may be so permeated with staphylococcal toxins as to render the likelihood of an endogenous eye inflammation possible as the result of the traumatism of operation. The same remarks apply to atrophic rhinitis and chronic sinusitis.

The condition of the operator's mouth and nose must also be considered in this connexion; carious teeth, pyorrhoea, or nasal trouble, including acute coryza, should be looked upon as a possible source of infection, and precautions taken; speaking during the operation should be forbidden for obvious reasons. The bacteriology of post-operative inflammatory eye troubles indicates that the pneumococcus and staphylococcus play an important part; these micro-organisms are not frequently found in the conjunctival sac, but the mouth is a common habitat, hence the great likelihood of infection arising from the operator's or assistants' exhalations.

Mention must be made of blindness resulting from the onset of optic atrophy, caused by intranasal operations. Such cases are, of course, not frequent, but there are a number on record.

Perhaps the most common accident has been entry of the orbit when exploring the antrum of Highmore with a trocar or cannula, or in forcibly boring a hole in the alveolus of the superior maxilla, for drainage purposes; loss of control and the absence of a stop on the drill has resulted in puncture of the floor of the orbit and either injury to the optic nerve or infection of the orbital contents. Forcible removal of bony nasal spurs and of the middle turbinal bone may produce a fracture involving the optic canal, the formation of callus, pressure of the callus on the nerve, and subsequent atrophy.

I am much indebted to Sir William J. Collins for permission to make use of Case 1 and of a portion of the ophthalmic material on which this article is based.

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AN INTRANEURAL CYST OF THE EIGHTH CERVICAL NERVE.

BY

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With a Report by

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THE patient in the following case, a lady, married, and aged 32, was first seen on November 1st, 1907. She complained of pain in the inner side of the left forearm and hand, which had been present for three weeks following an attack of "influenza." The pain was nearly continuous as a dull aching, with attacks of severe pain and tingling shooting to the little and ring fingers. It was aggravated by cold. The skin over the affected area was tender, so much so that the pressure of the wedding ring could not be tolerated.

State on Examination.

There was found to be marked wasting of both thenar and hypothenar eminences, and a little also of the interosseous spaces of the left hand. There was a slight amount of flattening of the flexor aspect of the ulnar side of the forearm.

The movements of the fingers were good, but the thumb could only be abducted, adducted, and opposed to the fingers weakly and imperfectly. The hand was slightly colder than the other. The objective sensory changes consisted of marked increase of painful sensation over the palmar and dorsal surfaces of the little and ring fingers, and ulnar half of the hand up to the level of the wrist-joint.

The pupils were natural, and radial pulses equal. On the left side of the neck, beneath the lower part of the sterno-mastoid muscle, could be felt a swelling, which was too deeply placed to admit of accurate definition, but which seemed to be fixed to the deep structures in the neighbourhood of the transverse process of the seventh cervical vertebra and neck of the first rib.

Initial Diagnosis.

A diagnosis of cervical rib was made, although the distribution of the sensory changes was not quite typical. For, in

cervical rib, the objective sensory change is commonly anaesthesia over the first dorsal area, or over the first dorsal and eighth cervical areas combined; whereas, in this case, the changes were confined to the eighth cervical area.

The patient was not aware of the weakness and wasting of the hand, but on further careful inquiry it became clear that for many years—almost as long as she could remember—there had been some difficulty in picking up and holding objects in the left hand. This could be traced back with certainty to the age of 14—namely, eighteen years. It further transpired that for two or three years past pain had occasionally been felt along the ulnar side of the forearm and hand, which had been treated as "neuritis."

Final Diagnosis.

A skiagram was taken by Dr. Harrison Orton which showed no cervical rib but a definite circumscribed shadow at the root of the neck extending downwards behind the clavicle. Electrical testing of the muscles showed no reaction in the abductor and opponens pollicis, partial reaction of degeneration in the remaining short muscles of the thumb, those of the little finger, the interossei and the flexor sublimis digitorum.

During the next week the swelling above the clavicle increased in size so as to cause visible asymmetry of the neck.

It seemed evident that the swelling affected the eighth cervical nerve above the brachial plexus; that it was of many years' standing; that it had recently begun to increase in size rapidly; it was feared that it might prove to be a sarcoma originating in an old neuro-fibroma.

Mr. Butlin was consulted and agreed with the general diagnosis; he advised an early operation, which he performed on November 19th, 1907.

Operation.

The brachial plexus and third part of the subclavian artery were exposed by a V-shaped incision carried downwards over the posterior border of the sterno-mastoid and outwards above the clavicle. The lowest of the three primary cords of the brachial plexus was identified, and on tracing it inwards a thin-walled, tense cystic swelling was found extending downwards behind the scalenus anticus over the first rib. The cyst was punctured and some clear fluid and a little mucoid material escaped. A small portion of the cyst wall was excised and a fresh section immediately cut by Mr. E. H. Shaw, who found the structure to be fibrous tissue only. His report in full appears at the end of this communication.

