PLATE I.

FIG. 1.—Piece of shrapnel embedded in posterior wall of maxillary antrum.

FIG. 2.—Piece of shrapnel in inferior meatus of left nasal passage.

TO ILLUSTRATE MAJOR SIR WILLIAM MILLIGAN AND MAJOR F. H. WESTMACOTT'S
PAPER ON WARFARE INJURIES AND NEUROSES.

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WARFARE INJURIES AND NEUROSES.¹

BY MAJOR SIR WILLIAM MILLIGAN, M.D.,

AND

MAJOR F. H. WESTMACOTT, F.R.C.S.

MR. PRESIDENT AND GENTLEMEN,—The 2nd Western General Military Hospital, whose headquarters are situated in Whitworth Street, Manchester, was opened for the reception of wounded soldiers upon September 20, 1914.

Since that date over 14,390 cases of sick, maimed, or disabled soldiers have passed through its portals from the Expeditionary Forces, many having received such serious injury from shot or shell as to permanently incapacitate them from ever following their occupations again.

Of these 14,390 and odd cases, the greater number have suffered from injuries necessitating their coming under the care of the general surgeon. A very fair sprinkling, however, having received serious damage to the pharynx, larynx, nose, or ear have been placed under the immediate charge of my colleague, Major Westmacott, and myself, either at Whitworth Street, the large military wards in the Manchester Royal Infirmary, or at one of our principal annexes in High Street, Oxford Street.

Our experience has been limited to the treatment of injuries to

¹ Paper read before the Laryngological Section of the Royal Society of Medicine, May 7, 1915.

the special organs we are here most interested in, the War Office having from the commencement very wisely determined to utilise the services of those in charge of the special departments at the Royal Infirmary for the work with which they were most familiar.

At the commencement of the war when our troops for strategical and other military reasons were retreating, it was noticeable that the larger percentage of those who were injured were wounded below the belt, as it were—the lower abdomen, the pelvis, the legs, and the feet.

Later on, when the army entrenched itself in the North of France and in Flanders, injuries to the head, neck, and upper part of the thorax became more frequent, the actual conditions of fighting explaining the difference in the situation of the wound or wounds received.

As might be expected, and as unfortunately proved only too true, in many instances the wounds received proved immediately fatal or fatal within a few hours or days.

Many of the injured whom we have seen have had miraculous escapes from death, the projectile or piece of shrapnel passing within a hair's-breadth, as it were, of some important structure which, if lacerated, would have meant practically instantaneous death.

What has struck us very forcibly has been the comparative immunity from septic complications of many of the injuries of the face and neck, and this we attribute, in part at any rate, to the absence of clothing in these particular regions and to the consequent non-contamination of the wound with portions of uniform, soiled underwear, earth, manure, etc., and also to the fact that in many cases the tracts of infection have communicated with the external air by way of the nasal passages, the mouth, the larynx, etc., a circumstance unfavourable to anaerobic infection of discharges from the wound.

In many of the cases seen by us the velocity of the projectile, fired at a comparatively short range, has been such as to pass clean through the head or the face, the wound of exit being hardly, if any, larger than the wound of entrance. The fact also that the bones of the face and of the framework of the nose are thinner and more brittle than those of the skull and extremities has probably had much to do with permitting the projectile to pass more cleanly through than is the case in, say, the long bones of the arms or legs, where splintering and severe comminution have been so frequent and have proved so disastrous.

PLATE III.

FIG. 5.—Foreign body in front of middle line of neck, level of fifth cervical vertebra.

FIG. 6.—Rifle bullet lying close to the left side of spine of second cervical vertebra.
Nose of bullet missing.

TO ILLUSTRATE MAJOR SIR WILLIAM MILLIGAN AND MAJOR F. H. WESTMACOTT'S
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The problems, therefore, we have had to face have, from the surgical point of view, been considerably easier than have those pertaining to wounds of the extremities or internal organs where wound infection has been practically invariable.

The principle of securing and of maintaining free drainage and of utilising to the full the antibacterial properties of the individual's tissue fluids has been invariably acted upon.

Where a projectile or piece of shrapnel has become deeply embedded in the bony framework of the face, nose, or that portion of the vertebral column corresponding to the epipharynx, the pharynx, or the hypo-pharynx, when its position has been accurately located by radiography, and when there is neither troublesome hæmorrhage nor evidence of sepsis, our practice has been to leave it severely alone, repeated clinical and radiosopic examinations being made to ascertain if it remains quiescent.

