DEAFNESS—ITS PREVENTION AND RELIEF.

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A. The Prevention of Deafness.

Amongst the problems raised during the study of deafness—especially deafness in children—is How to prevent deafness. Except in otosclerosis, which is a disease of adult-life, nearly all deafness either begins in childhood or its causes are present and may be removed during childhood. In this country between our voluntary Hospitals, our special Hospitals and our more recently instituted school medical service we have, I think, the best equipped organization for the prevention of deafness at present existing in the world.

As I see it, prevention must proceed along three lines.

Firstly, the more careful treatment of the infectious diseases—measles, scarlet fever, meningitis, etc., and of the ear complications of these diseases. Little need be said on this point because most of such cases are treated nowadays in infectious diseases hospitals to which an aurist is attached. When measles and scarlet-fever are treated in the home a medical man should supervise the treatment. It is chiefly due to this improved treatment and to the examination and treatment of children by the officers of the school medical service that acquired deafness has diminished amongst the children who without it must go to our schools for the deaf. Thus the ratio of acquired to congenital deafness in these schools has fallen from 50% to 25%. When a child leaves an infectious diseases hospital to go back to school, the School Authority should be notified and the ears of the child examined. And the public should co-operate in the same way when the cases are treated at home.

The following table shows the extent of this improvement:—

Population of Scotland in	1891	...	4,025,674
	1931	...	4,800,000
Deaf in Scottish Schools	1895	...	524
	1931	...	534
Ratio of Acquired Cases	1895	...	50%
Congenital Cases	1895	...	50%
Congenitally Deaf in Schools	1931	...	358
Adventitiously „ „	1931	...	130
Percentage of Acquired Cases	1931	...	27%
„ „ Congenital Cases	1931	...	72.2%
Average family in Deaf Cases	1895	...	5.5
	1931	...	4

Ratio of deafborn in congenital families—3.3 hearing to 1 deaf, which is as near the Mendelian ratio as one could expect in such small numbers. (This Mendelian ratio would be nearer correct did we know the truth about the congenital cases. Parents are loath to admit heredity.)

A study of the above table—which is taken from a paper I read before the Royal Society of Medicine in 1932—shows that Acquired Deafness as a cause of Dumbness is doomed. In another 40 years there will be little of it and only the congenitally deaf will need special accommodation.

This reduction is not confined to Scotland. My colleague, Mr. Sibley Haycock, drew up returns from schools in England with a similar showing and I take the following from a recently published article by the London County Council which is eloquent in the same direction (see *British Medical Journal*, Sept. 7th, 1935). “By way of introduction to the report for 1934 of the School Medical Officer for the County of London, Sir Frederick Menzies sketches the improvement which has taken place during the present reign. It was in 1910 that the first school treatment centre was opened in London: there are now seventy-four such centres. The first dental centre was opened in the same year, and now there is provision for the dental treatment of 150,000 children annually. In 1910 there were sixty-eight school nurses; the number has been multiplied five-fold. Ringworm of the scalp, formerly one of the greatest scourges of children, is now rarely found; there were only 265 new cases last year, compared with over 6,000 in 1911. The proportion of children with discharging ears has come down from nearly 4 per cent. to under 1 per cent.” I have quoted this paragraph in full to show not only progress in the extinction of ear disease and its consequent deafness but the rapid growth of the arrangements for the treatment of all school children. The school clinic takes place of importance alongside of the voluntary hospital, the police and the army.

Secondly, syphilis, which is also an infectious disease, should be made notifiable. There are not many children born deaf on account of this disease, but both blindness and deafness are common in later life because of hereditary syphilis.

I take the following from a series of cases examined many years ago by myself.

“In 21 families there were 172 pregnancies. There were 30 miscarriages, or still-born children; including these there were 75 deaths, nearly all in the first or second year and in addition there were 31 deaf or deaf and blind children. There remained 66 living children of whom many are known to have been born before the poison entered the parental blood. As a rule I have called the 66 living children healthy but by that I mean only that they are not blind or deaf.” There could hardly be a more severe indictment of a disease than this. And were this the place I could easily extend the indictment. Treatment which has now been in force for 10 or 15 years under the most modern methods fails very largely because it is very prolonged and most patients give it up before it is completed.

