

SCIENCE:

A WEEKLY NEWSPAPER OF ALL THE ARTS AND SCIENCES

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

MARRIAGE.¹

It always gives me pleasure to respond to the invitation of the members of the Literary Society of Kendall Green, and it will always be my object in addressing you to choose subjects that will be of interest and importance to you in your future lives. You have come together here from every part of the United States to receive in the National College for Deaf-Mutes that higher education which you cannot obtain in the States from which you came.

In a very little while—it may be in one year, or two years, or more—you will separate from one another, and each go back singly to the places from which you came, to begin the battle of life. You will go out into the great world,—the world of hearing and speaking people, a world of people who cannot spell upon their fingers or make signs. Are you prepared for that change, and what is to be your position in that world?

I would have you all remember that you yourselves are a part of that great world of hearing and speaking people. You are not a race distinct and apart, and you must fulfil the duties of life, and make your way to honorable positions among hearing and speaking people.

Now, I have considered what subject I could bring to your attention to-night the consideration of which would be of assistance to you when you go out into the world; and there is no subject, I am sure, that lies closer to your hearts than the subject of marriage.

It is a very difficult thing for me to speak to you upon that subject, because I know that an idea has gone forth, and is very generally believed in by the deaf of this country, that I want to prevent you from marrying as you choose, and that I have tried to pass a law to interfere with your marriages. But, my friends, it is not true. I have never done such a thing, nor do I intend to; and before I speak upon this subject I want you distinctly to understand that I have no intention of interfering with your liberty of marriage. You can marry whom you choose, and I hope you will be happy. It is not for me to blame you for marrying to suit yourselves; for you all know that I myself, the son of a deaf mother, have married a deaf wife.

I think, however, that it is the duty of every good man and every good woman to remember that children follow marriage, and I am sure that there is no one among the deaf who desires to have his affliction handed down to his chil-

¹ An address delivered to the members of the Literary Society of Kendall Green, Washington, D.C., March 6, 1891, by Alexander Graham Bell.

dren. You all know that I have devoted considerable study and thought to the subject of the inheritance of deafness, and if you will put away prejudice out of your minds, and take up my researches relating to the deaf, you will find something that may be of value to you all.

We all know that some of the deaf have deaf children,—not all, not even the majority, but some,—a comparatively small number. In the vast majority of cases there are no deaf offspring, but in the remaining cases the proportion of offspring born deaf is very large,—so large as to cause alarm to thoughtful minds. Will it not be of interest and importance to you to find out why these few have deaf offspring? It may not be of much importance to you to inquire whether by and by, in a hundred years or so, we may have a deaf variety of the human race. That is a matter of great interest to scientific men, but not of special value to you. What you want to know, and what you are interested in, is this: are you yourself liable to have deaf offspring? Now, one value in my researches that you will find is this: that you can gain information that may assure you that you may increase your liability to have deaf offspring or diminish it, according to the way in which you marry.

The Rev. W. W. Turner of Hartford was the first, I think, who showed that those who are born deaf have a greater liability to have deaf offspring than those who are not. He showed, that, where a person born deaf marries another person born deaf, in this case about one-third of the children are deaf. Mr. Job Williams, the present principal of the Hartford Institution, has still more recently examined the subject; and, in a letter published in *Science* a short time ago, he arrives at the same conclusion,—about one-third are born deaf. In 1888, Mr. Connor, the principal of the Georgia Institution, made an examination of the results of the marriages of his pupils, and his statistics are published in "Facts and Opinions relating to the Deaf." He also comes to the same conclusion,—about one-third are born deaf.

The following table will show you the exact figures:—

TABLE I.—Concerning the Offspring of Couples Both of Whom were born Deaf.

Authority. ¹	Total Number of Families.	Total Number of Children.	Number of Deaf Children.	Percentage of Children who are Deaf.	Number of Deaf Children to every 100 Families.
Turner (1868).....	24	57	17	29.8	70.8
Connor (1888).....	16	59	19	32.4	118.7
Williams (1891).....	52	151	48	31.8	92.3

It is obvious that persons born deaf run considerable risk of having deaf offspring if they marry persons who are also born deaf.