When, on the other hand, the projectile is quite superficial and accessible, and when its removal would not in any way interfere with the integrity of any important structure, our practice has been to remove it by the easiest possible route, with due observance of ordinary surgical principles.

We are satisfied, however, that in many cases the *noli me tangere* attitude is not only in the best interests of the patient, but is also the most scientific. All meddlesome surgery, more especially by those untrained and unaccustomed to surgical manipulations, is, in the interests of the wounded, to be highly deprecated. We are strongly in favour, in the surgical treatment of warfare injuries and wound infections, of standardising the methods of treatment, so as to avoid undue experimentation and the following out of individual and often insufficiently tried methods of treatment, the actual results of which the surgeon is often little aware of. At the 2nd Western General Hospital there has been a remarkable uniformity of treatment, alike conservative and scientific, with the result that amputations have been very few, and many a limb, which on admission looked most unpromising, has been saved to its rightful owner.

When severe laceration has taken place and tracts of highly infected tissue are present, the underlying principle in treatment has been to open up the wound in every direction, to irrigate with antiseptic lotions, especially hydrogen peroxide, and to encourage a free flow of lymph by lavage, baths, etc.

In injuries to the nose and naso-pharynx, the immediate anxiety has often been the arrest of hæmorrhage, and the remote one how

best by some form of plastic operation to restore function and appearance. In several of our cases, hæmorrhage has been severe, and it has not always been possible to ascertain its actual source. In but few cases, however, has it been necessary to do more than plug from the front.

In one case, where a bullet entered the side of the face just below the left malar bone and passed across the nasal passages, emerging just under the malar bone upon the opposite side, the turbinal mucosa was much lacerated. Several attacks of severe hæmorrhage having taken place prior to admission to hospital the nasal passages were carefully cleansed, a few fragments of necrosed bone removed, and large doses of ernutin ordered with satisfactory results. In a few instances the bullet has been spat out after reaching the mouth, and in one case we removed a German bullet which was normal in size and shape, from between the layers of the soft palate.

In another case, that of a Belgian soldier, a bullet passed through the left nasal process of the superior maxilla and became embedded in the posterior antral wall upon the left side (Fig. 1). Two attacks of severe bleeding followed. Some necrosed bone was subsequently removed, after cutting through dense adhesions between the septum and inferior turbinal body, but the bullet was not interfered with and is there to this day, as may be seen by reference to the X-ray photograph in the adjoining room; he recovered completely.

In another case (Fig. 2) a piece of shrapnel passed through the left lacrymal sac and became embedded in the left inferior meatus, with the result that dense adhesions formed between the inferior turbinal and the septum nasi.

The piece of shrapnel was subsequently removed and the adhesions divided.

In comminuted injuries of the framework of the nose, the maintenance of a free passage and the prevention of adhesions has presented considerable difficulties. As an effective splint we have found nothing better than the finger of a disused rubber glove packed with gauze. It is light, unirritating, and capable of being made practically any size according to the amount of packing introduced into it.

When the bridge of the nose has been severely injured and depressed, with the result that its tip assumes the *en lorgnon* position, a most unsightly spectacle, some form of plastic operation is required. So far we have not been called upon to perform

any such operation, although two cases are shortly to be dealt with.

Severe injuries to the larynx have been comparatively rare. In one case a bullet struck the side of the neck at the level of the upper border of the thyroid cartilage upon the left side, was deflected by the cartilage, ran down the neck, and became embedded behind the left sterno-clavicular joint. Severe perichondritis of the arytaenoid cartilage resulted, accompanied by such an amount of oedema as to necessitate a tracheotomy. When last seen the patient was still wearing the tracheotomy tube, and the oedema was slowly subsiding. Figs. 3, 4, 5, show foreign bodies lying in the soft tissues in the immediate neighbourhood of the larynx.

Quite a number of cases of severe laryngeal catarrh from the trenches have been seen, but have presented no features demanding special attention.

Another class of injury quite different from the type of projectile injury we have been considering, but none the less interesting, is injury of motor or sensory nerve tracts coming under the heading of warfare neuroses.

We understand that neuroses of the organ of hearing are not included in our discussion to-day, and this we consider unfortunate, as warfare neuroses of the eighth nerve associated with such other neuroses as loss of smell, loss of speech, and even loss of memory have been by no means infrequent, and open up a field of inquiry, both pathological and physiological, at once interesting and instructive.

