I have always dissected away the tissue as far inward as the internal jugular vein where it lies under the lower end of the sterno-mastoid, drawn up the fatty tissue from under the clavicle, and removed the pad of fat lying under the inner border of the trapezius. It is not an easy dissection, as the space in which to work is so small. Before I finish the dissection I push up the tissue lying deeply beneath the clavicle into the supraclavicular space, with a finger in the cleared-out axilla to bring into view any fat or glands lying there.

The Extent of my Present Operation for Cancer of the Breast.

When I published the first series of 54 cases of this operation⁵ I did not remove the great pectoral muscle but dissected away the pectoral fascia only. I recognized that it was not easy to do this thoroughly as it was so intimately attached to the muscle, and, in order to make sure of its complete removal, in 1902 I excised the sternal portion (or the greater part of it) as a routine proceeding. I have never removed the pectoralis minor as a routine proceeding, for I see no object in doing so, though of course it is most important to take away the fat and glands lying above its upper border just under the clavicle (the subclavicular group). I have occasionally divided or removed it in cases of very extensive axillary growth, in some of which it was necessary to excise portions of the axillary vein with the growth, because division or removal of the muscle gives the best possible access to the whole course of the vessels. But if the pectoralis minor is retained it is, of course, important to spare also the internal anterior thoracic nerve, which supplies it.

In my first series of cases I was very fortunate in being able to trace every case but one. I had 30 cases in the 54 three years or longer after operation, and 9 had no recurrence, or almost 1 in 3, or 30 per cent. This is not as good as in my last series, but it must be remembered I was more fortunate in tracing my cases in the first series than in the last. Possibly the better results in the last series may have been due to the complete removal of the pectoral fascia with the muscle, possibly also to a more extensive removal of the surrounding skin and subcutaneous fat, though this seems doubtful, but certainly, I think, to the routine removal of the supraclavicular glands. In my first series of 54 cases I had no death, but I can confidently say no death in the later series was due to the supraclavicular extension of the operation.

As I have already stated, in dealing with recurrence I do not carry my incision towards the abdomen in order to remove the upper part of the sheath of the rectus or the fascia over the external oblique muscle. I have never seen a recurrence in this direction. Nor have I adopted the method of first clearing the axilla, and then later removing the breast and surrounding tissue. It seems to me that the chest wall, left exposed by the removal of the breast and surrounding tissue, can always be covered with a towel wrung out of hot saline while the surgeon is clearing the axilla; and I do not see any very decided advantage in dividing the small branches from the axillary artery which supply the breast before removing it. It is not as if one could tie one large vessel in the axilla, and thus render the removal of the breast almost a bloodless operation. The largest vessels are the perforating branches of the internal mammary artery, which are divided in the removal of the great pectoral muscle. I always begin the axillary clearance by dissecting out the fat and glands around the axillary vein above the upper border of the pectoralis minor, and as I do not remove, or even divide, this muscle in most cases, the space is best reached after the breast and great pectoral muscle have been removed.

I do not find the operation I practise, even when to it is added the supraclavicular extension, though a lengthy proceeding, a shock-producing one; only very seldom has the patient suffered from shock, even with this extensive dissection. I have had no fatality from shock in the 251 cases. In a woman of 79 for whom the complete operation for cancer of the breast was performed on one side, and an innocent cyst was dissected out of the other breast, there was no shock, and it was also absent in several women over 70 years of age. In one case, in a woman of 66, I removed both breasts, both great pectoral muscles, and cleared out both axillae at the same operation, without shock.

None of the 120 specially investigated cases were treated by x rays after operation, and yet 46 per cent. were free from local recurrence after three years, and 30.2 per cent. after five years. This compares well with the statistics of a series of

cases treated by x rays, referred to in the BRITISH MEDICAL JOURNAL (1921, ii, 411). This treatment by x rays seems a most reasonable method, for if x rays can cause the disappearance of cancer nodules, as I know from my own experience they can, how much more likely are they to destroy those cancer cells lying in the tissues which will ultimately grow and form a recurrence? But as far as the statistics quoted in the BRITISH MEDICAL JOURNAL indicate, cases not treated by x rays seem to remain as free from recurrence as those treated by it.

