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Original thoughts:
The sign of the elevation of the voice.

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(translated by Paul H. Mason 2006, reviewed by M. Jacques Lenoir)

The experiments that I shall expose were suggested by the connection of two common acts of observation.

1. Deaf people, who have a lesion of the labyrinthine apparatus, raise their voices abnormally: their intonation is no longer modulate; the phonatory effort is still out of proportion with the desired result which is to make oneself heard to a listener who is situated at a normal conversational distance.
2. a subject whose hearing is intact raises his voice abnormally in the middle of intense noise (e.g. on a railroad). This elevation of the voice is not only necessary by the obligation of the speaker to make oneself heard to the listener, but also the need to hear one's self better. All this happens as if the subject was momentarily in a condition of a sickness where hearing is lowered by a labyrinthine lesion.

To realise these conditions experimentally (where the subject is in the middle of tremendous noise), I use one of the deaf-making apparatus constructed according to the principles indicated by Barany for the total elimination of hearing of one ear during the testing of the degree of hearing of the other ear.

These apparatus, in fact, produce a loud noise, whose intermittent appearances and disappearances we can control.

[1] This is a translation of the original article: Lombard, E. (1911). Le signe de l'elevation de la voix. Annales des Maladies de l'Oreille, du Larynx, du Nez et du Pharynx, 37, 101-119. (article is out of copyright)

My attention being caught by this point, I did soon remark, from the research on hearing in a patient suffering from sickness attained by the unilateral labyrinthite, that, each time a noise apparatus is placed on the hearing (non-deaf) ear, the ordinary voice in conversation instantaneously took on the character well known in the voice of labyrinthine deaf people. Inversely, the removal or discontinuation of the deaf-making device was followed by the immediate return to the usual vocal intensity. The patient did not appear to be aware of this double change.

Experimental Technique

Apparatus: The devices of noise, introduced by the research of Barany in the otological practice, are used for the examination of the unilateral deaf.

For application to experiments of the elevation of the voice, these devices should be selected so that they satisfy three conditions:

1. The noise-producing mechanism should have a sufficiently long functional duration, many minutes;
2. It can be stopped instantaneously
3. the noise produced would be sufficiently intense to stop all perception; if it is possible, the intensity should be variable at will

Three devices correspond in part to our demands

a. the plan/device (dispositif) of Voss: a stream of compressed air collides with the inner walls of the canal

We used a similar device at the beginning of our research. The current of compressed air was able to provide a constant pressure of 300 to 500 centimetres; it is directed by a flexible tube, supplied with an otoscopic nozzle, to the vicinity of the meatus, more exactly to within a couple millimetres of the internal face of the tragus.

To experiment on both ears, a Y tube split the unique/singular current into two secondary currents, which permits us to dispense of two devices (which allows us to only use one apparatus). The deafening effect created is absolute when the current of air is being well directed and all perception is rendered impossible for a normal ear.

b. The Deaf-making telephones (Neumann, Lombard),
   These deaf-making telephones are composed of two telephonic receptors which we make speak by connecting them to the output of a vibrating coil; the intensity is controlled by more-or-less tightening the vibrator and by restraining the gain on the inductor. You have to avoid using too strong a coil, because it causes a trepidation of the plates of the receptor and of the receptors themselves.
c. The devices[2] ("appareils") derived from the apparatus of Barany: the noise also takes the form of a continuous crepitation. The deafening is probably less perfect than with the device of Voss. Furthermore, the primitive devices only worked during a half-minute on average, which is insufficient. Such as it is, this device is however quite satisfactory for clinical research.

Way of making the subject speak: -- in order to observe with ease the variations of intensity of the voice, we have the choice of multiple tricks: according to the circumstances, each of them finds their guidelines; it is good to vary them, to employ them successively, to control them one by the other: a simple positive proof with one of them becomes sometimes resounding with the second.

