

voiced, we may say, from many quarters besides ours, some efforts were made to meet the necessities of the times.

But Dr. Sohier Bryant's criticism shows only too plainly how much still remains to be done, and how important it is that the matter should be taken in hand and pushed through to a successful issue without delay. D. M.

PREVALENCE OF EAR INJURIES AND DISEASES IN THE FRENCH ARMY.

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THE importance of the subject of this paper was forced upon my attention this summer, while serving with the French as Médecin traitant d'Oto-Rhino-Laryngologie. The number of cases of ear injuries and defects seen was out of proportion to my expectation. The ear patients amounted to about the same number as the eye patients—that is to say, five or seven times as many as might have been expected. An investigation brought to light the numerical importance of the defective ears, their origin, and their economic gravity. I had the good fortune to assemble these statistics myself. Some of the figures came from personal observation; others were kindly furnished by the French War Office and by officers working in the speciality.

Comparing the eye and ear sick, I found more cases of total loss of function among the eye cases than among the ear cases. Further, there is a larger proportion of quickly recovering cases among the eye cases than among the ear cases. Among the ear cases we find a larger proportion of cases with a great impairment of function than with the eye.

In the zone des Armées at the Front, the total sick contains 16 per cent. of ear cases in the evacuation hospitals. These figures are equal, or greater, than figures for eyes. From the evacuation hospitals 4½ per cent. of ear cases are evacuated to the rear.

In the rear of the zone des Armées, in the zone des Etapes, ear cases form 6½ per cent. of total sick. These figures rise during time of inactivity at the Front and fall during military activity. Seven per cent. of these cases are evacuated from the zone des Etapes in the Interior.

In the Interior region ear cases form 9 per cent. of total sick.

I estimate that about 80 per cent. of the ear cases will show considerable impairment of function. This impairment will be sufficient to permanently interfere with the civil occupations of the patients. The above figures are for 1917, some of them approximate.

The large number of ear defects and their economic value make this branch of military surgery of considerable importance from a pension point of view. From my figures I estimate the allowance of pension claims for ear disabilities will amount to a minimum of 24 per 1000 of the fighting force per year.

The nature of the injuries of the ears and their complications fall into three categories :

- I.—Rupture of the tympanic membranes.
- II.—Complications of ruptured tympani :
 - A. Suppuration of middle ears, acute and chronic.
 - B. Mastoiditis, mastoid abscess and its complications.
- III.—Commotion of the eighth cranial nerve apparatus (the cochlear branches always suffer, the vestibular branches less frequently) :
 - A. Sudden onset.
 - B. Gradual onset.

The increase in large guns, shells, mines, bombs, grenades, etc., together with the longer exposure to rapid-fire arms, account for the increase of ear injuries among the soldiers of this war.

The loud detonations rupture the tympanic membranes, also cause hæmorrhage, ecchymoses, and molecular disintegration of the ear apparatus. Continued irritation of the ear apparatus by less violent explosions causes a molecular change and nutritional impairment resulting in a dry inflammation of the ear apparatus. Deafness and vertigo are common effects of "commotion" and "shell-shock" of whatever kind or nature.

The susceptibility of ears to damage at the Front is increased through obstruction of the nares, pharynges, and Eustachian tubes. Susceptibility is increased also by absence of the middle-ear apparatus, as well as by its impairment through loss of continuity, loss of substance, and the presence of cicatrices. The presence of nutritional disturbances (dry inflammation), otosclerosis, "dry catarrh," calcification, fibrosis, etc., render the ear mechanically more delicate and susceptible to injury. At the same time all these conditions interfere with the repair of injuries. All the forms of dry otitis are very apt to increase rapidly under exposure to the excessive irritation of loud sounds. The clinical histories of many ear patients show the rapid (a few weeks) sequence of degenerative, dry inflammatory conditions of the middle ear following ear injury at the Front.

With appropriate care ruptured tympanic membranes healed without suppuration and with restoration of function in five to twenty-one days. After the occurrence of suppuration the duration of the trouble is longer. However, convalescence is considerably shorter than the course of middle-ear suppuration is in civil practice, and averages about twelve days. Uncomplicated middle-ear suppuration among the soldiers yields very quickly to dry treatment, probably because the condition is primarily traumatic, and is not due, as in civil practice, to an underlying pathological state.

In "commotion," or lesions of the eighth nerve, the acute cases give the best prognosis, but complete restoration of function cannot be expected. The treatment of these cases is prolonged auditory rest with general hygienic attention. In the cases of nerve lesions and commotion of gradual onset, no improvement can be expected with or without treatment.

The treatment of ruptured tympanic membranes and the prevention of complications is directed to the encouragement of spontaneous repair, which is best secured by the prevention of infection and suppuration. The care of the perforations should be aseptic, dry treatment, removal of moisture in the meatus by wiping, insufflation of sterile boric acid

powder, and plugging of the meatus with sterile absorbent cotton painted with collodion. The treatment should be repeated sufficiently often to secure the desired protection against suppuration. The treatment of suppurating middle ears and consequent complications is the same as is required in civil practice. The good results of treatment and operative intervention are surprisingly quickly obtained among the soldiers, and are very satisfactory.

The figures given above are smaller than the actual conditions warrant, because a considerable number of deaf ears are not brought to the attention of the surgeon. Many individuals bear the loss of a part of their hearing without complaint. Another considerable number of cases are not noted, because they are overlooked on account of graver injuries to other parts. The total number that slips through the statistics is probably equal to the number given on the statistical sheet. The greater part of the cases that do not appear on the statistics are those seen by the regimental surgeons, who make no available report on this subject. We can safely estimate the actual total or the figures of potential ear injuries to be twice the statistical figures given above.

The large number and the considerable functional impairment of the oto-laryngological cases occurring in the French Army is a warning to which all the Allies can pay attention. The English-speaking Allies especially should take notice, for with them the organisation of the special service of oto-rhino-laryngology is weakest.

The loss of industrial capacity and consequent increase of pension potentiality of these cases renders it incumbent on the proper authorities to use all the preventive measures available. The best possible organisation of experienced specialists supplied with sufficient material is needed for good results.

I wish to express my thanks to my *confrères* in the French Army oto-rhino-laryngological service, and to the chief surgeons and heads of the French Service of Military Health. Everyone has been most cordial and ready to help my investigation with suggestions and statistical data.

THE MORBID ANATOMY OF WAR INJURIES OF THE EAR.

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INTRODUCTION.

FROM the point of view of morbid anatomy, war injuries of the ear may be classified as follows:

(1) *Direct injuries* due to bullets or pieces of shrapnel or high explosive shell. (2) *Indirect injury* due to blows or falls on the head. These injuries may be subdivided into (a) those without fracture of the labyrinth capsule, and (b) those with fracture of the labyrinth capsule. (3) *Noise deafness* due to prolonged or intense gunfire, and (4) "*shell*" or "*explosion*" *deafness* (labyrinth concussion). Such conditions as hysterical deafness or deaf-mutism and malingered deafness do not come within the scope of this paper.

(1) *Direct Injuries*.—Fracture of the mastoid process or of the external meatus may occur with or without splintering of the bone.