On dissecting out the cyst, which was about 2 in. in length, it was found to be in the course of the eighth cervical nerve, which apparently ran into it close to the intervertebral foramen, and issued from it at the point of junction with the first dorsal trunk. No nerve fibres could be detected in the cyst wall microscopically at the time of operation. The cyst was removed, the nerve being divided on either side of it, and the ends sutured together with catgut. The wound was then closed with fine silk sutures.

After-Progress.

Union took place by first intention, and immediate recovery was uneventful; there was some pain in the whole limb for the first few days, and considerable hyperaesthesia of the hand and forearm for eight or nine weeks, which prevented thorough massage and electrical treatment being carried out. During this time also there was an area of solid oedema which extended from 2 in. above the wrist-joint down to the middle of the palm, fairly sharply defined above and below and limited to the anterior aspect. The subjective sensory symptoms gradually passed off and definite eighth cervical anaesthesia remained; the movements of all the digits were much impaired, all the intrinsic muscles of the hand being paralysed. The *main-en-griffe* position was marked, hyperextension of the proximal phalanges being slightly less in the index and middle fingers than in the others. Massage and electrical treatment were employed regularly, and a splint used to correct the deformity of the hand.

On July 22nd, 1908, electrical testing of the muscles of the upper limb was carried out by Dr. Harrison Orton, and showed complete loss of reaction in the flexor sublimis digitorum and all the intrinsic muscles of the hand. No qualitative changes were observed in any other muscles of the limb, but in the flexor carpi ulnaris the contractions were decidedly feeble. The anaesthesia remained as before, the whole hand showing signs of malnutrition—namely, cold, shiny, congested skin, roughness of the nails, etc.

RESULT.

Since that time much improvement has taken place in the appearance and general usefulness of the hand, though the electrical reactions when tested in January, 1910, remained unaltered, nor is there any return of voluntary power to the affected muscles. There was no return of sensation over the eighth cervical area for more than a year after operation, but it has now been completely regained, together with the nutrition of the skin.

REMARKS.

The chief points of interest in the case which have led me to publish it are:

1. The situation of the nerve lesion, marking the distribution of the anterior primary division of the eighth cervical nerve.
2. The transformation of the nerve trunk into a cyst.

Mr. Thomas Bryant,¹ in a lecture delivered before the Royal College of Surgeons in 1888, mentioned two cases of cystic tumours of nerve.

The first is described as a cystic tumour of the size of half a hazel nut, which was enucleated from the sheath of the median nerve above the anterior annular ligament. This swelling had given rise to pain over the distribution of the median nerve in the hand.

The second case is that of a cystic tumour within the sheath of the upper cord of the brachial plexus, which caused pain chiefly over the distribution of the musculospiral nerve; removal of the swelling was followed by recovery. Mr. Goodheart reported that it seemed to be a blood cyst. This specimen is preserved in the museum of Guy's Hospital, and appears to be a fibrous-walled cyst containing blood clot.

A remarkable case of multiple neuro-fibromata affecting the nerves both within and external to the spinal canal, some of the tumours being cystic, is recorded in the *Transactions of the Medico-Chirurgical Society* by Mr. Septimus Sibley.² The largest of the many tumours was situated upon the anterior crural nerve, the capsule being continuous with the sheath of the nerve. "On section the tumour presented the appearance of a fibro-cellular tumour interspersed with cysts, the fibrous portion being chiefly collected in one part, and the cystic portion in another. All the smaller cysts were filled with clear serous fluid, the cysts being formed by a thin, smooth fibrous wall. The largest cyst was nearly filled with partly organized blood clot. A second cyst, the size of a walnut, was filled with yellowish gelatinous or colloid substance." This specimen is preserved in the museum of Middlesex Hospital.

In the museum of St. Bartholomew's Hospital is a specimen which was obtained from the dissecting room, and consists of a portion of the inferior articular branch of the external popliteal nerve, which shows two small thin-walled cysts in the course of the nerve.

In the case of the cervical nerve cyst recorded above, although examination of the specimen does not give any definite indication of its origin, it seems probable that the cyst arose from a fibro-neuroma which had been present for many years before undergoing cystic change. The examples quoted seem to show that such a condition does occur.

My thanks are due to Mr. Butlin for his kind help and for his permission to publish this case.

REPORT BY MR. E. H. SHAW.

The specimen consists of a unilocular ovoid cyst measuring $2\frac{1}{2}$ in. in its vertical length by 1 in. in transverse diameter. Its wall is thin and composed of strong fibrous tissue; it is strengthened in places by rather thick plaques, which fade gradually away on to the thinner parts of the wall. The inner surface is smooth and pale, like an ordinary endothelial surface. The outer aspect of the cyst wall is composed of loose connective tissue, and numerous blood vessels are seen traversing its surface. A nerve is seen at the upper part of the specimen; it gives off a number of small branches which spread out and soon become incorporated with the outer part of the cyst wall; the remainder of the nerve passes on and becomes lost in the lower part of the wall.