First procedure. – We ask the subject to read a simple text in a loud sustained voice: the subject conserves as much as possible the tonality of the recitation. If he declares that he doesn't know how to read, we make him count from 1 to 100 for example: it is as you can see very easy, during the lecture or the counting, to create alternative phases of hearing and deafness; each phase is marked by a change in intensity of the voice, which is raised during deafness, only to return to the normal intensity at the precise moment of the cessation of the device; from there, a series of altogether characteristic strengthenings and weakenings. It is remarked that, in certain subjects already hypoacoustic and presenting a slight degree of paracousia ("paracousie"), the contrasts are less and less marked as the experiments go on; it seems that it tends to install itself like a sort of habituation; it suffices therefore, to oppose

[2] N.p. I am using the words 'device' and 'apparatus' interchangeably in my translation

this habituation, to create a pause between each phrase or each indentation; the phonatory effort, no longer being sustained and uniform, but having necessarily to renew itself at the beginning of each phrase, regularly augments at each period of deafness, only to diminish from the beginning of periods of hearing.

Second procedure – During a discontinued discourse, and in the intervals which interrupt the continuity, we change the hearing conditions. Here is, for example, what to do for a patient who declares to not being able to hear at all. We compose a written questionnaire and we ask the subject to respond in a loud voice to each written question. In the interval of two responses, we put into action the 'deaf-maker', or we stop it's functioning: the elevation and the fall of the voice then forms a striking contrast.

Third procedure – It is the simplest. It consists of monitoring the modifications of the voice of the subject who is abruptly made deaf while he responds to a question; the voice immediately takes on the labyrinthine intonation.

Such is the very elementary technique of our experiments.
Let's look at the results.

Experiments:
To facilitate our work, we shall only consider two categories of subject:

1. Totally normal patients, with no auricular history
2. Totally deaf patients, uni or bilateral. By totally deaf, we mean patients deprived of any perception by an interruption localised on any point of the nervous network, from the cochlear papilla to the cortex.

1. EXPERIMENTS ON A NORMAL HEARING SUBJECT
   A. *First Phase*. – I ask the subject to read, in a loud voice, an easy text or to count without stopping a series of numbers. During this reading or counting, I rapidly apply to each ear a deafening apparatus switched on; the normal subject is suddenly transformed into a bilateral deaf person. Immediately, the intensity

of the voice raises, he talks very loudly, the way bilateral-labyrinthine-deaf-people do. I quickly take the deafening device off, or I stop it; the intensity lowers and becomes the level of the beginning. The subject, who has not stopped reading out loud, is not aware of these rapid alterations. Sometimes, the elevation seems less abrupt; one can observe a sort of progression in the augmentation of intensity which, little by little, raises until the voice is shouting (reaches a very loud level).

B. *Second phase*. – Instead of deafening the two ears simultaneously, we proceeded in stages. Thus, a device being applied to one ear, we observe if he manifested changes in vocal intensity.

Sometimes the change is hardly apparent, sometimes we remark a notable elevation from this moment [3]. While keeping the first device in place, we apply the second on the free ear. The elevation is made this time like in the first phase.

The two successive elevations, when they manifest themselves, are in general very unequal, although it is not always possible to say which one is predominant, so it is important to remember this point when we research the elevation of the voice in a unilateral deaf-person.

2. EXPERIMENT ON A SUBJECT WITH TOTAL BILATERAL DEAFNESS.—At first glance it is sufficiently logical to ask how a deaf-person can become more deaf. In fact, he is not (or he does not), and it is precisely there the interesting point. The application of these devices, simultaneously or successively, is, in him, altogether useless. The elevated output, screaming, monotone, of labyrinthine-deaf-people stays as it is, elevated and monotone, without colour. Hence, the use of the deaf-maker gives us the way to immediately distinguish between a bilateral labyrinthine deaf person from a normal hearing subject, which is not always as easy as we would think.

[3] If the noise of the deaf-maker is intense, the perception of the opposite ear is diminished to a certain degree by a reflex mechanism.

3. EXPERIMENT ON A TOTAL UNILATERAL DEAF SUBJECT WITH THE OTHER EAR INTACT – The voice of these patients is not distinguishable by a particular characteristic, in contrast to bilateral deaf-people.

a. *Simultaneous* application of the deaf-making-machines: the artificial suppression of the only healthy ear converts a unilateral deaf-person into a bilateral deaf person; the elevation of the voice is thus immediate and considerable, like the *simultaneous* making-deaf of the ears of a normal-hearing subject. From this we can see that, should we limit ourselves to this experiment, nothing permits us to distinguish between a unilateral deaf-person and a normal hearing person; this can be achieved in the second phase of the experiment.

b. we apply the apparatus *one after the other and in succession* on the one, and then on the other ear, or alternatively on one and on the other ear.