When there has been a definite objective injury to any one particular nerve or group of nerves preventing the passage of motor or sensory impulses to or from the central nervous system, the resulting lesion or lesions are readily explicable, but where there has been no local lesion, no outward mark of internal disturbance, the problems offered for our solution are extremely difficult.

As an example of injury with definite objective evidence, we may cite the case of a soldier suffering from left recurrent paralysis from a bullet wound in the face. In this case the bullet is embedded close to the spine of the second cervical vertebra (Fig. 6). In its passage it must have injured those fibres of the vagus which go to form the nervus recurrens at a distance of from one to two inches below the base of the skull.

Or the case of another soldier seriously injured by a bullet which passed from just below and behind the lobule of the left

ear, traversed the skull, and so completely disorganised the contents of the right orbit as to necessitate removal of the eye. In its passage it so damaged the cribriform area as to produce almost complete anosmia.

Nerve injuries such as those present no particular difficulties, but when one comes to cases of loss of sight, of speech, hearing, smell, or memory, without any objective evidence of damage done, we are at once faced by problems of real moment.

We speak constantly of concussion as the cause of such cases—but what is concussion? Is concussion always attended by definite organic changes, however minute, or are there certain molecular alterations in tissue fluids or tissue cells which so modify the transit of impulses from the higher nerve centres as to produce at times temporary, at times permanent, loss of function?

Again, in certain of these cases is there an element of hysteria, or is it a subconscious manifestation of the effects of sheer fright? What has struck us very forcibly has been the rapidity with which many of these cases recover when the patient is nursed under favourable and quiet surroundings, “far from the madding crowd’s ignoble strife.”

If we may be allowed to revert for one moment to the auditory nerve, we are satisfied that so-called concussion deafness is, in many cases, merely a passing phase in the temporary abolition of sensory impulses in a brain already anæmic as the result of physical fatigue and mental strain, the actual loss of hearing being induced by a sudden climax as it were, *e.g.* the bursting of a shell, accompanied as it is by a general atmospheric commotion, and the not infrequent burial of the soldier in the earthwork of his trench. Nine or ten cases have been observed by us, of the deaf and dumb state, all recovered from within six weeks.

The period of subconscious inertia following such injuries varies within wide limits, as also does the response of the special organ or organs involved. That the abrogation of function is due not to an organic lesion, but to a temporary suspension of neuron impulses from the higher cortical cells of the central nervous system to the periphery is our belief.

Our view is that the hiatus or synapse interfering with the flow of nervous stimuli is a central and not a peripheral one, for the reason that in so many of the cases of sudden blindness and sudden deafness no trace of any peripheral organic lesion was demonstrable, and moreover the rapid recovery of so many of the patients we have observed is a strong argument that none was ever present.

What has struck us in many of the cases of so-called concussion deafness has been the presence of previous ear disease. This we believe has tended to throw the effects of the concussion more upon the sentient than upon the conducting segments of the organs of hearing. Illuminating evidence of the central origin of these functional disturbances is also obtained from an examination of soldiers who have suddenly lost the power of speech.

Laryngeal examination demonstrates that these cases are not cases of hysterical aphonia, but that they are cases of neurotic or functional aphonia due to the sudden arrest of those volitional impulses which are necessary to produce speech. There is no paresis of the adductors as in true hysterical aphonia; there is a total inability to put the vocal cords in motion. Something has happened to prevent volitional impulses, a synapse somewhere, and probably in the cortical cells of the centres for speech, precluding that transmission of nerve energy which is requisite to set the machinery of speech in motion.

Such cases do well with rest, strychnine, and a judicious mixture of auto-suggestion and encouragement.

These thoughts and observations, Mr. President, are but as pebbles on a rock-bound coast, a coast presenting difficulties to him who would explore inland, but the man who succeeds in passing what at first sight appear impenetrable barriers will obtain the reward of having added something to the sum total of human knowledge, of having done something for the benefit of mankind in general, and in particular for the welfare of those courageous men who at present so bravely and tenaciously defend our sea-girt home.

"On Fame's eternal camping ground
Their silent tents are spread,
And Glory guards with solemn arms
The bivouac of the dead."

ABNORMALLY LONG STYLOID PROCESS CAUSING THROAT SYMPTOMS; REMOVAL.

BY W. S. SYME, M.D., F.R.S.E.,
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THIS condition has been so infrequently described that the report of a case may not be lacking in interest.

The patient was a medical man, aged forty-three, rather stout, and with a short thick neck. Three years ago he had a severe