If we take all the marriages of congenitally deaf persons, without reference to whether they married deaf or hearing persons, we have five independent sets of statistics from which we may derive information regarding the effects upon the offspring. (1) My own researches indicate that where

¹ For Rev. W. W. Turner's results, see my Memoir, p. 20. For Mr. Connor's results, see Facts and Opinions relating to the Deaf, p. 61. For Mr. Job Williams's figures, see *Science*, vol. xvii. p. 76, published Feb. 6, 1891. Dr. Gillett, in *Science* (vol. xvii. p. 59, Jan. 30, 1891), says there were thirteen couples in the Illinois Institution in which both parties were born deaf. One of these couples had two hearing children and one deaf child. He does not state how many children were born to the other twelve couples, but says they could all hear.

one or both of the parties were born deaf there will be fifteen deaf children in every hundred families; (2) Dr. Gillett's statistics give eighteen deaf children to every hundred families; (3) Dr. Turner's, thirty-two; (4) Mr. Williams's, forty-seven; and (5) Mr. Connor's, ninety-five.

TABLE II. — *Concerning the Offspring of Couples One or Both of Whom were born Deaf.*

Authority. ¹	Total Number of Families.	Total Number of Deaf Children.	Percentage. (Number of Deaf Children to every 100 Families.)
Turner (1868).....	190	61	32.1
Bell (1883).....	360	56	15.5
Connor (1888).....	22	21	95.4
Gillett (1891).....	71	13	18.3
Williams (1891).....	211	101	47.8

Persons who are reported deaf from birth, as a class, exhibit a tendency to transmit the defect; and yet when we come to individual cases we cannot decide with absolute certainty that any one was born deaf. Some who are reported deaf from birth probably lost hearing in infancy; others reported deaf in infancy were probably born deaf. For educational purposes the distinction may be immaterial, but in the study of inheritance it makes all the difference in the world whether the deafness occurred before or after birth. Now, in my researches I think I have found a surer and more safe guide to those cases that are liable to transmit the defect.

The new guide that I would give you is this: look at the family rather than at the individual. You will find in certain families that one child is deaf and all the rest hearing, the ancestors and other relatives also being free from deafness. This is what is known as a "sporadic" case of deafness, — deafness which afflicts one only in a family.

Well, the deafness in such cases may be accidental. There is no proof that such deafness is liable to be inherited, excepting where the person is reported deaf from birth. In the vast majority of cases reported deaf from birth there is an undoubted tendency to inheritance; but where the deafness is caused by meningitis, scarlet-fever, or like causes, and no other case of deafness exists in the family, there is probably little, if any, tendency to inheritance. But when you have two members of one family deaf, or three, or four, or five, there you have the proof that a tendency to deafness exists in the family. What I term "family deafness" exists there. Something has been transmitted from the parents to the children that has caused deafness, or helped to cause it. I remember a case in which there were four children in one family deaf, and none of them were born deaf. One child became deaf, perhaps, from measles, another from scarlet-fever, etc. I do not now remember exactly what causes were stated. They became deaf, however, at different times, and from apparently accidental causes. But can we consider that it was accidental that there should have been four children in one family deaf? The fact that a number of children in the same family are deaf points to an inherited tendency to deafness in the family. One result of my researches is to show the great importance of studying the results of marriages of persons who come from families of

that kind. My results, however, until verified by other observers, should be received as probable only, and not certainly proved.

So far as I can find out, the hereditary character of the defect in a family is roughly indicated by the proportion of the family who are deaf. If you make a fraction, and place the number of deaf children above as the numerator, and the total number of children below as the denominator, for example, $\frac{1}{6}$, that fraction will give you some idea of the tendency to deafness in that family: one child in six is deaf. Again, take a case in which three out of six are deaf ($\frac{3}{6}$). Now, the tendency to transmit deafness in this family ($\frac{3}{6}$) will be greater than in that ($\frac{1}{6}$). Every member of the first family ($\frac{3}{6}$), whether deaf or hearing, will have a greater tendency to have deaf children than the members of the other ($\frac{1}{6}$). In general, the tendency to transmit deafness is greatest in those families that have the largest proportion of deaf members, and smallest in those that have the least. This conclusion is exceedingly probable, and should therefore be taken as a guide by those who desire to avoid the production of deaf offspring. If you marry a hearing person who has three or four deaf brothers and sisters, the probability of your having deaf children will be greater than if you marry a deaf person (not born deaf) who has no deaf relatives.