REFERENCES.

¹ *Annals of Surgery*, 1903, vol. xxviii, p. 573. ² BRITISH MEDICAL JOURNAL, 1904, ii, p. 825. ³ *Ibid.*, 1921, i, p. 93. ⁴ *Annals of Surgery*, November, 1898, p. 571. ⁵ *Bristol Medico-Chirurgical Journal*, 1902, p. 305.

CATARACT EXTRACTION FOLLOWED BY SYMPTOMS SUGGESTIVE OF SYMPATHETIC OPHTHALMIA.

BY

FREELAND FERGUS, M.D., LL.D., F.R.S.E.,

CONSULTING SURGEON, GLASGOW EYE INFIRMARY.

On the same evening I happened to read two very suggestive papers: the first was that of Sir William Willcox which appeared in the issue of the BRITISH MEDICAL JOURNAL of January 13th, entitled "The clinical, pathological, and radiological aspects of inspection of the teeth and gums"; the other was by Professor Trug of Montpellier, entitled "Deux nouveaux cas d'ophtalmie sympathique," which appeared in the *Archiv. d'Ophthalmologie* for July, 1922.

Those two papers recalled to my memory a case which was under my care a few years ago.

The patient was a man well on in middle life who consulted me for defective sight. I found him to be highly myopic, and in each eye there were slight corneal opacities. In addition, however, he had a well marked cataract in one eye, and I advised extraction of the lens. He agreed to this and was admitted to a nursing home. On testing the eye by cultures on serum agar—a practice which I have invariably followed since 1891—I found no growth, and after a few days of systematic douching of the eye I extracted the lens. The operation passed off well, there being a slight escape of vitreous but no other untoward event. The eye was dressed in the usual manner with sterile cotton-wool and a roller bandage for the first few days, and after a period of fully a fortnight he was allowed to go home, wearing dark glasses and with instructions both to himself and to his medical attendant that the eye was to be bathed with sterile saline.

After the lapse of nearly three months I was informed by the medical man in charge that the other eye had become inflamed. I at once went to see him and found that there was a mild irido-cyclitis with adhesions of the iris to the lens capsule and a few deposits on the posterior surface of the cornea. All such inflammations are invariably the result of infection, and therefore the question at once arose as to the source of the infection in this case. I was satisfied that nothing had been introduced at the time of the operation. Everything had been carefully sterilized and no growth had been found on the culture media. On investigating matters I found that his mouth was in a deplorable condition. A number of the teeth in both jaws were much decayed and there were the usual symptoms of pyorrhoea alveolaris. It seemed to me that that condition might be the *fons et origo mali*.

He was at once removed back to the nursing home and each jaw was thoroughly cleaned; all the teeth were removed and a potassium chlorate wash prescribed. The symptoms at once began to ameliorate, and in the course of a few weeks he was able to go home entirely relieved of all acute symptoms and with good useful vision in each eye. That is some years ago, and there has been no recurrence of the acute symptoms; the only indication of the disturbance is the presence of one or two insignificant synechiae which were not broken down by the use of atropine.

Now I do not consider that this was in any true sense of the term a case of sympathetic ophthalmitis, although it presented the usual features of that disease, and I have no doubt would have ended in complete loss of vision had the source of the infection not been discovered and removed. I regard true sympathetic ophthalmitis as almost certainly due to a definite specific micro-organism which has not yet been discovered. Hence we sometimes have severe wounds of the eyeball not followed by this terrible disease, and in other cases we find it following a trivial injury. Such anomalies seem to me to depend on the absence or presence of a specific micro-organism.

Broadly speaking, septic accidents after cataract and other operations on the eyeball seem to me to be readily divisible into two groups. In the first I include suppurations, which mean the introduction of some pyogenic organisms at the time of operation or before the wound has healed.

Personally I have not seen a suppuration, much less a panophthalmitis, after cataract extraction since 1891, when I had the case which made me adopt the practice of testing the conjunctiva before operating.