Microscopic sections were made of various parts of the cyst wall. One through a thickened patch reveals dense fibrous tissue arranged in irregular wavy lines with very few cells; it reminds one of the appearances presented by the cornea and the thickened patches seen on the spleen in perisplenitis. No lining of endothelial or other cells is visible; the outer part of the wall is composed of loose fibrous tissue containing numerous blood vessels and many spindle cells. Several small nerve bundles are also seen.

Another section of the lowest part of the cyst wall shows an inner dense fibrous layer, much thinner than the first part, and an outer layer of fibrous tissue thickly packed with spindle and oval cells. Several nerves are seen surrounded by these cells, and are cut in various planes. Many large blood vessels are present in both parts of the wall, and in several places collections of blood pigment are visible—old blood extravasations.

In a third section the separation into inner dense fibrous tissue and outer loose fibrous tissue is not so abrupt, and many more spindle-shaped cells are seen in the inner part. Several flattened cells can also be seen on the internal surface; these are evidently endothelial in character.

Origin of the Cyst.

It is difficult to prove whether the cyst is due to dilatation of connective tissue lymphatic spaces in one of the nerves or to the same change occurring in the neighbourhood of the nerve and implicating it by extension and pressure. The close relationship existing between the cyst wall and the surrounding

nerves, seen both macroscopically and microscopically, suggests strongly that it has arisen in the connective tissue of a nerve.

On the other hand, lymphatic cysts do occur in the neck, and it is possible for such a cyst to cause trouble by pressure on the adjoining nerves. These cysts, however, are usually multiple, occur in young people, and may become very large and numerous without involving the nerves. A third possibility is a cystic change occurring in a fibro-neuroma; there is no macroscopic tumour remains in this specimen, but the presence of the numerous spindle-shaped cells in the second section might lend support to this suggestion.

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TRACHEOTOMY DURING THE ADMINISTRATION OF NITROUS OXIDE GAS.

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The following incident occurred during a dental operation upon a patient, a man aged 24, who was suffering from multiple osteo-arthritis. Most of the larger joints were markedly affected, including both mandibular joints to such an extent that the teeth could be separated only by about one-third of an inch. The teeth were in a very bad condition, with the exception of a few in the front of the lower jaw they were all decayed to the gum level. It was thought advisable in the treatment of his condition that all these stumps should be removed, and the mouth put in as healthy a state as possible.

Nitrous oxide was administered for this purpose, the intention being to remove the more accessible stumps towards the front of the mouth on the first occasion so that, at a subsequent administration, those at the back could be more easily removed. Previously to the administration it was found that, although the free passage of air through the mouth was somewhat limited by the fixation of the lower jaw, nasal respiration was perfectly free.

Anaesthesia was induced in a normal manner by the nasal method, and one root had been removed when slight cyanosis was noticed, which continued to increase in spite of the admission of air. The administration was at once discontinued, but respiration ceased entirely. The mouth was opened with a Mason's gag, and the tongue drawn forward; no obvious obstruction could be felt by the finger in the pharynx, which was sponged out, large quantities of very viscid mucus being present.

The patient was placed on the floor and artificial respiration performed, but it was obvious that there was laryngeal obstruction, as no air passed into the chest; therefore tracheotomy was immediately performed and artificial respiration continued, air passing freely through the opening through which oxygen was administered. After a very few compressions of the chest natural respiration was resumed, the patient's colour rapidly improved, and he soon recovered consciousness.

In view of the condition of affairs, the problem of the removal of the teeth was solved by administering chloroform next day through the tracheotomy tube, the pharynx being plugged with a sponge; after all the stumps had been removed, the tracheotomy wound was closed, and the patient made an uninterrupted recovery.

The interesting feature of the case was that although the mouth was opened, the tongue drawn forward, and the pharynx sponged out, complete laryngeal obstruction persisted, which appeared to be due to congestion of the tissues around the epiglottis, the tongue and neighbouring soft parts being much swollen; immediately the asphyxial symptoms were relieved by tracheotomy, the swelling subsided, and the patient could breathe through the natural passages.

WE observe that at Whitehaven, as on the occasion of nearly all mining disasters, the medical profession played its usual but commonly unrecognized part, Dr. C. J. J. Harris of Whitehaven being mentioned among those who formed the first rescue party to descend. The accident, besides being one of the worst on record in point of loss of life, has not even the advantage of affording any hint, apparently, as to how mining operations may be rendered less perilous. When a mine catches fire all ordinary aids to rescue work are set at naught, and while the dangers attending it are greatly increased the chances of material success are reduced to a minimum.