he was invalided as a consequence, and written down as B 2. From that time to the present he has been bothered at intervals by bright lights, but otherwise has had no particular trouble until July, 1928, when both corneae developed small deep ulcers, which showed little staining with fluorescein. Since then his trouble has slowly progressed, until on November 22nd, 1928, the condition of the eyes was as follows.

Extending across the cornea of the right eye from side to side, and beyond it on each side, invading the sclera for a short distance, was a deep, gutter-like excavation of the corneal tissue (Fig. 2, C). The edges had a somewhat rolled appearance, and at the situation B, Fig. 2, were sodden-looking and stained on instilling fluorescein; the remaining area did not stain. Above the ulcer, in the situation A, Fig. 2, was a greyish, somewhat linear infiltration of the cornea, and at E were two small punched-out circular ulcers. The conjunctiva over the area D, Fig. 2, was opaque white, and marbled in appearance, as described later.

The condition of the left eye was in all essentials similar to the right, but ulceration was not so extensive. There was the same gutter-like excavation affecting the part of the cornea exposed in the palpebral fissure. It extended rather more than half-way across the cornea, and involved the adjoining corneo-scleral junction; a small spot only stained. The conjunctiva showed the same scarred appearance, and there was no intraocular involvement.

It may at once be stated that all the eyes had essentially similar features, though differing in detail, and were clearly similar to the case published by Mr. Humphrey Neame in the *Transactions of the Royal Society of Medicine* in November, 1928.

We may now examine the special features of these ulcers. First the intolerance of light is much less marked than might have been expected from the extent of the ulcer, and the circumcorneal injection of the eyes was less than would be present in other forms of corneal ulcer of similar dimensions in patients of this age. The ulcers themselves showed a marked tendency to involve the parts exposed in the palpebral aperture—that is, of course, the part originally exposed to the gas. They were deeply excavated, had a gouged-out appearance, and the tissue at the edge appeared sodden and ill nourished. They extended deeply into the substantia propria—so deeply, in fact, as to expose Descemet's membrane in Case i. They did not, however, perforate. In general appearance they reminded one a little of a Mooren's ulcer. The instillation of fluorescein did not produce extensive staining, but only showed up small spots or areas, chiefly at the edges.

From the shelving side of the ulcers infiltration could be seen extending into the adjoining cornea, and showed up as a grey area in it which had a linear arrangement (Fig. 1, D, Fig. 2, A). In one case iritis was present, but it was quite mild, and this in spite of the long persistence of the condition. In both of our cases, as well as in Neame's, one or two small localized, deep, nearly circular ulcers developed at the limbus (Figs. 1 and 2, E).

A marked feature of the ulcers was the long period, roughly ten years, between what clearly was their ultimate cause and their actual development; their extreme indolence; their situation in the palpebral aperture; their deep, gouged-out appearance; the comparatively mild symptoms; and their slow healing. The conjunctiva within the palpebral aperture has a very characteristic appearance, and even now is a good deal reminiscent of its appearance at the time of the gassing. It is somewhat swollen and in parts is almost of a homogeneous pearly white colour; in other parts, where it is less opaque, it has a marbled appearance, the "veining" effect being produced by the vessels, which in places show great irregularity in their calibre. It seems reasonable to suggest that it was the damage done to the vascular and nerve supply of the cornea by the gas, and the subsequent scarring, which has resulted in permanent impairment of the nutrition of the cornea and so to its ultimate ulceration.

With regard to treatment, we believe the most help is to be obtained from curetting any staining area, and cauterizing this small point very carefully with carbolic, or with the actual cautery. We have tried many other drugs without any clear advantage. We seriously contemplated sewing the lids together, and are inclined to believe, like Mr. Herbert Fisher, that this would prove valuable. We doubt whether any form of corneal section is advisable.

NINE CASES OF ERYTHEMA NODOSUM.

BY

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DURING the winter of 1926 and spring of 1927 nine cases of erythema nodosum came under our notice in a busy country general practice. A short account of these cases may not be uninteresting as throwing some light upon the etiology of the condition.