The second group consists chiefly of cases of extraction followed by iritis or irido-cyclitis. These, no doubt, may be due to something introduced at the time of the operation, but I am strongly of opinion that for the most part they are due to such sources of infection as obtained in the case above described, and in addition to examining the conjunctiva I have come to the conclusion that no case of cataract extraction should be undertaken till the operator is satisfied that there is no acute septic condition of the mouth, of the antra, of the nasal cavities, of the ethmoidal cells, and of the frontal and sphenoidal sinuses.

I have not much hope from drugs, except in the presence of syphilis, in the treatment of such cases. Atropine should certainly be used, but probably the best line of general treatment is biological, as by suitable serums and vaccines, together with the removal of the source of infection. I use atropine regularly, but not indiscriminately, for it is liable to do damage by interfering with drainage, and thus may cause the retention of toxins.

"TETANISM" IN MENINGITIS.

BY

H. BATTY SHAW, M.D., F.R.C.P.,

PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL, AND TO THE BROMPTON HOSPITAL FOR DISEASES OF THE CHEST;

AND

CYRIL DEE SHAPLAND, M.R.C.S., L.R.C.P.,

LATE HOUSE-PHYSICIAN, UNIVERSITY COLLEGE HOSPITAL.

The following case contains much that is of interest, especially from the point of view of diagnosis.

E. P., a married man, aged 37, was a mattress manufacturer, a business which brought him into contact with feathers. Although feeling far from well for a week or so at the end of October before coming to London from his place of business in the country, severe illness only commenced in London on November 1st, 1922, with sharp pain in the left side of the chest, and a shivering attack. Dr. Charles Dixon of Acton attended him and found him looking very ill and suffering from left-sided pneumonia; the fever persisted for six days, a pseudo-crisis occurring on the fourth day, the true crisis on the sixth. On November 4th, as the pulse was so weak, the patient had been given three separate hypodermic injections of 1/60 grain of strychnine sulphate; on November 5th two such injections, and on November 6th one.

For the nine days following the crisis the patient's temperature remained slightly subnormal (about 98°), his pulse was 70 to 80, and respirations 20 to 24. On November 15th he was seized with acute pain in the right side of the abdomen, evidently due to colitis, for he passed slime and membranous material shortly afterwards for twenty-four hours. On the following three days his temperature rose to a maximum of 101°. On the morning of Sunday, November 19th, he complained of stiffness of the jaw and neck, which he attributed to sitting in a draught. The next day, however, the spasm of the neck and jaw muscles was much more marked, and, as tetanus was suspected, he was admitted to University College Hospital (November 20th).

When seen at 2.15 p.m. on that day his condition was grave. The temperature was 97°, pulse 104, and respirations 26. He lay on his back in bed with his neck held rigid; the angles of the mouth were drawn outwards, and his face presented the typical risus sardonicus; the masseters were in a condition of tonic spasm, producing absolute lockjaw; the accessible muscles of the neck were rigid, and the recti abdominis were in such a state of tonic contraction that a remarkable "statuesque" appearance was given to the anterior abdominal wall. The musculatures of the upper and lower extremities were not affected. He was quite conscious, and the reflexes were normal; although unable to speak, he conversed quite rationally by means of "hand" signs. At 5 p.m. lumbar puncture was performed, and 10 c.cm. of perfectly clear fluid was withdrawn, following which 6.5 c.cm. of a sterile 25 per cent. solution of magnesium sulphate were injected intrathecally. Examination of the fluid revealed no abnormalities microscopically, nor was any growth obtained on culture.

As it was impossible to feed the patient by the mouth a nasal catheter was passed at 5.30 p.m., but in spite of the fact that 1/4 grain of morphine and 1/120 grain of atropine had been given an hour previously, a violent spasm was produced directly some milk was given by this method, and was repeated at a second attempt.

Between 12 noon and 12 midnight the patient received 9,500 units of antitetanic serum subcutaneously. When seen at midnight (November 20th-21st) his jaw was partially relaxed, he was sweating profusely, the axillary temperature had risen to 104.4°, and the pulse to 130. He was kept under morphine during the night, but in spite of this the spasms of the neck and facial

muscles became more severe, and he died in a sharp spasm at 8.45 a.m. on November 21st.