1. Progressive deafening (one ear and then the other): if it is deafness in the right ear; the first deaf-maker is applied to the right ear, no change. The second apparatus is then applied to the left ear: elevation (i.e. the voice is subsequently elevated).

2. Alternating deafening (one ear or the other): it is the previous experiment repeated with a single apparatus. Be it still right ear deafness. The apparatus is placed on the right ear without effect. I remove it and place it on the left ear: elevation.

I could have commenced the other way around: the result would have been the same, but the order reversed. There is an ear for which the deaf-maker is altogether inactive (useless) or altogether active (potent stimulus).

We note that these two results, the positive and the negative, complete themselves and that it is indispensable to possess them both, because suppose that we placed the deaf-maker to the healthy ear; the elevation of the voice which follows immediately could be taken as that which succeeds frequently enough the deafness of a single ear in a normal subject.

Thus we are able to recognise with total confidence a unilateral deafness. This certitude is founded on

the comparison of the very different effects of the deaf-maker on one ear and the other.

An added advantage is the ability to distinguish the deaf side, because we can estimate without difficulty that it is the ear for which the deaf-maker is useless; the very simple experiment at the beginning raises itself to the dignity of a diagnostic sign.

In the previous experiments we only considered schematic cases, which does not mean that they are insubstantial, the deaf-people examined had deafness originating exclusively from a lesion to the cochlear labyrinth, and furthermore it was total; such as, for example, the traumatically deaf with a fracture to the bony capsule, the syphilitic deaf. All the deaf-people were not all because of the labyrinthine problems; lesions to the transmitting apparatus and lesions to the perceptual apparatus combined themselves in unequal proportions to end up with the same general result: decrease or lowering of audition. These mixed forms, on the other hand, rarely progress to total deafness; they are, then, partially deaf or incompletely deaf.

It is interesting to know what becomes of the preceding experiments repeated on subjects suffering from incomplete deafness.

Without prejudging the rectifications that later research will not miss out on giving to the actual findings, we think we are able to resume these last ones using a very general formula, with no other claim but to remain as such.

RULE. – The differences of intensity caused by the manoeuvre of creating intermittent deafness is altogether much more complete than this deafness and more complete.

This statement supposes the following conditions satisfactory:

1. *Conditions dependant on the deaf-making apparatus employed*. – all things being equal, the greater the intensity of the noise the greater the elevation of the intensity of the voice; like this, certain hypoacoustic cases do not react to weak alterations of the transmission of a deaf-making device,

this may mislead us to the degree that audition remains intact. The test/proof becomes possible as soon as we employ a strong deaf-making stimulus. Hence, one should never neglect to make sure that the deafening stimulus is sufficient: for example, if a telephone is available, take good care to tightly apply the receptors to the outer ear.

The existence of different degrees of deafness is easily demonstrated through the use of an adjustable device: the deaf-making telephone, for example, in which we can vary the intensity of the noise while gripping more or less the vibrator or by manoeuvring the carriage: we thus put into evidence, on the normal subject, a veritable parallelism between the degree of deafness and that of the elevation of the voice, this mounts progressively until we obtain the intensity of the voice is screeching.

2, *Conditions dependant on the ear we deafen* – It is the succession and the complement of the preceding phase, because, if the apparatus must produce a very intense noise, this noise is meant to be heard by the ear under experimentation. To become perceived by this ear, the noise uses/utilises the ordinary mode of the sonorous conduction: the aero-tympanic mode (1)[4], which returns to say that the deafness should be much easier—from the most sensitive sign—that the deafened ear deviates less than in the normal conditions of audition. Like this, a subject in whom the auricular mechanism is as close as possible to the normal height, raises their voice even with only one ear deafened.

An obstacle in the transmission is translated by a certain resistance to deafening: however, a deficiency of the perception on the other hand is favourable. A deaf-maker, even one of weak intensity, finally overcomes a residual auditory perception, on the condition that the transmission takes effect according to the physiological formula.

3. In the case of unilateral deafness, conditions depending on the state of the examined ear,

[4] (1) There is a place to also take account of the conduction by the pavilion/house (cartilaginous conduction)

we necessarily suppose that the one we deafen is easily deafened.

In other terms, the elevation of the voice is inversely proportional to the variable ease with which the patient can hear his own voice by the ear that stayed free (the one we examine). Does he hear sufficiently? The sign is slightly positive or zero. The lower the perception, the greater is the elevation of the voice, just until the extreme limit realised by the total deafness of the free ear. It can be seen, thus, that the elevation is inversely proportional to the degree of auditory capacity of the ear not fitted with the device.

