therefore it is fair to say that the majority of sigmoid perforations could be treated by exteriorization.

Most surgeons, including Wells (1949), Sedgwick (1951), Patton (1953), and Patterson (1955), favour local repair, with proximal colostomy. This is technically easy, but it must have a higher mortality because in some cases further leakage will occur from the site of perforation despite the proximal colostomy, as shown in Case 3 above. Also, the nearer the colostomy is to the perforation the more effective it should be—for instance, a left iliac colostomy for a sigmoid perforation.

Ryan (1958) treated four cases by immediate resection and end-to-end anastomosis to reconstruct the colonic tract. The results were excellent—all four patients made an interrupted recovery. It is very doubtful, however, whether if resection and anastomosis were widely used in the treatment of perforated diverticulitis there would be any overall reduction in the mortality, because to the definite mortality of emergency colonic anastomosis would be added the deaths from the severity of the primary perforation. The simple and safe method of exteriorization is therefore to be preferred. In the few cases where exteriorization is not possible the wisest course would be to perform resection of the affected area of sigmoid colon by the Hartmann method.

Summary

Fourteen cases of perforated diverticulitis are recorded. The relative incidence is assessed and the composition of series noted. The treatment was always surgical, and the benefits of exteriorization of the lesion over either local repair or local repair and proximal colostomy are shown by the fact that all five patients treated by exteriorization survived while among the nine treated either by local repair alone or with a proximal colostomy there were four deaths.

I thank Mr. I. Q. Evans, Mr. B. B. Hickey, and Mr. C. H. Tanner, the consultant surgeons under whose care these patients were admitted, for permission to publish this article; and Dr. D. H. Davies, who kindly traced their records.

REFERENCES

- Aylett, S. O. (1954). *Surgery of the Caecum and the Colon*. Livingstone, Edinburgh.
 Bacon, H. E. (1948). *J. int. Coll. Surg.*, **11**, 560.
 Black, J. M. (1931). *Brit. med. J.*, **1**, 180.
 Crile, G. (1954). *Surgery*, **35**, 122.
 Eggers, C. (1941). *Ann. Surg.*, **113**, 15.
 Graham, R. R. (1937). *Canad. med. Ass. J.*, **36**, 1.
 MacLaren, I. F. (1957). *J. roy. Coll. Surg. Edin.*, **3**, 129.
 Martin, K. A., and Adsit, C. G. (1945). *Med. Clin. N. Amer.*, **29**, 639.
 Patterson, H. A. (1955). *Surg. Clin. N. Amer.*, **35**, 451.
 Patton, R. J. (1953). *Arch. Surg. Chic.*, **66**, 410.
 Ryan, P. (1958). *Brit. J. Surg.*, **45**, 611.
 Sedgwick, C. E. (1951). *Surg. Clin. N. Amer.*, **31**, 783.
 Smithwick, R. H. (1960). *Amer. J. Surg.*, **99**, 192.
 Wells, C. A. (1949). *Brit. J. Radiol.*, **22**, 449.
 Wheeler, W. I. de C. (1930). *Brit. med. J.*, **1**, 5.

The two addresses given at the afternoon session of a conference held by the British Council for the Welfare of Spastics in December, 1960—"Education for Life After School," by Mr. H. B. DAVIES, B.Sc. (headmaster, Thomas Delarue School, Tunbridge), and "From School to Work," by Mr. M. O. DAVIES, B.A. (senior youth employment officer, London County Council)—have been published by the Council in a leaflet called *Spastic School Leavers: Employment?* (Price 1s. 6d., post free, from the B.C.W.S., 13 Suffolk Street, Haymarket, London S.W.1.)

TWO CASES OF CHLOROQUINE-INDUCED RETINAL DAMAGE

BY

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Chloroquine and allied substances are being used to a considerable extent in the treatment of rheumatoid arthritis and various skin diseases. Corneal changes resulting from the systemic use of chloroquine are now a well-recognized entity, and there are numerous reports in the literature of this not infrequent side-effect of chloroquine medication.

Retinal changes from chloroquine are fortunately much less frequent, but are nevertheless very important because they lead to irreversible changes with serious visual impairment, for which, as yet, there is no effective treatment.

So far there are only a few reported cases in the literature, and it would thus seem advisable to report the following two new cases which I have seen during the past 18 months.

Case 1

A man aged 28 was first seen in 1955 in the skin department of a local hospital complaining of a rash on the face and forearms of three years' duration; he also gave a history of a blistering eruption of the ears, especially severe when exposed to sunlight and heat. A diagnosis of "light sensitivity" was made and treatment was begun with tablets of chloroquine 150 mg. twice daily, together with a local application of a light-screening agent. Later medication was changed to "avlochlor" (chloroquine phosphate) 250 mg. twice daily, and he remained on this until shortly before December, 1959, when he was seen again in the skin department complaining of difficulty with night vision, and some difficulty in seeing steps. A refraction carried out four months previously had shown an unaided vision of 6/5 in each eye. He was referred to me in March, 1960, by the skin consultant, who drew my attention to an article reporting similar eye symptoms following chloroquine therapy (Hobbs *et al.*, 1959).