The autopsy was delayed until thirty-three hours after death, because, despite the fact that there was no trace of any wound or abrasion, it was considered advisable to report the case to the coroner as one of tetanus. The left lower lobe was intensely congested and showed signs of delayed resolution of the former pneumonia; there was a small patch of fibrinous pleurisy at the right base posteriorly; elsewhere there were signs of broncho-pneumonia. The arachnoid and pia mater looked more opaque than normal, and were adherent to the dura mater; along the lines of the cortical vessels was a greenish-yellow exudate; microscopical examination showed the presence of an intense infiltration of the meninges with polymorphonuclear leucocytes. A streptococcus was grown from the meninges, and also from the heart blood. There were no other *post mortem* findings of note; the stools yielded no signs of the tetanus bacillus, nor was this organism discoverable in the meninges, lungs, or colon.

This case can be viewed from many different clinical points of view.

1. The case might have been one of meningitis, against which were the facts that the spinal fluid was normal; the patient was perfectly rational and conscious, and did not complain of headache or photophobia; there was no vomiting, nor were there any ocular palsies.

2. The tonic contractures might have been due to the effect of strychnine injected during the pneumonia.

3. The case might have been thought to be one of tetanus, and that the infection had taken place at the time of hypodermic medication; or one of so-called visceral tetanus, which is said to occur in patients who present no sign of external wound or abrasion.

With regard to the first possibility, at no moment did it occur to us that the patient could be suffering from any form of meningitis, or even of meningism, nor are we aware of any systematic account of tetanus, except one, in which meningitis is put forward as a condition to be diagnosed from tetanus. The late Sir G. Sims Woodhead, in vol. i of Allbutt and Rolleston's *System of Medicine*, stated that basal meningitis may sometimes be mistaken for tetanus. But had we thought that spinal meningitis might be present the negative findings of the spinal fluid excluded this, and the complete absence of cerebral symptoms excluded the cerebral form of meningitis. So far as we can find in the literature there is no description which says that the tetanus bacillus may produce meningitis, nor do we know of any observation which could give information as to the effects produced upon the meninges when intrathecal medication with magnesium sulphate is practised.

Mr. C. J. Fuller, clinical clerk, fortunately called to mind the details of a case which was similar to the present one. It was reported by Dr. L. S. Fry in the *BRITISH MEDICAL JOURNAL* of January 14th, 1922 (p. 56), as one of meningitis simulating tetanus. The case was under the care of Dr. W. Collier in the Radcliffe Infirmary, Oxford. In correction of the report by Dr. Fry, Dr. W. T. Collier informs us that a few organisms were found in the meningeal pus—including a very small Gram-negative bacillus and Gram-positive diplococci, and on cultivation a Gram-positive diplococcus grew; smears from the vesiculæ revealed no pus cells or gonococci, nor were gonococci found in the meningeal exudate.

It is thus clear that meningitis may provoke tonic spasm of the facial muscles, producing risus sardonicus, of the muscles of the neck and of the abdominal wall; that the spasm may be constant, lasting for hours and even days; and that the spasm may become increased by irritation such as is produced by nasal feeding, etc., the patient remaining conscious throughout the illness. Such features have been held in the past to constitute a clinical picture of undoubted tetanus; this view must be abandoned. It appears to us that no reliance can be placed upon an exclusive clinical picture of tetanus, because the disease may be accurately imitated by meningitis. It is very convenient to speak of the clinical condition of "meningism" to describe those cases which, though closely simulating meningitis, are shown to be quite free from any inflammation of the meninges. As a result of the experience gained by a study of Dr. W. Collier's case and our own it would seem advisable to coin an expression—"tetanism"—to fix the identity of those clinical conditions which simulate the very special form of toxæmia produced by the growth of *Bacillus tetani* at some spot remote from the central system, and which may be dependent upon meningitis developed as a result of infection of the central nervous system by organisms quite different from *B. tetani*.