but they nevertheless present a striking difference from this type. Thus on alkaline potato medium they produce a characteristic pinkish growth, while that of the *V. Gindha* as described is of a maize-yellow colour. The cholera-red reaction differentiates our strains from the *V. Kegallensis*.

It appears doubtful if this system of classification is sufficiently complete for the identification of the paracholera vibrios. It is probable that this group comprises a number of different types or species, and that these may be classed and identified not only by their cultural characters but also by their specific serum reactions. Thus, of the six strains isolated by us from these choleraic cases, we have been able to show that four are specifically different from the other two, though all present similar cultural characters.

The evidence is strongly in favour of these strains being causally related to the cholera-like disease with which they were associated, and we have therefore classified them as parachoerera vibrios. For future reference the two species, represented respectively by strains G. and L., might be designated *V. parachoerera* A and B (Mackie and Storer, 1916).

---

**MILITARY CATEGORIES IN DISEASES OF THE EAR.**

*By Captain John F. O'Malley.*

Royal Army Medical Corps.

Aural Surgeon, Royal Herbert Hospital, Woolwich; Surgeon, Royal Ear Hospital, and Aural Surgeon, Evelina Hospital, etc.

For the purposes of classification, a useful working system for defects of vision and ocular affections has been in existence for many years, but, so far as I have been able to ascertain, no uniform or practical scheme has been adopted for defects of hearing or diseases of the ear.

In attempting to supply this want I would venture to put forward the plan on which I have worked during the past two years.

The rough visual test of reading large type at a certain distance is easily carried out by the medical examiner at the recruiting centre or elsewhere in the case of men who have good vision, but when more or less gross errors of refraction and other defects are present, the valuation of these becomes the duty of the ophthalmic surgeon. Similarly, a man who in the compass of a large-sized room, say, twenty feet across, appears to readily hear without hesitation the various questions which it is essential to ask him and which are addressed to him in a quiet, even, conversational voice and in the absence of the history of any past or present suppuration, may be presumed to have normal hearing. But when such questions have to be repeated to him or the speaker's voice has to be raised, or a history of deafness with or without suppuration is given or ascertained, the case should then pass on to the aural surgeon for examination. It is with the latter type of case that I propose to deal.

I place them in two main groups as follows:—

(A) Deafness (without active suppuration).

(B) Suppuration (active with deafness).

Group A includes the following:—
Middle-ear deafness: (a) Middle-ear catarrh; (b) otosclerosis; (c) past suppurations, but membranes well healed and no recurrences for many years.

(2) Internal ear deafness, which includes a family type.

(3) Mixed middle and internal ear deafness: (a) Advanced middle-ear catarrhal cases; (b) artillerymen, who have been exposed to long periods of intense gunfire; (c) some shell concussion cases, middle and internal ear lesions combined (b and c may also come under heading 2).

Owing to the vast complexity of our present military organization, a man with deterioration of hearing up to thirty or thirty-three per cent can be placed in low categories and may be usefully employed in labour teams with others who have good hearing, but those with grosser losses than this should be excluded from the Service.

Grades of Deafness.—Cases of deafness I place in four grades according to approximate loss of hearing, as 15 per cent, 20 per cent, 25 per cent, and 30 per cent to 33 per cent, which are graphically represented as follows: D1, D2, D3 and D4.

Grades of Suppuration.—Cases of suppuration are also placed in four grades and are graphically represented as follows: S1, S2, S3, S4.

S1.—In this grade there is some membrane loss, large or small, but the drainage is good. (Good drainage is the first and last essential in the treatment of suppuration.) The middle-ear cavity is dry or only slightly moist with mucus or pus. Occasional recurrences of suppuration may arise, usually with head colds, and are due to Eustachian tube infection from the throat, naso-pharynx or nose. The middle-ear cavity can be seen as a definite space beyond the free edges of the partially destroyed membrane, and is usually lined with epithelium and free from ulceration or naked granulations (vascular elevations not covered with epithelium). The deeper the middle-ear cavity, the better the ventilation and drainage facilities.

S2.—The membrane loss may be large or small, but the drainage is bad for one of the following reasons: (a) The membrane may show a small perforation situated a considerable distance above the floor of the middle-ear cavity; (b) the middle ear cavity is anatomically shallow and not a clear, deep, roomy space, free of the damaged edges of the membrane; (c) the membrane may be very little destroyed, but is adherent to the promontory and inner wall of the tympanum; (d) large granulation areas or polypi may obstruct the exit of pus from the tympanic cavity; (e) marked narrowing of the meatus due to chronic eczema and inflammatory pus infections of the meatal tissues is present.

S3.—Membrane loss, large or small, with bad drainage and in addition some inflammatory infiltration outside the limits of the middle-ear cavity, such as the meatal walls. When such disease exists posteriorly and superiorly, along the margin of the tympanum, the question of radical mastoid operation will arise, as well as the risk of the disease extending to the lateral sinus and cranial cavity, with any fresh exacerbation of the middle-ear infection. Cranial complications are, however, comparatively rare.

S4.—Cases similar to S2 and S3, but with definite symptoms and signs of labyrinthine irritation, with or without labyrinthine fistula.

This classification of cases according to anatomical features, facilities of drainage, site of lesion and extent of disease, is of considerable practical help in enabling
one to arrive at a fairly definite prognosis and to decide upon the best line of

treatment.