Case 1.—A single woman, aged 23, first came under our notice with complete blindness in the right eye. She was sent to hospital to see a consultant, who reported to us that she was suffering from a retrobulbar neuritis of rheumatic origin. She was given salicylates internally and made a complete recovery in two months. She resumed her duties, but eight months later complained of pains in her limbs. On examination it was found that she had developed well-marked erythema nodosum, but had no signs or symptoms of rheumatism. Under our usual treatment—namely, sodium salicylate internally and liniment of methyl salicylate locally—she made a complete recovery within a fortnight.

Case 2.—We were called in to see this patient, a youth, aged 17, after he had been in bed with pyrexia for two days. For a further four days he remained feverish, but there was no other sign or symptom and a diagnosis could not be reached. The pyrexia did not respond to quinine treatment. On the seventh day of the fever he was given the following mixture every four hours.

Sod. salicyl.	...	...	...	...	...	gr. vij
Liq. ammon. acet.	...	...	...	...	...	3i
Spirit. chlorof.	...	...	...	...	...	ʒviij
Aq. camph.	...	...	...	...	ad	3ss

Twenty-four hours later his temperature started falling, and coincidently with this erythema nodosum appeared on both legs, causing much local pain and tenderness. Local application of liniment of methyl salicylate relieved the pain and the patient made an uneventful recovery. Apart from some asthma and a nasal catarrhal condition this patient had always been well. His mother was also slightly asthmatic, but the rest of the family—father and two brothers—were very strong and healthy.

Case 3.—A farm labourer, aged 37, reported with typical erythema nodosum on both legs. He declared that he felt perfectly well, but the "lumps" on his legs were somewhat tender to pressure, and his legs generally ached. His temperature and pulse were normal. He was sent home to bed and given the usual antirheumatic treatment. The following day we were summoned urgently to see the patient, and found him with a temperature of 101°, a rapid pulse, and feeling very sorry for himself. He had been feverish all night. A thorough examination revealed nothing more than the nodules on the legs. Within a further twenty-four hours the temperature and pulse had returned to normal, the nodules became smaller, and the patient recovered. He has been perfectly well for the last two years. The patient had been a healthy man until this illness, but it is interesting that one sister has since come under our care for pulmonary tuberculosis and has recently been discharged from a sanatorium, and a brother was given three months' leave for a chronic cough and doubtful signs in the chest.

Case 4.—The patient was a schoolgirl, aged 15. We were called upon to visit her father, a farmer, aged 47, who had always been a particularly strong and healthy man, but for the previous week he had suffered from a short dry cough, marked shortness of breath, and some cyanosis. The diagnosis of rheumatic pleurisy with pericarditis was later verified by his response to treatment, and he made a complete recovery. Casually we were asked to look at the girl's legs because she had been complaining of pain in them since the previous day. She had well-marked nodules on both legs with some pyrexia and sweating. Under anti-rheumatic treatment she recovered rapidly.

Case 5.—This patient, a woman aged 42, consulted us for "painful lumps" in both legs, diagnosed as a typical erythema nodosum. The usual treatment was prescribed. Three days later we were summoned to see her as she was worse. To our surprise we found her legs were more tender and inflamed. On further inquiry it was discovered that the dispenser had given her a methyl soap liniment instead of liniment of methyl salicylate. She obtained immediate relief with the latter liniment, but it took three weeks before the nodules completely disappeared with the pain. It is interesting to note that about fifteen months previously we had attended her only son for acute rheumatic arthritis, and he had been under our treatment for three months.

Case 6.—A woman, aged 45, consulted us with erythema nodosum of both legs. She felt a little run down and out of sorts, and complained of tenderness of the legs, but her temperature was normal, and apart from well-defined nodules on her legs nothing abnormal was found on examination. She was placed on the ordinary treatment. She was seen twice again; on the first

occasion she reported herself as free from trouble with her legs, and asked for a tonic. The patient declared that she had derived much relief from the local application of methyl salicylate ointment.