Now, there are two ways for one to properly hear his own voice well:

1. By air conduction with one ear with the physiological transmitter intact; this state corresponds to the normal formula of audition: the ear is made to hear by the air.
2. By cranio-tympanic conduction, in these particular pathological conditions are not yet completely understood, but translate to an inversion of the normal formula. These states are found manifested in certain subjects, paracoustic deafs (1)[5], in which the transmitter hardened to lose these marvellous properties of suspension and of mobility, which put them in physiological imminence of oscillation for the shocks of very weak energy.

Thus, we reveal in our collection of observations a case of a 50 year old woman, who has progressive deafness since puberty (2)[6], with all the characteristics otherwise attributed by Bezold to the affection appointed to the name of otosclerosis. In this lady, the effect of the deafeners is hardly noticeable. The sick-lady, who is intelligent, declares that she can clearly hear her own voice during very intense bilateral deafening: she seems to hear within herself; the normal formula of audition in her is reversed, but the sign is reversed as well, since it is negative or nearly negative.

[5] (1) By paracoustic deafs, we don't want to say illness of the paracousia of Willis, in spite of the fact that these are not rare in these forms of hypoacousia.

[6] (2) Without labyrinthine insufficiency clinically detectable

As there are two ways to properly hear your own voice, there are also two ways to badly hear your own voice:

1. By the aero-tympanic conduction when the perception is defective (lesions to the nervous apparatus)
2. By the cranio-tympanic conduction when the effect of the lesions of the transmitter, tending to apparently exaggerate this conduction, do not compensate a perception which becomes more and more deficient.

The question thus becomes very complicated as soon as we pass from the study of total deafness to that of partial deafness. The examination of a large number of illnesses arising from partial deafness lead us to think that, clinically, the modifications in the intensity of the voice seem to be subjected to two sorts of influences:

A. Influence of the formula of audition: is it normal or reversed. Predictably, this consideration leads us to take into account an important factor: the seat of the lesion or the lesions;
B. In the case of partial unilateral deafness and during the unilateral proof, (deafening of the healthy ear or less deaf): influence of the capacity of audition of the more sick ear *evaluated for the speech* independently from any test with the audiometer of the diapason (or tuning fork). Thus a very pronounced lowering of the audition for the voice to whisper and *a fortiori* for the loud voice creates the most favourable conditions to the manifestation of the sign.

Now, remember the meaning of the first condition: influence of the formula of audition. We saw that the sign had a tendency to become strongly positive when the formula approached that of normal audition; but this formula will be found again in incomplete deaf people of labyrinthine origin, or in the incomplete deafness by combined lesions, but *with preponderance* of the lesions of the perceptual apparatus. The illnesses caused by similar lesions are not or are very subtly paracoustic: the subsiding of the audition is above all the result of the nervous lesion, that of the oscillating organ pass to the second plan.

Also, let us recall the meaning of the second condition: the state of the

audition expressed to the value of audition for speech.

A considerable lowering of the audition for speech when the apparatus of transmission is anatomically preserved corresponds in general to the notable alterations of the nervous apparatus; but then, if the formula of normal or nearly normal audition and the lowering of audition for speech are the two conditions which control the more or less ease of the appearance of the sign, that would amount to say that this is in the most part linked to the degree of alterations made on the nervous apparatus. Inversely, a notable hypoacoustic, but with signs of vocal elevation hardly positive, or even negative, must have it's immediate cause in a blurring of the apparatus of transmission, the lesion of the nervous apparatus not being predominant.

These deductions are only valid in partial deaf-people with conservation of the apparatus of transmission. We have to stress that the matter remains reserved for cases where the diminution of the audition is due to a spontaneous elimination or of the surgical exenteration of an important part of this apparatus.

We have examined, from the particular point of view that preoccupies us (as a special subject of interest), a certain number of hollowed patients [the translator assumes that: hollowed cases refers to the removal of the inner parts of a diseased bone without damaging the periosteum]. It appeared to us that the results varied with the subjects and also with the age of the operative act.

