per cent.) had 6/12 vision or better. Where there was little or no interference with vision the corneal scar was either very slight or was situated outside the papillary area.

TABLE VIII—229 Cases
*Visual Result six months after Discharge
from Hospital*

Age	6/6	6/9	6/12	6/18	6/24	6/36	6/60	Less than 6/60	H.M.	Nil
-25	4	7	2	2	—	—	—	—	—	—
25-	18	27	18	4	10	3	1	6	2	2
45-	8	18	15	9	13	11	3	6	9	10
65-	1	2	2	3	0	1	1	2	4	5
Total	31	54	37	18	23	15	5	14	15	17

FIG. 9

*Percentage with no useful vision in affected
eye in relation to age*

The good results emphasise the fact that many ulcers were extremely small and in every respect were slight. The bad results show 46 with no useful vision in the affected eye (20·5 per cent.), and in 17 of these cases the eye had to be removed.

The graph to illustrate the percentage with no useful vision shows the marked influence of age in this category (Fig. 9).

The time elapsed before admission to hospital was noted in 335 cases, and as would be expected, this shows an increase with the severity of the ulcer.

TABLE X

Time elapsed before admission to hospital in relation to severity.

Total cases 335

	DAYS																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Slight ...	14	42	35	34	20	11	5	6	5	—	1	—	—	5	3	—	—	—	—	—	3
Moderate	8	21	22	23	15	15	6	5	2	2	3	2	1	3	—	1	—	—	—	—	2
Severe ...	—	—	2	3	4	2	1	1	—	2	1	1	1	2	—	—	—	—	—	—	—

AVERAGE DAYS Slight = 4·46
 Moderate = 5·07
 Severe = 7·45

Time in Shift.—The miner works a shift of eight hours, and with a view to determining whether fatigue had any influence on the incidence of eye injuries, the time in the shift the accident occurred was noted in 221 cases.

Fig. 11 shows a progressive increase in frequency from the first to the sixth hour, with a decided drop in the last two hours of the shift. The distribution bears no evident relation to fatigue, but speed of working might be related. Statistically the variation observed is not one which is in the least likely to have arisen by chance, and therefore probably represents a real difference of incidence. This factor is being investigated in a further series of cases.

Glasgow Cases.—A similar investigation was commenced in Glasgow Eye Infirmary in October 1938. The same index cards were used so that the Edinburgh and Glasgow cases would as far as possible be comparable.

FIG. 11.—Time in shift. 221 Cases

The reports on 87 cases have been studied and the results are summarised as follows:—

TABLE XII

OCCUPATION		
Miner ...	...	27=31 per cent.
Engineer ...	...	15=17·2 per cent.
Labourer ...	...	14
Shipbuilding ...	...	9
Quarryman ...	...	4
Mason ...	...	2
Boilermaker ...	...	2
Blacksmith ...	...	2
Housewife ...	...	4
Schoolboy ...	...	3

Five other occupations are represented with one case from each, namely:—

Stonebreaker, cabinetmaker, clerk, gardener, tram conductor.

The occupational incidence differs from the Edinburgh series in having fewer coal miners (31 per cent. compared with 66·8),

a higher percentage of engineers (17.2 compared with 6.5), and 10.3 per cent. of shipbuilders. Of the coal miners, 70 per cent. occurred amongst men who use the pick.

TABLE XIII.—GLASGOW CASES. Total 84
Bacteriology—Severity of Ulcer

Organism	No.	Slight	Moderate	Severe
No growth ...	28	10	14	4
Diphtheroids ...	9	5	4	—
Staph. alb. ...	4	2	2	—
Staph. aur....	21	9	10	2
Anthracoïds ...	2	—	1	1
Pneumococcus ...	12	4	5	3
Group IV ...	5	—	4	1
Dip. + K. Weeks ...	1	—	1	—
Dip. + Morax ...	1	1	—	—
S. alb. + K. Weeks	1	—	1	—

Where cultures were negative, films from the ulcer edge were examined, and a morphological diagnosis was made in 16 cases, namely :—

Organism	No.	Slight	Moderate	Severe
Morax ...	7	1	6	—
Pneumococcus ...	9	1	6	2

Including the morphology cases the pneumococcus was found in 30.9 per cent., compared with 14 per cent. in the Edinburgh series.

Infection of the lacrimal sac was noted only once, and staph. aureus was the organism recovered.