Case 7.—A married woman, aged 55, consulted us for "tender lumps on her legs." She complained of not feeling well, but, apart from slight anaemia and the condition of her legs, she appeared to us to be quite well. Our usual treatment was prescribed, and when she reported again in a week's time she was much improved.

Case 8.—This patient, a married woman aged 65, was under our treatment for heart trouble—aortic and mitral regurgitation. On this occasion she suddenly fell ill, with a temperature of 102° and a rapid irregular pulse. After four days of irregular pyrexia she apparently improved, the temperature returning to normal, but her pulse remaining somewhat irregular. Two days later—on the seventh day of her illness—she developed erythema nodosum, first in the left leg and later in the right leg. She could not tolerate salicylates, and it was many weeks before the nodules disappeared from her legs. The patient recovered from this attack, but died about nine months later from heart failure.

Case 9.—An unmarried woman, aged 22, reported with erythema nodosum in one leg only, much debility and anaemia, but no fever. She found great relief in the local application of methyl salicylate ointment. Finally, she made a complete recovery, but the marked debility and anaemia persisted for several weeks. We attended this patient subsequently on two occasions for erythema pernio, which responded to treatment with calcium lactate.

The series obviously is too short to warrant any final conclusions, but we could not help being struck by the following facts:

1. In four cases only were we able to detect pyrexia (Cases 2, 3, 4, and 8). In two cases the nodules on the legs apparently were present before the pyrexia (Cases 3 and 4); in the other two cases (2 and 8) the fever had abated before the nodules appeared.
2. The close association in two cases (4 and 5) between a family history of acute rheumatism and erythema nodosum. In two of the cases (1 and 8) there had been a definite attack of acute rheumatism.
3. In every case marked relief to the tenderness in the legs was obtained by the local application of methyl salicylate, either as the liniment or as the ointment.
4. Internal administration of sodium salicylate definitely did appear to have a beneficial effect, and intolerance to the drug was accompanied by the prolonged course of the condition (Case 8).
5. The families of all these patients are well known to us, and in no instance, except Case 3, was there a past history of tuberculosis.

THE USE OF HEROIN AFTER ABDOMINAL OPERATIONS: A WARNING.

BY

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THE relief of pain after an abdominal operation is not infrequently one of the first cares of the surgeon, and for this purpose the injection of morphine or heroin is often necessary. For some years, in common, I believe, with many surgeons, I have favoured heroin rather than morphine. My reasons are shortly as follows: (1) heroin is more effective as an analgesic than morphine; (2) it has less after-effect as regards distension, constipation, and general malaise; (3) if a tube of morphine has been kept for some little time a change into apomorphine may occur, with resulting vomiting.

For a good many years, both in hospital and in private practice, when necessary $1/6$ grain of heroin has been administered without the slightest ill effect. The following two cases are cited, however, as a warning.

CASE I.

A lady, 64 years of age, rather asthmatic, suffered from chronic cholecystitis. Owing to the asthma, in order to give as little anaesthetic as possible, $1/4$ grain of morphine together with $1/100$ grain of atropine was administered half an hour before operation, but it was done purposely for the reasons mentioned above.

The operation consisted of a cholecystectomy, and the anaesthetic was gas and oxygen and warmed ether. The operation was completed in forty-five minutes, and the patient was back in

bed at about 10 a.m. At 1 p.m. I saw her, when she was well round, and complaining of a lot of pain. She was sufficiently conscious to be asking for her artificial teeth. As she seemed to be in great pain I ordered $1/6$ grain of heroin, which was administered just after 1 o'clock. At 1.25 I received a telephone message to come round to the nursing home at once. The injection had relieved the pain within five or six minutes, and the matron had left the room, but thought that she would go in and see her again after about ten minutes. On going into the room the patient was talking, when suddenly she became quiet and the matron noticed a change in her breathing. She immediately realized that the patient was profoundly unconscious, administered strychnine, brandy, and ether hypodermically, and sent for me. When I arrived the patient was blue, the skin was mottled, and she was breathing about once in every two and a half minutes; but the pupils were not pin-point, and never were during the whole course of events. The pulse was good, about 80. I immediately thought of internal haemorrhage and of a possible embolism, but obviously neither of these catastrophes had occurred.

