AUDITORY RE-EDUCATION.[1]

By F. F. Muecke, M.B., B.S., F.R.C.S.,

Aural Surgeon, Maida Vale Hospital for Epilepsy; Assistant Surgeon, London Throat Hospital; Aural Registrar, London Hospital.

Summary of Cases Treated.—Cases treated, 36; cured, 1; definite improvement, 3; improved, but relapsed after treatment, 10; In *statu quo*, 22.

This result is altogether at variance with the published results of the various inventors of re-educators. I have worked with two of these machines, been associated with a third, and closely read the inventor's description of two more. These five comprise all the best known instruments, and although they differ in details, yet to my honest belief their actions and results upon the auditory apparatus are identical in kind.

The instruments are extremely complicated to the observer, and it is wonderful what can be done with them from an electrical and physical point of view.

The main objectives aimed at are:

(*a*) The production of sound vibration from 80 to 3500 per second.

(*b*) Control of the intensity of the sound according to the susceptibility of the patient.

(*c*) Regularity in the emission of the sound wave.

(*d*) Regulation of the waves to each ear separately.

(*e*) Vibration of the drum by the sound waves and transmitted vibration by the air-cushion in the meatus.

In all the instruments the sound waves are conveyed by a telephone receiver which is placed firmly against the ear, and the intensity of the sound is gradually increased until the patient experiences a distinct "tickling" sensation. This intensity can readily be maintained and the tone altered at will. The limit thus obtained must not be passed, as actual pain and giddiness are thereby caused. Each sitting lasts from three to five minutes. If after fourteen consecutive sittings no improvement is found, the case is not proceeded with further.

The actual effect on the ear is chiefly threefold:

(*a*) Vibration of the tympanic membrane, both physiologically

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by the sound waves and mechanically by the air-cushion. The "tickling" is the conscious effect of the vibration.

(*b*) Vaso-dilatation of the vessels of the meatus, membrane, and middle ear.

(*c*) Stimulation of the nerve-endings in the labyrinth by the loud sounds.

It now remains to be seen how the deaf ear can be helped by these means. For the sake of convenience the causes of deafness may be placed under five main headings (naturally leaving out those actually suppurating) :

(1) Old suppurative otitis with no membrane or a large perforation.

(2) Old suppurative otitis with adhesions and scars.

(3) Otosclerosis.

(4) Chronic otitis media catarrhalis.

(5) The various forms of nerve deafness.

To commence with the first of these divisions, it is obvious that the only way in which such cases can be benefited would be by the last of the means mentioned above, namely, the stimulation of the labyrinth. But it is rare to find any diminution in the bone-conduction in these cases, so the labyrinth is probably not at fault. Therefore one would not expect any benefit from the re-educators in these cases. And this was found to be the case in the eight patients who came under this heading.

Secondly, practically the same might be said of the next division, as it is extremely hard to imagine that drum-vibration or vaso-dilatation could have any effect on the old scars and fibrous adhesions. Practically I found these cases equally unsatisfactory.

Thirdly, even more improbable of help should this division be, for here we are dealing with bony ankylosis of the stapes to the edges of the foramen ovalis. However, certainly some of these patients were temporarily helped as regards tinnitus.

Fourthly, we come to by far the largest group—the chronic catarrhal type, with indrawn drums, some hypertrophic and some atrophic. It is in this group where the possibilities, if any, of the re-educators are mainly centred. The effect of the drum massage and vaso-dilatation is certainly beneficial, as every aurist has long ago noticed with the pneumo-massage machines; but we must grant to the re-educators a physiological massage which may be of greater benefit. In the early chronic stages of this disease I obtained some improvement either in the hearing or the tinnitus in almost every case, but no more improvement than that which

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I could obtain in the same case with the Eustachian catheter and pneumo-massage, in fact, the latter method—as might be expected—gave the better results. Unfortunately I got the relapse which aurists are so familiar with in other forms of treatment. I continued the treatment, giving three or four separate courses, all with the same result. The effect on tinnitus was, on the whole, more satisfactory than on the hearing. In the later stages of this trouble some of the patients had immediate benefit, which I could not equally get with the catheter and pneumo-massage. I put this down to the stimulation of the labyrinth, which from want of function had become sluggish. It is well known in the late stages of chronic otitis media that bone-conduction is lessened and the wakening up of the nerve-endings may account for the improvement. Unfortunately again the relapse came after treatment had stopped.