TABLE XIV—GLASGOW CASES
Days in Hospital in Relation to Age and Severity

Age	No.	SEVERITY			DAYS IN HOSPITAL													
		Sl.	Mod.	Sev.	0	5	10	15	20	25	30	35	40	45	50	55	60	
5	2	2	—	—	—	1	—	—	1	—	—	—	—	—	—	—	—	
10	2	1	1	—	—	—	1	1	—	—	—	—	—	—	—	—	—	
15	6	4	2	—	—	3	1	2	—	—	—	—	—	—	—	—	—	
20	5	3	2	—	—	1	2	2	—	—	—	—	—	—	—	—	—	
25	5	4	—	1	1	1	1	1	1	—	—	—	—	—	—	—	—	
30	6	2	3	1	—	1	—	4	—	—	—	1	—	—	—	—	—	
35	6	2	4	—	—	1	1	2	1	1	—	—	—	—	—	—	—	
40	13	6	4	3	—	5	1	3	1	2	—	—	—	—	1	—	—	
45	14	4	7	3	1	1	2	2	1	2	—	1	2	1	1	—	—	
50	6	1	5	—	—	1	1	2	—	1	—	1	—	—	—	—	—	
55	8	—	8	—	—	3	2	2	—	—	—	1	—	—	—	—	—	
60	7	—	5	2	—	1	3	—	—	1	1	1	—	—	—	—	—	
65	7	1	5	1	—	2	—	—	2	2	—	—	—	1	—	—	—	

GLASGOW CASES—FIG. 15

Average days in hospital in relation to age groups

In this series of 87 cases the average stay in hospital was 19 days.

TABLE XVI

Visual result six months after discharge from hospital.—86 Cases

Age Groups	6/6	6/9	6/12	6/18	6/24	6/36	6/60	Less than 6/60	H.M.	Nil
-25	2	4	1	2	—	5	—	—	—	—
25-	—	6	6	6	1	—	2	3	5	1
45-	—	2	2	7	3	4	2	5	9	1
65-	—	1	—	—	—	—	1	3	1	1
Totals	2	13	9	15	4	9	5	11	15	3

GLASGOW CASES.—FIG. 17

Percentage with no useful vision in affected eye in relation to age groups

In 27.9 per cent. of the cases vision was 6/12 or better, and 33.7 per cent. had no useful vision in the affected eye.

TABLE XVIII

*Time elapsed before admission to hospital in relation to severity.
79 Cases*

	DAYS																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	
Slight ...	5	5	9	5	2	1	1	1	—	1	—	—	—	—	—	—	—	—	—	—	
Moderate	3	4	8	7	6	1	1	1	—	2	—	—	—	3	—	—	1	1	—	2	
Severe ...	—	1	1	1	—	1	2	—	—	—	—	—	—	1	1	—	—	—	1	—	

AVERAGE DAYS Slight = 3.43
 Moderate = 6.32
 Severe = 8.55

First Aid Treatment of Eye Injuries in Coal Mines.—Eye drops No. 1 are used in the first aid treatment of eye injuries in accordance with instructions issued by the Factory Department of the Home Office. The drops consist of Cocaine 0.5 per cent. and Hydrarg. Perchlor., in Castor Oil 1 in 3,000.

The incidence of ulcer of the cornea is so common amongst coal miners that these drops appear to be inadequate as a protection against this serious infection of the eye.

Working for the Ross Foundation, an investigation on infections of the cornea was commenced in 1939 at the Pharmacology Department, Edinburgh University. It was found that Albucid Soluble (Sodium Sulphacetamide) is more effective in preventing infection of the cornea than any treatment previously used for the purpose.²

As regards the clinical use of sulphonamides, Major G. I. Scott reported :—³

“ It would seem to be essential in the treatment of infections of an avascular tissue such as the cornea (where the defence mechanism is relatively at a minimum), to keep the concentration of the drug at a high level by some form of local application. For this purpose we have at the moment two sulphonamides which can be expected to act locally with effect :—

(1) Sulphanilamide . . . provided that it is applied as a finely-divided powder in a thick layer over the cornea and conjunctiva, and

(2) Sodium Sulphacetamide . . . which can be used as an ointment, as a powder, or in solutions which are approximately neutral up to concentrations of 10 per cent.”

It is I think important that the solutions used should not depart far from neutrality, since quite apart from the local irritant action of solutions with a high pH, the lysozyme in the tears is, as Ridley has emphasised, most effective at normal pH.

There is no experimental justification for the use of sulphapyridine, sulphathiazole, or sulphadiazine. It is probable that the sodium salts of these sulphonamides would penetrate readily, but the high pH of the solutions (greater than 10.0) would make them too irritant for repeated application.

Local treatment alone.—The main value of purely local treatment, with preparations such as the above is, I think, in the prevention of infections of the eye:—

1. I would suggest that a 10 per cent. solution of sodium sulphacetamide should be tried as a substitute for Credé's method in the prophylactic treatment of the eyes of the newly born child.

2. The second great use for a suitable sulphonamide, as a local application, would seem to be in the first aid treatment of industrial injuries."

As Albucid Soluble is harmless to the eye, it was recognised that it could be confidently recommended as the best first aid treatment for use in the ambulance rooms at collieries.

With the sanction of the Mines Department, and the collaboration of H.M. Divisional Inspector of Mines in Edinburgh, 30 collieries in Scotland were selected for a practical trial of the new treatment, which was commenced in December 1941.

Eye drops No. 1 were replaced by 10 per cent. solution of Albucid Soluble.

Standard bottles and brushes were provided.

Arrangements were made for the eye drops to be renewed and the bottles and brushes sterilised every two months.

Cardboard eye shields were also issued to ambulance rooms for use in serious wounds of the eyeball.

Instructions issued to Ambulance Room Attendants:—

EYE INJURIES.