The statistics collated by me ("Memoir," p. 25) indicate that 816 marriages of deaf-mutes produce 82 deaf children: in other words, every 100 marriages are productive of 10 deaf children. That is a result independent of the cause of deafness, — an average of all cases considered. Eliminating 40 cases where the cause of deafness is not given, I divide the remaining 776 cases into 4 classes: —

Class 1. Persons not born deaf who have no deaf relatives.

Class 2. Persons not born deaf who have deaf relatives.

Class 3. Persons born deaf who have no deaf relatives.

Class 4. Persons born deaf who have deaf relatives.

TABLE III.

	Number of Families.	Number of Deaf Children.	Percentage. (Number of Deaf Children to every 100 Families.)
Class 1. Not born deaf, no deaf relatives..	363	17	4.7
Class 2. Not born deaf, deaf relatives.....	53	5	9.4
Class 3. Born deaf, no deaf relatives.....	130	15	11.5
Class 4. Born deaf, deaf relatives.....	230	41	17.8

The percentage results are shown by themselves in the following table (Table IV.), in which the figures indicate the number of deaf children produced by every 100 marriages of persons belonging to Classes 1, 2, 3, and 4.

TABLE IV.

PERIOD OF LIFE WHEN DEAFNESS OCCURRED.	CHARACTER OF THE DEAFNESS.	
	Sporadic Deafness.	Family Deafness.
After birth.	4.7	9.4
Birth.	11.5	17.8

My statistics are confessedly very imperfect, and many persons have hastily concluded that the results are therefore

¹ References as for Table I. For my own results, see Memoir, p. 25.

of no value or significance. This, however, is not the case; for the imperfection of the statistics assures us that the figures given are all underestimates, the true number of deaf children in every case being greater than that mentioned. As a matter of fact, all the statistics since collected by others have shown larger percentages.

While it is believed that the true percentages are larger than those given, it is probable that they are proportionately larger; so that we may conclude with probable accuracy that persons belonging to Class 4 are more liable to have deaf children than those belonging to Class 3, those of Class 3 more liable than those of Class 2, and those belonging to Class 1 are the least liable of any, to have deaf offspring. The relative liabilities are probably represented by the percentage figures.

The results are imperfect from another cause. The institution reports from which the statistics were compiled did not give details concerning both the parties to a marriage.

It would be stated that Mr. So-and-so "married a deaf-mute;" but no information would be given as to whether his wife was born deaf or not, or whether she had or had not deaf relatives. I have only been able, therefore, to classify the marriages by one side. For example: the results noted for Class 1 give the summation of all marriages of persons not born deaf who have no deaf relatives, quite regardless of the fact that some of them married congenital deaf-mutes, others semi-mutes, and still others hearing persons. We may deduce, however, from the figures, that, if the husband belongs to Class 1, his liability to have deaf offspring will be greatest if his wife belongs to Class 4, and least if she belongs to Class 1, etc.

Now that Professor Fay has taken up the subject, I hope that we may obtain statistics of greater accuracy and importance than any yet compiled.

When we obtain statistics classified by both parties to the marriage, I think it will be found, that, where persons belonging to Class 1 marry persons also belonging to Class 1, there will be no deaf offspring, or, at least, that the percentage of deaf offspring will be insignificant; for surely accidental deafness is no more liable to be inherited than the accidental loss of an arm in battle, for instance. If, however, a person born without an arm should marry a person also born without an arm, some of the children would probably exhibit the same defect. In a similar manner, persons belonging to Classes 2, 3, and 4 exhibit a decided tendency to transmit deafness to their offspring.

Now, there is a law of heredity that may afford great comfort to many of the deaf, — the law of reversion. There is a very strong tendency in offspring to revert to the normal type of the race. It requires constant selection from generation to generation on both sides to perpetuate any abnormal peculiarity. There will always, therefore, be a tendency to produce hearing children rather than deaf, excepting in cases where both parties to a marriage come from families belonging to Classes 2, 3, and 4.

Probabilities for Your Guidance.

Whatever may be the character of the deafness in your own case, you will probably diminish your liability to have deaf offspring (1) by marrying a hearing person in whose family there is no deafness; (2) by marrying a deaf person (not born deaf) who has no deaf relatives (Class 1), or a hearing brother or sister of such a person.