The thinking practitioner will not be at all surprised at these results, for the treatment can in no way affect the cause, which remaining, quickly reduces the auditory apparatus to its previous condition.

In two of the cases, both of whom had been under several courses of treatment at the hand of one of these inventors, but had relapsed after, I removed the cause of the trouble. Afterwards one of these had the re-educator only and the other the re-educator plus catheter, the latter doing the better. Both are certainly improved, but I think this was more due to the operation than the after-treatment, and it is interesting to note that neither has relapsed, as they did after the inventor's treatment only.

I did not try the re-educator on any of these cases in their earliest or sub-acute stage, as we already know such cases to be readily cured by older and well-tried methods. Probably it is this form of case which swells the numbers of "successful" cases in the published re-education lists. But if the cause be left the deafness will undoubtedly return.

Now to come to the fifth group, namely, nerve deafness. My list shows that here I have no success at all—even despite the combination with active and anti-syphilitic treatment. This is only in keeping with the results obtained in the treatment of affections of the other nerves of special sense. I believe that when there is any actual disease or affection of the labyrinth the re-educators are quite useless.

The main beneficial effect of the machine I believe to be the vibration effect. The word "re-educator" goes for nothing. In

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one of the cases which showed temporary improvement I endeavoured to prove this by keeping the receiver firmly against the ear and controlling the intensity to a marked "tickling" sensation. I kept to this for three days and carefully noted the result. The next three days I had the receiver held slightly further from the ear and increased the intensity of the sound to well above the previous. Now, though the vibration was not felt as the added air-cushion vibration was absent, no result was found, the patient herself asking to be put back on the old method. I found a similar result in the other three cases on which I tried this method.

It will be noticed that I have one cured case. He was thought to be a case of neurasthenic deafness, and I quite concurred in the diagnosis. He was an exceedingly rapid cure and has remained so.

I have had no experience in voice-listening lessons, which the educators claim to be a useful adjunct to their method, but I fail to see why it should not be equally useful in any other method.

Three cases have so far (a year to sixteen months) not relapsed. One (a relapse of the inventor's) refers to tinnitus only. The second had a removal of marked nasal obstruction, and the third, certainly highly successful at the time, I have lately not been able to trace.

So I regret to state that the result of my experience with re-education has not been satisfactory. I state with emphasis that no patient should attempt this treatment until a reputable aurist has either ordered it or found further orthodox treatment useless—for although the treatment can do no direct harm, it may do indirect harm by postponing the removal of the cause of the deafness.

These cases were all done at the London Hospital. Mr. Hunter Tod, the Aural Surgeon at the Hospital, saw the patients before and after, and can verify my results. Quite a number came from Mr. Tod's private practice, so I had excellent material to work upon.

[For tables, see next page.]