FIRST AID TREATMENT.

EYE DROPS.

Eye drops should be applied to the eye by pulling the lower lid forward and using the camel-hair brush.

To remove a foreign body from the cornea the brush only should be used. If this fails, a pad and bandage should be applied and the patient sent at once for expert treatment.

The following particulars should be entered in the first aid book each time the eye drops are used:—

Name, age, and address of patient.

Was a foreign body removed with the brush.

Was further treatment required by a doctor or in hospital.

How long was the patient off work.

Every two months a fresh bottle of eye drops will be sent from the Pharmacology Department, University of Edinburgh. The bottle in use should then be posted to the Department, using the same packing and the printed address label supplied.

Cardboard Eye Shield

The shield should be applied over the dressing ONLY in the case of a serious wound of the eyeball. It is kept in place by tying the tapes behind the head. The shield is to prevent further injury before the patient reaches hospital.

It was the original intention of the Ross Foundation to continue the experimental stage of the new first aid treatment for a year. It became evident, however, from the reports of several collieries that Albucid Soluble was so satisfactory in its results that any delay after six months trial would not be justifiable. All the collieries were therefore visited in June 1942 by the Director of the Foundation.

Report after Six Months' Trial.—Managers and Ambulance Room Attendants were unanimous in their praise of the new treatment, and the results of six months' trial are summarised as follows :—

Total number of men employed in the collieries	-	23,500
Number of injuries treated with albucid soluble	-	646
Foreign bodies removed from the eye with the brush		360

Of all cases treated at the ambulance room, 15 men lost 74 days off work, an average of five days. Several of these did not report for treatment on the day of injury.

In 34 cases an unsuccessful attempt was made with the brush to remove a foreign body embedded in the cornea. These men were all treated by the doctor after having the eye drops applied. One man lost work for 7 days and another for 9 days. No working time was lost by the remaining 32 men.

Only 7 cases have been admitted to hospital with corneal ulcer during the six months under review, and three of these men reported to the doctor without receiving the eye drops. The length of stay in hospital varied from 19 days to 3½ months.

The best indication of the efficacy of first aid treatment is the time off work on account of eye injury, and the figures show the remarkable record of 96·3 per cent. of injuries treated with no loss of working time whatever.

Men frequently reported for drops for smoke-grit or dust in

the eyes. These cases were not recorded and the eyes gave no further trouble.

Occasionally the drops have been used for burns with caustic potash and sulphuric acid, and the results have been very good.

It should be emphasised that early treatment is essential and that the danger of ulceration increases with the lapse of time. Notices have been posted at some collieries recommending immediate report for treatment after injury, and the response of the men has been excellent. It was almost invariably stated that the men find the drops very soothing.

As a means of saving much individual suffering and as a method of conserving man power, it has been recommended to the Mines Department that this new scheme of first aid treatment be adopted at all collieries throughout the country.

Hospital Treatment.—In the Eye Department, Royal Infirmary, Edinburgh, albucid soluble is being used for the treatment of corneal ulcer. Further clinical work is necessary before any standard treatment can be recommended.

Two forms of application of the drug are in use at present, namely :—

1. 30 per cent. albucid soluble eye drops applied six times daily.
2. Albucid powder applied locally to the ulcer.

Both drops and powder are reported to give satisfactory results, and no irritation of the eye has been caused by either method of administration.

Summary

This report deals with a series of 437 traumatic ulcers of the cornea; 350 cases in the Royal Infirmary, Edinburgh, and 87 cases in the Glasgow Eye Infirmary.

59.7 per cent. occurred in coal miners.

The bacteriology is shown in detail and includes the conjunctival flora of healthy miners. The pneumococcus was recovered from the ulcer less frequently than was anticipated, but it was the commonest organism in the severe type of hypopyon ulcer. Dacryocystitis associated with hypopyon ulcer was present in 7.8 per cent. of the Edinburgh cases, and was noted only once in the Glasgow series.

The average stay in hospital was 16.2 days in Edinburgh, and 19 days in Glasgow.

In 23.8 per cent. of the total cases there was no useful vision left in the affected eye six months after discharge from hospital.

Albucid Soluble eye drops in the first aid treatment of eye injuries in coal mines have been most successful in preventing infection and corneal ulcer.

A practical test was carried out for six months at thirty collieries in Scotland, and 96.3 per cent. of eye injuries were treated with no loss of working time.

In the hospital treatment of the developed hypopyon ulcer the method of application of Albucid Soluble is still in the experimental stage, but the results appear to be satisfactory.

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SYMPATHETIC OPHTHALMITIS

BY

T. HARRISON BUTLER

SYMPATHETIC ophthalmitis is a rare disease, and some surgeons have never seen a case. Professor Franschetti told me some twelve years ago that he had never seen one in Professor Vogt's Clinic at Zürich. During thirty years' work at the Coventry Hospital I had two cases both of which might have been prevented. One was a man whose eye was perforated by a piece of coal. I failed to remove this from the interior of the eye, and eventually advised that the eye should be excised. My advice was disregarded and sympathetic ophthalmitis developed. The injured eye was removed