On the other hand, you will probably increase your liability to have deaf offspring (1) by marrying a deaf person (not

born deaf) who has deaf relatives (Class 2), or a hearing brother or sister of such a person; (2) by marrying a deaf person (born deaf) who has no deaf relatives (Class 3), or a hearing brother or sister of such a person; (3) by marrying a deaf person (born deaf) who has deaf relatives (Class 4), or a hearing brother or sister of such a person.

Of course, if you yourself were born deaf, or have deaf relatives, it is perfectly possible that in any event some of your children may be deaf. Still, I am inclined to think, that, if you marry a member of a family in which there is no deafness (or only a single case of non-congenital deafness), you will not only have fewer deaf children than if you married into a family containing a congenital deaf-mute, or a number of deaf persons, but the deafness of your children will not tend so strongly to be handed down to the grandchildren. The tendency to inheritance will be weakened in the one case, and intensified in the other: that is, in the former case your deaf child will have a less tendency to transmit his defect to his children than you yourself possess; in the latter case, a greater tendency.

Take the case of a family in which three or four children are born deaf.

Now, suppose that all the members of this family and their deaf descendants are careful to marry only into families which are free from deafness, or which contain only single cases of non-congenital deafness. Then the probabilities are that at each generation the percentage of children born deaf will be less, and the proportion of hearing children greater, until finally the deaf tendency disappears, and all the descendants will hear.

On the other hand, suppose that the members of this family and their deaf descendants marry into families containing a congenital deaf-mute, or containing several deaf persons. Then the probabilities are that at each generation the percentage of children born deaf will increase, and the proportion of hearing children will be less, until finally the tendency to produce hearing offspring disappears, and all the descendants will be deaf. This family would then constitute a deaf variety of the race, in which deaf offspring would be the rule, and hearing offspring the exception.

Now, the point that I would impress upon you all is the significance of family deafness. I would have you remember that all the members of a family in which there are a number of deaf-mutes have a liability to produce deaf offspring, the hearing members of the family as well as the deaf members.

This, I think, is the explanation of the curious fact that the congenitally deaf pupils of the Hartford Institution who married hearing persons had a larger percentage of deaf children than those who married deaf-mutes. It is probable that many of the hearing persons they married had brothers or sisters who were born deaf.

Cases will constantly arise in which a proposed marriage will appear undesirable and desirable both at the same time. For example: a semi-mute having no deaf relatives may form an attachment for a congenitally deaf person in whose family deafness may be hereditary. Of course, I have nothing to say as to what the young people should do: that is a matter for them to decide. I cannot even undertake to advise. The semi-mute will have no tendency to have deaf children if he or she will marry a person of similar kind (Class 1), or marry a hearing person belonging to a family in which there is no deafness: hence this person, by marrying a congenitally deaf person in whose family deafness is hereditary, will create a liability to have deaf offspring which would not

otherwise exist. From this point of view, the marriage is undesirable.

On the other hand, from the point of view of the person born deaf, such a marriage is extremely desirable, for it will diminish the hereditary tendency in his family. In such a case, the friends of one party would probably favor the union, and the friends of the other advise against it; and the mutual friends of both could only say, "It is desirable to one, and undesirable to the other: we cannot advise; your own hearts must decide the matter."

Now, I have come before you to-night to show you that there may be something in my researches of benefit to you; I want also to assure you that there is nothing of harm. I want to disabuse your minds entirely of the idea that I intend or desire to interfere with your perfect liberty of choice. I claim the right to advise you as I would advise my own children, or any young people in whom I feel an interest. In this matter my views coincide very closely with those recently expressed by President Gallaudet through the columns of *Science*. You have to live in a world of hearing and speaking people, and every thing that will help you to mingle with hearing and speaking people will promote your welfare and happiness. A hearing partner will wed you to the hearing world, and be of inestimable value to you in all the relations of life. Not only will your own success in life be thereby increased, but the welfare of your children will be materially promoted. It is surely to the interests of children, both deaf and hearing, that one at least of their parents should hear.

I would therefore hold before you as the ideal marriage a marriage with a hearing person. Do not let any one place in your minds the idea that such a marriage cannot be a happy one. Do not let any one make you believe that you cannot find a hearing person who will treat you as an equal. The chances are infinitely more in your favor that out of the millions of hearing persons in this country you may be able to find one with whom you may be happy than that you should find one among the smaller numbers of the deaf.