**Voice Tests for Hearing.**—The common method of standing at measured
distances from the patient and asking him to repeat certain words and phrases,
whispered or spoken by the examiner, I never employ, because the man becomes
conscious at once of being tested and if so disposed he will exaggerate or malinger.
My routine plan is to sit at a table with a large note-book before me into
which particulars of the cases are entered and the patient is seated about three
feet away on my left, within easy reach for examination of his ears. He is freely
interrogated in a quiet, even, conversational voice on all particulars pertaining
to himself, such as rank, number, age, service, his duties now and those of his
civil life and notes are made of the answers. The voice is not directed towards
him, but at right angles to this line, and writing is continued, so that in this way
he is not conscious of being tested. The voice is at times lowered and the effect
noted. If in this way he appears to hear distinctly and without hesitation and
needs no repetition of questions, he is not more than 20 per cent deaf. If he
requires occasional repetition—say, one in four—he is 25 per cent deaf. A
definitely Rinne negative patient who has full absolute bone conduction will
require the occasional repetition of some questions. An exception to this rule
will be found at times in certain cases of active suppuration where it is often
noticed that they hear better when freely suppurating than when the disease
is arrested. If questions have to be frequently repeated or the voice raised the
hearing is 30 per cent or more deteriorated. If he gives a history of having
been turned off drills and parades permanently for not responding to orders
owing to deafness, his hearing is 30 per cent or more deteriorated.

**Tuning-fork Tests.**—The tests which I employ most and consider of greatest
value in estimating degrees of deafness are Rinne's and absolute bone conduction.
The C2 is the fork chiefly used and that of Lucae with a striker attached to the
stem is the one which I employ. It can be heard by bone conduction (meatus
open) for fifteen seconds, and by air conduction for twenty-five seconds. In the
absolute bone conduction test the end of the fork stem is applied to the patient’s
mastoid over the antrum (his meatus being closed by finger pressure on his
tragus) until he ceases to hear it, and it is then transferred to the examiner’s
mastoid, whose meatus is also closed and any difference in the periods for which
it is heard is noted.

If bone conduction is full, Rinne’s test is of considerable value in estimating
middle-ear deafness, and about 8 per cent of the cases one meets with are of
this type.

When Rinne’s test is definitely negative and bone conduction full, I place the
loss of hearing at 25 per cent approximately. The definite Rinne with full bone
conduction is therefore taken as a standard of loss, and variations in air and bone
conduction are estimated by comparison with this.

**Summary of Tests.**

Fork used, Lucae C2

- **B.C.** (Bone conduction) = 15 seconds.
- **A.C.** (Air conduction) = 25 "

- B.C. full.

D1, both ears

- A.C. shortened a little but longer than B.C. = Rinne plus = 10 to
  15 per cent loss approximately.

Conv. voice: answers freely without hesitation.
Clinical and other Notes

D2, both ears A.C. and B.C. equal. Rinné = plus minus = 15 to 20 per cent loss approximately.
Conv. voice: heard without hesitation.

D3, both ears A.O. definitely shorter than B.C. = Rinné minus = about 25 per cent loss.
(This is taken as the standard of depreciation for fixing percentages.)
Conv. voice: heard well, but occasional need for repetition of some questions.

D4, both ears A.C. also shortened = Rinné plus, or plus minus, or minus = about 30 per cent loss.
(Internal ear or mixed middle and internal ear deafness.)
Conv. voice: frequent repetition of questions and finally voice has to be raised, so much so that a person with normal hearing will hear it distinctly about 30 feet away.

How Categories are arrived at, New Classification (A, B, D, E).
One ear is normal, hearing equals 100 per cent.
Other ear is in grades D1, D2, D3, 15, 20, 25 and 30 per cent loss.
When combined average loss of two ears is 15 or per cent or under = Category A.
Combined loss (average) is about 20 to 20 per cent = B2. (Abroad, any theatre of war.)
average loss is about 25 per cent = B2 or B3. (Abroad.)
Average loss is about 30 per cent = B2 or B3 (Home Service.)
Above 83 percent = E.

Suppuration, S1, = hearing D1 and 2, = B1. (North-West Europe.)
,, S2, = D9 ,, 4, = B2 and E. (North-West Europe.)
,, S3, = D1 ,, 2, = B2. Hearing, D8 and 4 = B2. (North West Europe.)
,, S4, = D1 ,, 2, = B2. ,, D9 ,, 4 = B3. (Home Service.)

Cases of S2 and S3 when the disease is active may be temporarily placed in Category D.

FIVE CASES OF METASTATIC GAS GANGRENE—THREE FOLLOWED BY RECOVERY.

By Captain J. V. J. HARTLEY.
Royal Army Medical Corps.

That micro-organisms, in cases of gas gangrene, gain entrance to the bloodstream and produce lesions in distant parts of the body, is perhaps of more frequent occurrence than is generally supposed. This in the majority of cases is a terminal phenomenon and readily escapes notice. Colonel Wallace [1] in his contribution on gas gangrene mentions two cases in which metastatic lesions were manifest shortly before death and two similar cases are recorded by Kenneth Taylor [2]. Mullally and McNee [3] describe a remarkable case in which the bacillus of malignant oedema, circulating in the blood, became localized at the sites of injections of A.T.S. and pituitrin. During the past five months, five cases of metastatic gas gangrene have occurred in — General Hospital and three of these are of special interest, inasmuch as each made a satisfactory recovery.

The records of the five cases are as follows:—
Case 1 (under the care of Captain W. F. Neil, R.A.M.C., T.C.).—Cpl. A. was admitted on September 9, suffering from gunshot wounds of right upper arm. The humerus was comminuted and the wound very foul and septic. December 6: Operation. Drainage improved and fragments of bone removed. December 9: The