Here is an extract from the City of Glasgow (Medical Officer's Report) for 1929:

“Even with all the facilities for treatment the individuals suffering from Venereal Disease do not take advantage of the treatment to a cure. The voluntary system does not seem to be a success.”

In the report just quoted the percentage of defaulters before completion of treatment is stated to have been 55.3% in 1923 and 77.1% in 1929. The average percentage in default during the past five years was 70.5%.

The third line of attack in preventing deafness is the prevention of congenital cases. Medical readers do not now require to have the principles of Mendelism explained to them. Mendelism is the only theory which explains the facts of hereditary deafness and it only requires a broad enough view of the theory to include not only the clearly hereditary cases, but the apparently sporadic cases as well. If the hybrid does not marry a deaf-born person and does not meet another hybrid, no deafness will follow in the offspring. But as there are three hybrids for every deaf-born person and as we have no test for such latent deafness—no test for a recessive—the prevention of congenital deafness will always remain a difficult, and perhaps in part, an insoluble problem.

Assuming then that Mendelism holds the key to the diminution if not to the extinction of congenital or hereditary deafness; assuming too, that we have a population willing to be guided, what suggestions may be made for the attainment of our object.

1. The deaf-born or the children of the deaf-born should not marry into families in which any case of congenital deafness has occurred either in the direct line or in the collateral branches. Should such marriage take place sterilization or birth control or any other precaution seems justified. This should apply to the hearing members (hybrids) on both sides.

2. As there are three hybrids (apparently normal people) for every deaf-born person, all hearing people, before entering marriage, should ascertain whether any case of congenital deafness has occurred among their relatives.

3. Even the deaf-born may count on hearing children should he be able to marry into a pure hearing family.

4. Even should all such precautions be observed congenital cases will occur, because the hybrids which seem normal will meet and the so-called sporadic cases will occur, but the scheme above outlined would result in the rapid diminution of congenital or hereditary deafness.

5. During the last year of school life all children—now aged 15 years—should be instructed in Mendelism. This may be done as a short course in Natural History. It is no use postponing such information till the deaf-born have fallen in love during their meetings in missions or clubs for the deaf.

Such a scheme seems better than legislation for the prevention of deafness. It should never be forgotten that apart from their deafness the deaf-born become useful and capable citizens. But deafness is a great handicap. I have never heard, except in the pages of a novel, of a mother who hoped her child would be born deaf.

For some years, under the auspices of the Volta Bureau, Edgar Allan Fay of Washington, D.C., collected material from the histories of 4,000 families in the United States and in 1898 published the results under the title of "Marriages of the Deaf in America." This was before Mendelism was resurrected and became known to the world in general. Dr. Fay could have put forward a theory of Fayism to explain congenital deafness. Had Mendel been alive in 1898 he would probably have exclaimed, "I told you so." But Mendel was dead and Fay knew nothing about him.

The general principle which Fay established was: It is not the immediate parentage of the deaf child which has determined his deafness *but the possession of deaf relatives* which determines the liability to deafness. Dr. Fay's work is monumental and his conclusions supported by a wealth of proof which it is difficult to exaggerate. His tables cannot be quoted here, but I select the following quotations:—

“ In marriages where both of the partners are congenitally deaf and where both have deaf relatives, the proportion of them having deaf offspring and the proportion of deaf children born therefrom are very high (28.4 and 30.3 per cent.).”

and again:—

“ The possession of deaf relatives Seems to be a trustworthy indication of a liability to deaf offspring. If a person, whether congenitally or adventitiously deaf, has deaf relatives, that person, however married, is liable to have deaf offspring, the liability being much greater however in the case of the congenitally deaf than in that of the adventitiously deaf.” (Fay: “Marriages of the Deaf in America,” pp. 130-1. Published by the Volta Bureau, 1898.)

One would have thought that with evidence of this kind before the public—some of it for quite half a century—measures would have been formulated for the control of congenital deafness.

There are two reasons for this apparent neglect.