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No.	Age and sex.	Symptoms before treatment.	Length of treatment.	Hearing.		Tinnitus.	Remarks.
				Before.	After.		
1—8	15 to 30	Cases of chronic otitis media (suppurative). Now dried up. All without drums or with large perforation	14; 1 a day consecutive	Only speech. W. and Wh. *nil*	Unchanged	Unchanged	No reaction whatever. All could easily stand the full strength. Naturally no "tingling" sensation.
9 H. T——	M., 23	Nerve deafness during secondary syphilis. Onset fairly sudden. "606" given	30; 2 periods	Loud voice only	Slight variations during treatment. Result *nil*	Not present	Most unsatisfactory both from "606" and re-education point of view.
10 Q. K——	F., 25	Nerve deafness. Congenital syphilis. Three years' deafness, sudden onset. "606" 2 months ago	35; 2 periods	Wh. 5 in. Left *nil*. Rinne + both	Extraordinary variations from good hearing to stone deaf. *In statu quo*	Unchanged. Said that the noises increased after treatment for 10 hours	Unsatisfactory. Some days almost expected cure. This variation may have been due to "606." Patient ceased because gave up in disappointment.
11	M., 32	Old specific. Nerve deafness. Deaf 5 years. Specific treatment 12 years ago	14	Loud voice only	Unchanged	*Nil*	Ceased to come as no improvement.
12	F., 12	Nerve deafness. Sudden deafness following shock aged four (whilst bathing). Stone deaf. Conscious of vibrations only	20; 2 periods	*Nil*	*Nil*	*Nil*	Treatment quite useless. Sent to lip-reading school.
13 G——	M., 25	Nerve deafness. Deafness following measles when aged four. Some hearing returned when aged fourteen. Loud low-pitched sounds only	45 visits; 4 periods	Shout only. Occasionally distinguished words	*Nil*	*Nil*	Was hopeful during treatment, as patient thought that the traffic in the street was more audible. The end was most disappointing.
14 K——	F., 20	Nerve deafness following scarlet fever 14 years ago. Lip reads	20	Loud voice close to ear	*Nil*	*Nil*	Unsatisfactory.
15	M., 12	Sudden onset of deafness 3 months ago. Conscious of vibration only. No response to any labyrinthine tests	14	*Nil*	*Nil*	*Nil*	No result. Sent to lip-reading school.

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No.	Age and sex.	Symptoms before treatment.	Length of treatment.	Hearing.		Tinnitus.	Remarks.
				Before.	After.		
16	F., 12	Nerve deafness, 3 years following measles. Stone deaf. Labyrinthine reactions present	14	*Nil*	*Nil*	*Nil*	No result. Sent to lip-reading school.
17 B——	M., 50	Chronic otitis media. Slight nerve deafness, left ear. Right ear affected since childhood, left 10 years	45 ; 3 periods	Right ear *nil*. Left, W. 3 in. ; Wh. 1½ ft.	W. 3 in. ; Wh. 3 ft.	Unchanged	Improvement during treatment. Found that he could do without his hand to his ear. Relapsed after 1½ months. Another treatment and again relapsed to former state.
18 H. F——	M., 18	Chronic suppurative otitis media, drums healed. Right ear deaf 12 years, left ear deaf 2 years. Large scar on right side.	20	W., left 6 in. ; right *nil*. Wh., left 6 ft. ; right 4 in.	W., left 8 in. ; right contact. Wh., left 14 ft. ; right 6 in.	*Nil*	Great improvement. Retained office billet and could again hear through telephone. Ceased coming without notice. Unable to trace him.
19 M. L——	F., 49	Left ear — discharge and deafness since childhood, dried up 3 years ago ; drum scarred and adherent to tympanic wall. Right ear – chronic otitis media 1 year, gradually getting worse, retracted drum. Rinne just + in right ear	14	Left shout only. Right, W., 5 in. ; Wh., 15 ft.	*In statu quo*	Unchanged	Patient greatly dissatisfied.
20 M. A——	M., 45	Chronic otitis media both 18 years. Drum retracted and greatly thickened. Calcareous deposit	20	Loud voice close to ear	*In statu quo*	Unchanged	No improvement.
21 M. D——	M., 28	Chronic otitis media 25 years. Several treatments with inventor	30	W. and Wh. *nil*. Voice 1 ft. both	Voice 3 ft.	Better	Relapsed in 14 days, just as he had during other treatments
22 J. D——	M., 36	Chronic otitis media 22 years left, 12 years right. Great noises—almost melancholic because of the noises	14	Left, W. and Wh. *nil*. Right, W. *nil*, Wh. 2 in. V. : L., 1 ft. ; R., 10 ft.	*Nil*	No relief to great noises	After submucous resection of the septum there was definite improvement in both noises and hearing, and I am going to restart him at the instrument