At the time I was in the dark as to the cause of the patient's condition, and although it occurred shortly after the administration of the heroin, I did not believe this to be the cause. The patient was literally in *extremis*. The tongue was pulled out, the mattress turned round, and artificial respiration commenced. Owing to the conformity of the chest the greatest difficulty was experienced in forcing inspiration, and all that seemed possible to do was to empty the chest of air. A voluntary breath was taken about once every two minutes. After a short time I sent for Dr. R. J. Clausen, who had administered the anaesthetic, with the intention of possibly inflating the lungs through a laryngeal tube. Pending his arrival, artificial respiration was maintained. Dr. Clausen considered that it would be inadvisable to pass a laryngeal tube, and tried to stimulate inspiration by the administration of carbon dioxide. This, however, did not meet with any success.

After about an hour the respirations seemed to be rather better. The patient was now breathing about once every minute, and it was then noticed that if artificial respiration was stopped the pulse began to flag. After about an hour and a half the respirations approximated two to the minute, and the first sign of hope appeared—namely, the coffee which had previously been administered per rectum was returned. Just about this time a few involuntary face movements were noticed, and artificial respiration could be left off for a short while. After about two hours I noticed that the inspiratory movement of artificial respiration stimulated a voluntary respiration, but that without artificial respiration only two to three respirations a minute were voluntarily performed. At the end of three hours there were definite signs of returning consciousness, and a conjunctival reflex was occasionally obtained when artificial respiration was continued. On ceasing the artificial respiration the reflex disappeared.

At this time I realized that the breathing was that of a profoundly drugged person, similar to what I had seen in morphine poisoning. It was necessary to continue intermittent artificial respiration for another hour, care being taken that the artificial inspiratory movement did not stifle a voluntary expiratory effort, and vice versa. At 6 p.m. respirations were about five to the minute, and the need for artificial respiration no longer existed. At 6.30 the patient recovered consciousness—that is, after five and a half hours.

The following morning respirations were ten to the minute. Convalescence after this was uneventful, except for considerable pain in the right arm, which had been dislocated during the movements of artificial respiration. This necessitated another anaesthetic for replacing the joint by Kocher's method.

The tube of heroin tablets ($1/6$ grain) was subsequently investigated. It was not a new tube, and tablets had already been administered to other patients without ill effect.

While the patient was convalescent I vaccinated the right arm with $1/6$ grain of heroin dissolved in water, and vaccinated the left arm with a normal saline to act as a control, in order to see if a possible idiosyncrasy for heroin existed. No difference between the two sides could be detected. It is, of course, possible that a desensitizing effect may have been produced, though this is very unlikely.

CASE II.

The second case, for particulars of which I am indebted to Mr. W. E. Tanner, was that of a patient, aged 49, on whom cholecystectomy and appendicectomy had been performed. Before the operation $1/100$ grain of atropine was given, and the anaesthetic was open ether. About an hour after the patient had been put back to bed $1/6$ grain of heroin was given hypodermically. The patient became comatose, with pin-point pupils and no conjunctival reflex. The respirations fell to three a minute, the pulse to 60. She was given pituitary extract and strychnine, and artificial respiration was carried out.

Five hours after the injection of heroin the respirations were nine to the minute. The patient was drowsy, but could be roused. Fifteen hours later the patient was fully conscious; the respirations were eighteen to the minute, and she made an uninterrupted recovery.

CONCLUSIONS.

I have thought it well to put these two cases on record to serve as a warning. Respiratory stoppage must be very rare, but nevertheless when it does occur the very alarming situation can scarcely be imagined.

It is interesting that both these cases were cholecystectomies. In the one case morphine had been given prior to the operation, but not in the other. On the other hand,