In the hollowed cases still receiving treatment or recently epidermised the sign is in general negative or weakly positive, unless that the labyrinthine function is not already compromised at the moment of hollowing out; it is thus strongly positive. Conversely, in hollowed cases that have been cured for several months or years, it is not rare, I could say that it is almost the rule, to find the positive test. We can admit that the degree of the cochlear alterations that install themselves or complete themselves after the hollowing operation is certainly not foreign to the variability of the results considered as a function of time passed since the operation.

It is open to observation as well that subjects with lesions of the transmission and presenting a high degree of the phenomenon described under the name of paracousia of Willis abnormally raise

the voice by deafening and behave in this case like the hypoacoustic labyrinthine subjects or normal subjects; the statement is interesting and to be kept in mind: the noise of the deaf-maker develops the paracousia and allows without a doubt a better audition of this noise, from which it returns partially to the conditions of normal audition (aerotympanique audition), greater ease of deafening and elevation of the voice.

All the hypoacoustics with paracousia of Willis do not raise the voice by deafening, but it is useful to know this apparent exception

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The sudden changing of the characteristics of the voice by deafening is the effect of the loss of auditory control; the relation between these two phenomena is very constant.

This explanation is exact overall, but too general, because it does not tell us why the change of intensity takes place always in the same way, in that of one augmentation. One can admit of one way more precise that, if the voice of a subject is artificially deafened with so many similarities with that of a labyrinthine deaf, it is that that he produces in one like the other an effort of adaptation to these new conditions.

The noise of the deaf-maker [deafener] suppresses all sonorous perception other than that of the noise itself. The subject being tested on who doesn't hear his own voice better than external sounds forces himself to remedy his failing audition by *augmenting* the intensity of his glottis; he shouts in a certain fashion to himself, like we shout to the ear of a deaf-person. And from this seemingly true explanation, again only provisional, we can consider that approach a beginning of the proof:

A. By the experimental facts. – the parallelism of the two phenomena is remarkable, the elevation of the voice progresses with deafening. We put the facts in evidence:

In certain subjects at normal audition by progressive deafening in two stages: one ear, then the other;

semi-deaf, and then complete deafness; the two states follow in time and are distinguished by two degrees of elevation of the voice.

The Other proof: by means of a adjust*able apparatus and to the increasing effect,* we deafen not in two separate stages, but in following a regular progression: for example by gripping the vibrator or by putting gain on the two spools of the telephone apparatus. The experiment, during a reading out loud, shows us that the tone at the start, the tone of the recitation, raises little by little just until a shouting voice is attained: we have seen much louder.

At the moment where deafening becomes complete, for the sounds transmitted by the aero-tympanic conduction as well as those transmitted by cranio-tympanic conduction, the regulation no longer exists strictly speaking: is is only created by the confused notion of the phonatory muscular effort.

B. The *facts of clinical observation* speak also in favour of the hypothesis of adaptation. The observation shows that the intensity of the voice appears as if totally disproportional to its goal in two types of patients: in the bilateral labyrinthine deaf who raise their voices too much; in certain paracoustic deaf who do not raise their voice enough. It is, in the two cases, that there appears to be vocal adaptation, and in that those we observe have the effect.

Remember what we said previously of the two ways of hearing your own voice: from outside to inside for one normal ear and by the aero-tympanic conduction; from inside to outside, by cranio—tympanic conduction, for one ear pathologically struck in the apparatus of transmission.

The two categories of deaf-people, one of whom (the labyrinthines) shout because they hear as badly from outside to inside as from within to without; the nervous apparatus, the common arrival point of the conduction by the two modes, cranio-tympanic and aero-tympanic, being insufficient, it does not help that one is better than the other; the audition by the air and the audition cranio-tympanic are equally bad.

The others (the hypoacoustics by lesions to the apparatus of transmission) speak softly, because they are badly informed of the value of the intensity used by the vocal sound; in effect, they hear as well and even better from within to without than from without to within, because in them the cranio-tympanic transmission seem to be excited to the detriment of the aero-tympanic.

The effect of these paradoxical conditions are only perceptible when the affection is bilateral: one of the two ears being normal or nearly normal is sufficient to vocal control, at the very least to that of the speaking voice.

These experiments and the explanations which we give them expose the role allotted to the acoustic ear in the regulation of the intensity of the voice; and I hasten to add that it doesn't matter precisely of any new conditions. Singers have known for a long time that an ear that hears badly prevents one to sing in tune.

From the very special point of view of experimental deafness, it is difficult to not see a relationship between the mechanism of the vestibular functions and that of the cochlear functions.