No.	Age and sex.	Symptoms before treatment.	Length of treatment.	Hearing.		Tinnitus.	Remarks.
				Before.	After.		
23 B——	F., 36	Deafness 18 years, mostly right. Noises bad. Paracusis Willisii. "Otosclerosis" diagnosed by several specialists. Several treatments with inventor. Submucous resection done with good result to nasal catarrh and noises	20	Right, W. *nil*. Left, W. 2 in.; Wh. 2 ft.	*In statu quo*	Much better	This case is still undergoing treatment. What little good was done to hearing and noises relapsed almost immediately treatment stopped. After submucous resection for grossly deviated septum the patient quickly felt great improvement in general health, noticing mostly the feeling of clearness in her head and relief from the noises. This first treatment of re-education has improved her as before, but has not relapsed in two months time.
24	M., 24	Chronic otitis media 6 years. Severe catarrh post-nasal	14	Wh. 1 in. both	*In statu quo*	Slight improvement	Did not return for second treatment. No difference in hearing.
25	M., 25	Otosclerosis 12 years	14	W. and Wh. *nil*. V. 2 ft.	*In statu quo*	—	Unsatisfactory.
26 S. H——	M., 50	Chronic otitis media 25 years. Slight nerve deafness	45; 3 periods	W. and Wh. *nil*. V., *nil* right, 2 ft. left	*In statu quo*	No difference	Unsatisfactory. Treated by two different kinds of education.
27 S. D——	M., 52	Otosclerosis 10 years	30; 2 periods	W., left 1 in., right 2 in. Wh., left 1 yard, right 2½ yards	*In statu quo*	Less	Although no improvement found by testing, patient was insistent that he was better—could hear the street traffic from office stool after 5 years' cessation. Patient relapsed to former state.
28 R——	F., 27	Chronic otitis media 8 years. Drum greatly indrawn	45; 3 periods	W. *nil*; Wh. contact	Wh., 3 in.	—	Insistent on improvement, but unfortunately relapsed after about 1 month.
29 F——	F., 30	Chronic otitis media 6 years. Indrawn drums	14	W., 1½ both. Wh., left 2 ft., right 1 ft.	*In statu quo*	—	Most unsatisfactory.

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No.	Age and sex.	Symptoms before treatment.	Length of treatment.	Hearing.		Tinnitus.	Remarks.
				Before.	After.		
30 N.M——	F., 31	Otosclerosis 12 years. Hears well with autophone	30	V., left 1½ ft., right 2 ft.	*In statu quo*	—	Most unsatisfactory.
31 W——	M., 42	Otosclerosis 10 years; 5 years hospital treatment	30; 2 periods	W., left 1½ in., right contact. Wh., left 3 ft., right contact	*In statu quo*	Less	Was confident during the first days. Noises distinctly less.
32 H——	M., 55	Chronic otitis media 20 years. Indrawn drums	14	W., left contact, right *nil*. Wh., left 14, right 6 in.	*In statu quo*	—	Most unsatisfactory.
33	F., 34	Chronic otitis media 15 years. Drum indrawn	25; 2 periods	V., left 3 ft., right 4 ft.	*In statu quo*	Less	Unsatisfactory though long time.
34 M.C——	F., 30	Chronic otitis media 5 years	14	No tests	*In statu quo*	—	Most unsatisfactory.
35	F., 54	Chronic otitis media 30 years. An old case of the inventor's—hearing during previous treatment *in statu quo*, but troublesome noises quite stopped till death of husband caused them to restart	20	—	—	Less	Noises again quite stopped.
36	M., 20	Deafness since aged 10 years. Several specialists could find no cause, who had been told many different things. Air conduction was normal. Bone conduction decreased. He was extremely neurotic in temperament, and I thought it a case of neurasthenic deafness	30; 3 periods	W., left *nil*, right contact. Wh. *nil*. Loud voice only. c^3 fork not heard, c^2 with difficulty. Labyrinthine tests present	Normal hearing, hears c^4 fork	Quite ceased	Absolute "cure" after about fourteen treatments. Re-engaged at office. Six months later had not relapsed.

N.B.—Where not mentioned labyrinthine tests were normal in all the cases.