1. It takes a long time before teaching like this sinks into the public mind, and action must come from a convinced public. Legislation, I think, is unnecessary, although it has been tried in some of the American States. The enthusiast is disappointed because it is difficult to arouse a strong feeling in a subject which affects only 1 in 3,000 or 4,000 of the population.

2. The second reason is that medical progress during these 50 years has been along broader avenues which affect the whole or a very large section of the population. One has only to mention the advances in pathology, in bacteriology, in serum therapy, in the use of vitamins and the secretions of the ductless glands, e.g., thyroxin, adrenalin, insulin, etc., to see how great the strides have been in general medicine. It is unlikely that any ductless gland specific ending in “in” will be discovered to combat congenital deafness. This latter is a defect, not a disease, and so far as we see at present will only be controlled by education and by prudent marriage. And the specialist reformer should remember that Providence has lots of time and is never in a hurry.

B. Aids to Hearing.

Seeing we must face the facts that the deaf and the hard of hearing, like the poor must continue to be with us, that neither surgery nor medicine will cure chronic deafness, what can be done for these severely handicapped people? Deaf clubs for the hard of hearing are based on the understanding that treatment has been tried and has failed. But the phrase “hard of hearing” implies that in most cases some hearing is left. One of my old teachers used to twit me about the inability of the aurists to cure chronic deafness. But can we cure chronic anything—chronic Brights

disease, chronic heart disease for instance? The answer to the question what can be done? is—If the subject is young teach him lip reading. This hardly ever fails with a young person with good eyesight. If he is at or past middle life give him an “aid” to his remaining hearing. Lip reading is the best “aid” we have and, except in the dark, is always available. No apparatus need be carried about by the good lip-reader.

Apart from lip-reading we have two types of aid available in cases of hardness of hearing. The first is the collector of sound, a development of the old man’s hand cupped behind the ear. This collector prolonged into a tube of 3 or 4 feet in length is the most generally applicable “aid” we have to-day. It takes many forms but the principle is the same. It collects sound waves and carries them without dispersion to the deaf person’s ear. But it is clumsy, it labels the user a deaf person and we cannot blame the woman whose vanity is touched by having to carry about such a piece of luggage. Still there is much to be said for the collector. There is no wear and tear, no battery running down.

Someone has said that the greatest thing in the world is an idea whose time has come. That is what happened nearly two hundred years ago when James Watt was seized by the idea of a separate condenser for the steam engine. I have been accustomed to think of this in the case of Joseph Lister when the idea of the germ origin of disease seized him. I like to think of the idea getting hold of the man, not the man of the idea, because it is in this way great men are made. In connection with our present subject something of this kind happened when Graham Bell, who was a teacher of the deaf, invented the telephone, and shortly afterwards we had the first electrical “aids” for the deaf—made up of a microphone, a battery and a receiver inserted into the ear. For half a century, with slight modification, this mechanism has been increasingly used by the hard of hearing and in cases of middle ear deafness often gave surprisingly good results. It had the following advantages: it was light, and could be made inconspicuous; it was literally portable. But its power of amplification was limited and the battery required constant supervision and in a week or two renewal. Further, it was not capable of selective amplification over a wide range of pitch. And then came the thermionic valve which gave us great amplification and a wide range for selection. The best of such instruments are really wireless sets with a special cord or lead for the use of the deaf person. For the most part such instruments are not portable in the sense that original electrical “aids” are. Instruments with one or more small valves are being made, and who will say that the struggle between weight and efficiency will not result in an instrument which even a lady will consent to carry about. The smallest portable set of the valve type with which the writer is acquainted weighs 2 lbs. 5 ozs. without its case and 3 lbs. 3 ozs. with its case.

The non-portable “aid” is invaluable in the Committee room, at a Board Meeting or in the home. And use has been found for the non-portable in the so-called church set by which from a microphone in the pulpit and cords led to individual pews, listeners may follow the order of service quite well. Here batteries may be dispensed with and the apparatus connected with the main. How far may such aids be used in the education of the deaf mute? One of my enthusiastic colleagues states that 84 per cent. of these deaf children may, by the use of such “aids”, and without lip-reading, be educated in this way. Any experienced teacher of the deaf or any experienced aurist may be forgiven if he doubts this.