1. The deaf mute, as a rule, is endowed with organic and mental sensitiveness little inferior to the normal; often it is quite normal.

2. It is both just and necessary to reinstate him in civil life and in his penal responsibility.

3. As it has been demonstrated that the sensitiveness of the deaf mute varies very little from the normal, and as it is known how great an influence the senses have on mental development in all systems of education, we ought to give much attention to "gymnastics" of the senses, not only for the purpose of instruction by the oral method, but because they are one of the most efficacious methods for promoting psychical development.

4. Bearing in mind the individual varieties in sensitiveness in deaf mutes, it is useful to divide them into different categories for purposes of instruction, in this way assisting the teacher, and rendering the instruction more advantageous to the pupil.

5. In view of the conditions of the principal organs of sensation in deaf mutes, we have a greater obligation to see that they enjoy an education which develops the faculties given them by nature.

6. Both for medico-legal and educational purposes it is useful, and in some cases indispensable, to examine the condition of sensitiveness of a deaf mute, in order to determine his mental condition.

St. Clair Thomson.

ON THE PARACUSIS OF WILLIS.

By Dr. D'AGUANNO (Palermo).

Read before the Fifth International Otological Congress at Florence.

Dr. D'AGUANNO referred to the various theories with regard to the causation of the paracusis of Willis. According to some authors, it arises from chronic lesions of the middle ear; according to others, from a peculiar torpor of the auditory nerve; while others again associate the torpor of the nerve with the lesions of the middle ear, thinking that in this way the question can be answered. Among the former, Von Tröltsch, while allowing that the majority of deaf patients hear better in the middle of noises, because one is obliged to speak to them in a louder voice than usual in a quiet room, cannot at the same time deny certain observations with regard to deafness which is truly "paradoxical," in which loud noises form the *conditio sine quâ non* for hearing; and he explains these cases by a slight looseness of the joints of the chain.

Prof. Politzer, who determined that in these cases the amelioration was real because his acoumeter was heard better in the midst of noise, thinks that we have to deal with a rigidity of the chain of bones, which the loud noises succeed in shaking, and thus produce a better hearing power. Meanwhile, if the hypothesis of Tröltsch has not yet been demonstrated, that of Prof. Politzer is also very difficult to conceive. If we admit, in fact, that this paradoxical deafness is the consequence of a

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rigidity of the bones (and not, indeed, of a complete ankylosis, because in these cases all sonorous vibration is useless), we ought to meet with it in all commencing cases of true or false ankylosis as an epiphenomenon of true and complete deafness, and not as an isolated fact, independent of the degree and of the form of the otitic affection. If, then, such an anomaly is present in certain cases, it ought, without doubt, to be related to another cause, or at least some other factor ought to intervene. St. John Roosa is doubtful in this respect. According to him, the paradoxical deafness ought always to be the consequence of a chronic non-purulent lesion of the tympanum the cause of which is to be sought for in a modification of the chain of ossicles ; but Müller and his partisans, on the contrary, attribute it to a torpor of the auditory nerve. The improvement of hearing in Urbantschitsch's case appears to have lasted for twenty-four hours after a railway journey. I do not deny that sometimes this form of deafness is the result of a torpor of the organ of perception, more particularly in the hysterical cases, and I admit that the nerve might acquire its functions under the stimulus of a powerful and continuous sonorous excitation, such as the noise of a vehicle or of a railway carriage ; however, we cannot elevate such an opinion to the dignity of a law, for the functional and objective examination of the auditory organ does not always speak in favour of such a torpor, and in this sense the following personal observation is striking.

B. R., aged thirty-four, a spirit merchant at Palermo, for the last four years, without any probable cause, had suffered from gradual and progressive diminution of hearing power, accompanied with subjective noises in both ears. The patient came to consult me rather on account of his deafness, which often prevented him from looking after his business. He drew my attention to the fact that his hearing was much better in the midst of external noises, so much so that his deafness varied directly with the degree of silence, and inversely with the amount of noise. At night, for instance, it was much more marked than in the day, and in a carriage it was less than when he walked about. Functional examination showed that whispered voice was not heard at all on either side ; ordinary conversation at twenty centimètres, loud voice at forty centimètres. Politzer's acoumeter was scarcely heard opposite the meatus, but very markedly, on the other hand, on the mastoid process. The tuning fork on the vortex was not lateralized. Rinné was negative ; Galton's whistle was heard up to the line 0·8 quite close to the ear. On the piano he did not hear the last octave. A point worthy of mention was that he heard ordinary voices quite well when spoken to him in front of a piece of paste-board, which he held between the teeth. As regards the previous history, there was no hereditary taint. He had never had syphilis nor any other disease bearing upon the ear. He had never drunk spirits to excess, but used tobacco very freely. Examination of the tympanic membranes showed them to be slightly opaque. The light cone was a little shortened, the short process projected, and there was very little mobility during Valsalva's inflation. Catheterism brought about very slight improvement on the right side (acoumeter heard at one centimètre) and no improvement on the left. Examination of the neighbouring

organs revealed hypertrophy of the nasal mucous membrane, and a fair amount of chronic granular pharyngitis, which appeared to be the direct cause of the chronic lesion of the tympanum.

In this case, as is evident, the paracusis cannot be explained by Müller's and by Urbantschitsch's hypotheses, because the functional examination, and the evidence of the paste-board (audiphone), indicated the integrity of the auditory nerve ; the lesion was evidently situated in the tympanum. Paracusis cannot, therefore, be always attributed to torpor of the nerve in view of such clinical facts. Similarly, Gellé's view seems insufficient, attributing as he does the paracusis to a "dynamogenic" action affected by noise. One would wish to know why the majority of deaf patients are not "dynamogenised." The same remark applies to another opinion of Gellé, who, admitting as a fact that often the subjective noise is the only cause of the defect of hearing, thinks that external sounds, by masking these, diminish the deafness.

Ménière, in his recent manual of clinical otology, takes up an eclectic position as regards this question. According to him, it depends upon an affection of the tympanum and on a torpor of the nerve. Nevertheless, this hypothesis does not seem to me satisfactory, either because we see pretty frequently that in the majority of cases there is a lesion of the tympanum without torpor of the nerve, while, on the other hand, when there is torpor we do find tympanic lesions, because in a number of cases of torpor of the acoustic nerve from inaction of the ossicular chain, and more precisely from ankylosis of the stapes, we meet with complete non-paradoxical deafness. If we admit, then, that this form of deafness occurs without torpor of the nerve, but with simple lesion of the tympanum, we must look for the cause in the condition of the contents in this category. Direct otoscopy revealed in our case chronic catarrh of the middle ear, with diminished mobility of the tympanic membrane, which would indicate rigidity of the ossicular chain. Meanwhile, this does not suffice to explain to us the paracusis, and, until *post-mortem* examination solves the question completely, I am inclined to believe in a dissociation of the chain according to the opinion of Tröltsch, or a loosening of the ligament of the ossicles, or some peculiar change or degeneration in the tympanic muscles, whose action is not yet quite known, and which loud noises only can excite, at the same time improving the hearing. The infrequency of these facts could alone explain to us the infrequent occurrence of paracusis.

Conclusions: First—Paradoxical deafness (paracusis of Willis) is a phenomenon symptomatic either of torpor of the auditory nerve or of a lesion of the tympanum. Second—The tympanic affection which gives rise to it might be related either to an interruption of the joints of the chain, or to a relaxation of the ossicular ligaments, or to a degeneration of the intra-tympanic muscles ; but up to the present we are not in possession of any certain proofs. *Dundas Grant* (*Trans.*).