We know that the active movements of the individual are recorded, characterised, and controlled for their next effects (or functions) by a reflex at the point of starting sensory vestibular: it is the vestibule-coordinator mechanism of the muscular actions that makes sure, for an important part, the upholding of static and dynamic equilibrium. Should the vestibular system not perform its task (interruption of the vestibular tract), the permanence of the equilibrium states would cease to exist, and this disturbance characterises vertigo.

Similarly, the cochlear apparatus which records and classifies the proper vocal sounds of a subject as well as the external vibrations is the starting point of a complicated accommodative action that ends-up at the thoraco-laryngeal musculature. This action commands the mechanism of vocal adaptation; and, if the cochlear function becomes insufficient, the adaptation is affected by the disorder of the sensitive peripheral organ.

Such would be, generally, the explanation that seems to be in best agreement with the experimental results and factual observations.

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Experiments and acts of observation find as of right now an important application in the subject of medico-legal expertise (1)[7].

We know that all deafness by trauma poses the expert two questions:

1. Is it deafness or not?
2. Is the deafness of labyrinthine origin?

Each time one has to do the proof of a sensory or sensorial disturbance, it is advantageous, and above all much more certain, to not rely purely on subjective symptoms; it is better to address oneself to the objective signs, of which our experiment has shown that the appearance is in a constant relationship with the sensory or sensorial disturbance.

In auricular semiotics, do we possess the objective signs capable of satisfying these conditions? We believed it, after the work of these last few years on the provoked nystagmus reflex. We thought that the appearance or disappearance of the nystagmic reflex is pathonomic of the preservation or the death of the whole labyrinth. But, it is not so at all.

[7] (1) See, for more details: Thesis of Halpern, Paris, 1910. These medico-legal applications were, on behalf of M. Barany, the object of research of control which led him to know the general technique of our method at the German society of Otology in May 1910. Certain journals have truncated the official account of this séance, to such a manner that their lecture rested under the impression that this author had the original idea of the method. The readers would be advised to look at the note that I published in the volume of July 1910 of the *Annals*. They will find in the following volume the response of M. Barany, who has never contested with me the priority of the discovery that he heard of from one of his students. It is curious to notice that the account of this polemic is presented by analysts of the same journals in a strange form. We seem to confuse the invention of the apparatus of noise which belongs to M. Barany with the elevation of the voice which belongs to M. Lombard. The inventor of the needle of the dressmaker had not yet imagined at the same time the suture of blood vessels.

When it comes to demonstrate the functional value of an ear by the only state of its vestibular reactions, one implies as established in advance, two propositions.

The first, it is that the traumatic lesions of the labyrinth necessarily always have to do with the vestibular apparatus. The second, is that, this vestibular apparatus having been destroyed or gravely compromised, the cochlear must be destroyed or gravely compromised as well.

Now neither one nor the other of these propositions can be demonstrated. The observations of traumatised heads/skulls/brains, followed by deafness with preservation of the excitability of the vestibular, are not rarities. And, if these observations are not found more often in the literature, this is due to an error of interpretation that has given (to) the nystagmic reflex an excessive diagnostic value. This sign is in truth an admirable means to recognise the functional integrity of the vestibular apparatus but it loses in large part its value for the diagnosis of lesions affecting the acoustic ear properly said. The conclusion is that it is only in the semiology of the cochlear system that one should look for the evidences of its alterations. We understandably leave to the side the functional signs, such as the subjective noises: they escape all types of control: leaving the audiometric (acoumetrique) proofs. Now, in the particular case of expertise, not a single one is capable of holding the comparison with the sign of the nystagmus reflex applied to the research of the vestibular alterations. The objectivity is nothing but relative; that of the nystagmus reflex is absolute. If we accept that the results of those audiometric [acoumetric] tests are all in good agreement: a precise and positive diagnosis can be the authority of this agreement. But this concordance is indispensable.

This is why we have multiplied them to try and accumulate the probablities. The most common employed can be grouped in two categories.

In the first, one finds all those that, based on the acts of observation known, have for fundamental characteristics to verify if the responses of the subject are in accordance with the results foreseen and expected.

To the second, belongs the proofs said based on an effect of surprise.

Only two deserve to be called objective in the strict sense of the word: it is the pupil test and the Leutpold test; they are not always easy to perform successfully.