I think the sentiment is hurtful that makes you believe you can only be happy with a deaf companion. That is a mistake, and, I believe, a grave one. I would have you believe that the welfare of yourself and your children will be greatly promoted by marriage with a hearing partner, if you can find one with whom you can be happy.

And now, my friends, I must thank you very much for the attentive way in which you have listened to me, and I hope that you will all dispel from your minds any idea that I intend to interfere with your liberty of marriage. I know that very grave misconceptions of my position and views have been circulated during the past few years among the deaf. I have before me to-night an audience composed of the brightest and most intelligent minds among the deaf, and I want you to help me in dispelling these ideas.

These misconceptions have arisen chiefly, I think, from too great reliance upon newspaper stories and second-hand information. The newspapers seem to know a good deal more about my opinions and views than I do myself, and I am constantly seeing items about myself that have utterly no basis in fact. Only a few weeks ago I read in a newspaper a long report of an interview with me that never took place. The substance of that article has since been copied from paper to paper all over the United States. I happened to be suffering from a slight headache when the reporter called at my hotel, and I thought this would afford a good excuse for avoiding an interview. I therefore sent my com-

pliments to the reporter, and begged to be excused. He went away, and I thought that that was the end of the matter. Alas, no! Next morning I found myself in the paper, in large capitals, giving forth opinions relating to the education of the deaf that I had never expressed.

Now, I would impress upon your minds the fact that if you want to do a man justice, you should believe what a man says himself rather than what people say he says. There is no man in America, I think, who has been more interviewed by newspaper reporters than I have, and I can assure you that I have never yet seen a report of an interview with me that was free from error.

But now I begin to be afraid of you; for you are the interviewers in this case, and I wonder how I shall be reported by you in the newspapers of the deaf. I am talking to you by word of mouth, while my friend, Professor Fay, is translating what I say into the sign-language. Then by and by you will translate it all back again into English for the benefit of your deaf friends in distant parts. You are the interviewers this time, and I fear you are just as liable to make errors of statement as the ordinary newspaper reporter. I have therefore brought with me to-night a gentleman who has taken a stenographic account of all that I am saying to you. I will look over his notes and correct them, and then it will afford me pleasure to present every member of the Literary Society with a printed copy of my remarks. Allow me, therefore, to request the correspondents of distant papers kindly to reserve their notes of my remarks until they can get my own words in black and white.

I must thank you very much for the attention with which you have listened to me, and in conclusion I would simply say, that, if any one here desires to ask me questions upon the subject of my address, I shall be happy to do my best to reply.

BRITISH NEW GUINEA.

MR. J. P. THOMSON read a paper in December last, on "The North-east Coast of British New Guinea, and some of the Adjacent Islands," before the Queensland Branch of the Royal Geographical Society of Australasia, an abstract of which appears in *The Scottish Geographical Magazine* for March. He remarked on the absence of information regarding this coast before the establishment of the British authority in New Guinea, which he accounted for by the fact that this part is less accessible from Australian ports than the south-eastern coast. The mountain-ranges, when viewed from a distance, seemed to rise abruptly from the shore, leaving no margin of cultivable land, and the natives bore the reputation of barbarous cannibals. Moreover, the indentations of the coast, such as Goodenough, Collingwood, Dyke Acland, and Holincote Bays, are too exposed to afford safe anchorage for ships in stormy weather. Sir William Macgregor, therefore, could not fail to bring back a large fund of information from his expedition to this coast in July, 1890.

The Anglo-German boundary is defined on the coast by Mitre Rock, a mass of conglomerate rising upon, or near to, the 8th parallel of south latitude, to a height of 60 feet above the water, with an opening about 12 feet high and 1 yard broad extending through it from north to south. Within a quarter of a mile of this rock, Boundary Cape, so named by Sir Peter Scratchley, projects into the sea, a promontory of low forest-clad hills rising to a height of 400 to 500 feet. No natives were discovered until the expedition had advanced as far south as Caution Point, where a large village on the coast is inhabited by a powerful tribe. The men ornament their chins with false beards extending from ear to ear, and decorate their heads with cassowary feathers, shells, and fibres; but tattooing seems not to be in fashion among them. The largest tribe met with inhabits a district of hilly ground and sago swamps lying to the south of Boundary Cape, behind which