On examination I found him to have an unaided vision of 6/9 in each eye. There were subepithelial changes in the cornea with some oedema, the appearance of the cornea of each eye being consistent with chloroquine medication. The maculae showed pigmentation and there was attenuation of the retinal arteries. Visual-field examination showed a dense absolute ring scotoma sparing the macula and extending into each upper temporal field (Fig. 1). In view of the symmetrical nature of the field defects a full neurological examination, including lumbar puncture, was carried out, but with negative results. He has been seen at intervals and, although he has had no chloroquine or similar drug since November, 1959, the fundus appearance and visual fields have remained unchanged. He has been forced to change from his original job of milk roundsman, since it was felt that it was no longer safe for him to drive a vehicle.

Case 2

A man aged 53 was first seen by me in August, 1961, when he was referred by his general practitioner, who reported that his optician had noticed a fall in his corrected visual acuity from 6/6 to 6/18 in each eye over a period of nine months.

My examination showed him to have a vision of 6/12 in each eye. The cornea in each eye showed mild signs typical of long-term chloroquine medication with subepithelial striae. The maculae showed pigmentary change similar to

This appearance seems to be both typical and suggestive of chloroquine toxicity, and it allowed a confident diagnosis to be made in Case 2 on fundus examination alone. Most cases also show attenuated arteries, possibly with retinal oedema and peripheral retinal pigmentation similar to that found in retinitis pigmentosa. The typical field defect is a ring scotoma which later breaks through to the periphery, especially in the upper temporal quadrant. Symptoms are those of the field defect together with night blindness. Foveal vision is affected comparatively late, though in one reported case the macular changes were progressive even after discontinuing the drug.

Because foveal vision is affected comparatively late, routine testing of visual acuity is not sufficient to exclude the development of toxic retinal changes; a more useful screening test would probably be the use of the Amsler charts, which are designed to pick up central field defects.

The toxic effects of the chloroquine seem to be directly on the retina, possibly by attenuation of its blood supply. Treatment to be tried includes systemic steroids and the giving of oxygen in an oxygen tent, but results are not very encouraging.

Summary

Two further cases of retinal damage following chloroquine medication are reported. A watch should be kept for its earliest signs among patients receiving long-term chloroquine therapy, because the retinal changes when produced appear to be permanent.

I thank Dr. R. J. Cairns, who first drew my attention to this condition, and both him and Dr. B. F. Russell for permission to publish the dermatological details of these cases.

REFERENCES

- Ellsworth, R. J., and Zeller, R. W. (1961). *Arch. Ophthalm. (Chicago)*, **66**, 269.
Hobbs, H. E., Eadie, S. P., and Somerville, F. (1961). *Brit. J. Ophthalm.*, **45**, 284.
— Sorsby, A., and Freedman, A. (1959). *Lancet*, **2**, 478.

"Accounts are not wanting of the execution and burial of Charles I. One is shown here (John Nalson, *A True copy of the journal of the High Court of Justice for the tryal of King Charles I.* London, 1684) together with Sir Henry Halford's account of the opening in 1813 of the coffin containing the body of the King, in the presence of the Prince Regent. What is not recorded is that he removed from the coffin and did not replace a 'piece of loose neck vertebra that had been separated by the axe.' This remained in the Halford family until the reign of Edward VII. It was the habit of a member of the family at that time to carry round the relic in his pocket. On one occasion it was said to have been produced for inspection at a dinner party. When this came to the ears of the King he was very angry and ordered it to be replaced in the coffin." (From programme of exhibition, "Birth and Death," in Harveian Library of Royal College of Physicians of London.)

FIG. 1.—Case 1. Combined peripheral and central fields showing bilateral ring scotoma with peripheral extension; $\frac{1}{4}^\circ$ white test object.

FIG. 2.—Case 2. Fundus photographs of left and right maculae.

that in Case 1. The striking thing in both cases was the aggregation of fine pigment granules, concentric with the fovea but sparing the fovea itself (Fig. 2).

Central visual fields again showed a pericentral ring scotoma in each eye, but this time without peripheral extension. Direct questioning revealed that the patient was receiving medication in the skin department of a London hospital for a skin disease. A subsequent communication from this hospital revealed that he had been under their care since 1950 for chronic discoid lupus erythematosus and that he had been receiving chloroquine 200 mg. daily from July, 1954, subsequently increased to 200 mg. twice daily in May, 1955. This therapy had led to control of the skin disease.

Chloroquine was immediately stopped and there has been slight subjective improvement of vision, which at the time of writing was 6/9 in both eyes but with no change in the visual field or fundus appearance.

Comment

The corneal and retinal signs which follow chloroquine medication are excellently summarized by Hobbs *et al.* (1961). Three further cases with retinal changes are reported by Ellsworth and Zeller (1961). In an established case there are aggregations of pigment, especially around the maculae but sparing the fovea.