It seemed to us that the modifications of the speaking voice during deafness can adapt itself to the rapid recognition of the total or severe deafness, and more particularly in the examination of expertise, in the same reason of the grand simplicity of the test, of its consistency and above all of its objectivity. We shall only consider in what follows that the diagnostic of the deafness in conscious simulations [pretenders?]; until now, we did not have the opportunity to examine from this point of view subjects belonging to the category of that which we can denote unconscious simulators.

To avoid all error of interpretation by excess or by defect, it is extremely important to agree, beforehand, on the *import* and the *meaning* that one is entitle to afford to the test.

I leave to the side bilateral deaf-people, rare enough in the practice, to occupy myself here with only unilateral deaf-people, by far the more frequent amongst the affections of the auditory organ which comes to the report of experts and also by far the most difficult to recognise.

Generally, it concerns lesions having totally destroyed the cochlear apparatus or profound attritions, irreversible, leading to a permanent loss of the function.

These forms of deafness doubly warrant the fixation of our attention: firstly because they are serious and attract compensation; in second place, because the unilateral variety is the auricular affection particularly chosen by pretenders (1)[8]. In fact, the integrity of the other ear defeats any supervision, and the absence of otoscopical signs is, in the spirit of the accident, quite capable of holding the diagnostic in check.

We have said that we had to agree on the scope of the

[8] (1) V. Lermoyez, *Annales des mal. De l'oreille,* etc., 1909.

Tests. Let us consider in fact three of the outcomes the most frequent:

1. Unilateral deafness in a subject in which the two ears are anteriorly healthy;
2. Total unilateral deafness, affecting a subject in which the affected ear is no longer altogether intact, the other being healthy;
3. Unilateral deafness affecting a subject in which not one or the other ear is altogether anteriorly intact.

Should we consider one or the other of these outcomes, the first point of fixation, is that the ear opposite to the traumatised side should be capable of being deafened. We know what is meant by the word “deafenable”. The study of the partially deaf provides us with information on the significance and we are permitted to define the physiological states which condition the deafness. Again, I have to stress that that one hypoacoustic ear is deafenable in the same way as a normal ear, provided that the formula of audition (1)[9] approaches as close as possible to the normal fomula.

The facts of the first two groups escapes those restrictions. Since the ear on the opposite side is supposedly intact: by themselves must they be examined to the point of view of the facts of the third group. So, we should be well advised to always commence by the analysis of the ear on the opposite side. This analysis is carried out most frequently elsewhere without difficulty, even safe from the cause of errors that one is always justified to fear as soon as we focus our research on the ear of interest. We shall proceed with method (modus operandi).

Objective examination firstly.

Evaluation of the degree of audition for loud and soft speech and above all a comparison of the cranio-tympanic and aero-tympanic conduction. This last part of the analysis tends, in the end, to research the degree of paracousia possible. It is obvious that, if the ear is not deafenable, the test does not hold, since it is entirely founded on the possibility of experimental deafness;

[9] Look much higher than that which must be heard here by formula of audition

it is the limitation that it suits to give it and that determines the import. Know: *the test requires that the ear on the opposite side can be deafened.*

It is also indispensable to specify the meaning.

The ear of the opposite side is thus known as deafenable; the performance of the test is then carried out on the simple experiments most highly exposed.

What signification do they have?

Should the traumatism affect an intact ear or be affected by old lesions, the definitive effect is the same from the anatomical and functional point of view: it is the destruction of the cochlear apparatus and, as a consequence, deafness.

Therefore all *negative* results obtained by deafness of the non-traumatised ear leaves the choice between two hypotheses: where the subject hears with a perfect ear intact, and, if he says it is deaf, he simulates (pretends?); or he still hears with a hypoacoustic ear, but not a deaf ear, and, if he says it is deaf, he is exaggerating.

Inversely, a *positive* result will mean total deafness or very severe deafness, *without making any prejudgements on the traumatic origin or spontaneity of this deafness.*

In Conclusion, a *positive* sign indicates that the ear in question has obtained total or severe deafness; a negative sign, that it is healthy or simply hypoacoustic.

To hold to these conclusion, that nothing prevents me to verify by the usual audiometric tests [acoumetric tests], we shall never distance ourselves from the domain of certitude. From research, actually running, we learn if we are authorised to extend the significance of the test to the diagnosis of the seat of the lesion; the study of partially deaf-people allows us to catch sight of it.