THE HISTORY OF TWINS, AS A CRITERION OF THE
RELATIVE POWERS OF NATURE AND NURTURE.

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The exceedingly close resemblance attributed to twins has been the subject of many novels and plays, and most persons have felt a desire to know upon what basis of truth those works of fiction may rest. But twins have many other claims to attention, one of which will be discussed in the present memoir. It is, that their history affords means of distinguishing between the effects of tendencies received at birth, and of those that were imposed by the circumstances of their after lives; in other words, between the effects of nature and of nurture. This is a subject of especial importance in its bearings on investigations into mental heredity, and I, for my part, have keenly felt the difficulty of drawing the necessary distinction whenever I tried to estimate the degree in which mental ability was, on the average, inherited. The objection to statistical evidence in proof of its inheritance has always been: 'The persons whom you compare may have lived under similar social conditions and have had similar advantages of education, but such prominent conditions are only a small part of those that determine the future of each man’s life. It is to trifling accidental circumstances that the bent of his disposition and his success are mainly due, and these you leave wholly out of account.' In fact, they do not admit of being tabulated, and therefore your statistics, however plausible at first sight, are really of very little use. No method of enquiry which I have been able to carry out—and I have tried many

1 In my English Men of Science, 1874, p. 12, I treated this subject in a cursory way. It subsequently occurred to me that it deserved a more elaborate enquiry, which I made, and of which this paper is a result.

of correspondence, which I pursued until enough material was accumulated for a general reconnaissance of the subject.

There is a large literature relating to twins in their purely surgical and physiological aspect. The reader interested in this should consult Die Lehre von den Zwillingen, von L. Kleinwächter, Prag. 1871; it is full of references, but it is also disfigured by a number of numerical misprints, especially in p. 26. I have not found any book that treats of twins from my present point of view.

The reader will easily understand that the word 'twins' is a vague expression, which covers two very dissimilar events; the one corresponding to the progeny of animals that have usually more than one young one at birth, and the other corresponding to those double-yolked eggs that are due to two germinal spots in a single ovum. The consequence of this is, that I find a considerable diversity in my results.

One would have expected that twins would commonly be found to possess a certain average likeness to one another; but a few would greatly exceed that degree of likeness, and a few would greatly fall short of it; but this is not at all the case. Twins may be divided into three groups, so distinct that there are no intermediate instances; namely, strongly alike, moderately alike, and extremely dissimilar. When the twins are a boy and a girl, they are never closely alike; in fact, their origin never corresponds to that of the above-mentioned double-yolked eggs.

I have received about eighty returns of cases of close similarity, thirty-five of which entered into many instructive details. In a few of these not a single point of difference could be specified. In the remainder, the colour of the hair and eyes were almost always identical; the height, weight, and strength were generally very nearly so, but I have a few cases of a notable difference in these, notwithstanding the resemblance was otherwise very near. The manner and address of the thirty-five pairs of twins is usually described as being very similar, though there often exists a difference of expression familiar to near relatives but unperceived by strangers. The intonation of the voice when speaking is commonly the same, but it frequently happens that the twins sing in different keys. Most singularly, that one point in which similarity is rare is the handwriting. I cannot account for this, considering how strongly handwriting runs in families, but I am sure of the fact.

I have only one case in which nobody, not even the twins themselves, could distinguish their own notes of lectures, &c.; barely two or three in which the handwriting was indistinguishable by others and only a few in which it was described as closely alike. On the other hand, I have many in which it is stated to be unlike, and some in which it is alluded to as the only point of difference.

One of my enquiries was for anecdotes as regards the mistakes made by near relatives, between the twins. They are numerous, but not very varied in character. When the twins are children, they have commonly to be distinguished by ribbons tied round their wrist or neck; nevertheless the one is sometimes fed, physicians, and whipped by mistake for the other; and the description of these little domestic catastrophes is usually given to me by the mother, in a phraseology that is somewhat touching by reason of its seriousness. I have one case in which a doubt remains whether the children were not changed in their bath, and the presumed A is not really B, and vice versa. In another case an artist was engaged in the portraits of twins who were between
three and four years of age, he had to lay aside his work for three weeks, and, on resuming it, could not tell to which child the respective likenesses he had in hand belonged. The mistakes are less numerous on comparing the character of the twins during the boyhood and girlhood of the twins, but almost as frequent in the part of strangers. I have many instances of tutors being unable to distinguish their twin pupils. Thus, two girls used regularly to impose on their music teacher when one of them wanted a whole holiday; they had their lessons at separate hours, and the one girl sacrificed herself to receive two lessons on the same day, while the other one enjoyed herself. Here is a brief and comprehensive account: 'Exactly alike in all, their schoolmasters never could tell them apart; at dancing parties they consistently changed partners without detection; their close resemblance is as well maintained in other circles. The following is a typical schoolboy anecdote: Two twins were fond of playing tricks, and complaints were frequently made; but the boys would not cease, and the culprit was at last caught by the headmaster, who was a guilty one, and the complainants were never certain which of the two he was. One headmaster used to say he would never flog the innocent twin, and when caught, he would not be used to flog both. No less than nine anecdotes have reached me of a twin seeing his or her reflection in a looking-glass, and addressing it, in the belief it was the other twin in person. I have many anecdotes of mistakes when the twins were nearly grown up. Thus: An amusing scene occurred at college when one twin came to visit the other; the porter on one occasion refusing to let the visitor out of the college gates, for, though they stood side by side, he professed ignorance as to which he ought to allow to depart. Children are usually quick in distinguishing between their parent and his or her twin; but I have two cases to the contrary. Thus, the daughter of a twin says: 'Such was the marvellous similarity of their features, voice, manner, &c., that I remember, as a child, being very much puzzled, and I think, had my aunt lived much with us, I should have ended by thinking I had two mothers.' The other, a father of twins, remarks: 'We were extremely alike, and are so at this moment, so much so that our children up to five and six years old did not know us apart.'

I have four or five instances of doubt during an engagement of marriage. Thus: 'A married first, but both twins met the lady together for the first time, and fell in love with her there and then. A managed to see her home and to gain her affection, though B went once up from the town, and neither the lady nor her parents could tell which was which.' I have also a German letter, written in quaint terms, about twin brothers and another twin, and it could not possibly be distinguished by them. In the well-known novel by Mr. Wilkie Collins of Poor Miss Finch, the blind girl distinguishes the twin she loves by the touch of his hand, which gives her a thrill that the touch of the other brother does not. Philosophers have not, I believe, yet investigated the conditions of such thrills; but I have a case in which Miss Finch's test would have failed. Two persons, both friends of a certain twin lady, told me that she had frequently remarked to them that 'kissing her twin sister was not like kissing her other sisters, but like kissing herself—her own hand, for example.' It would be an interesting experiment for twins who were closely alike, to try how far dogs could distinguish between them by scent.

I have a few anecdotes of strange mistakes made between twins in adult life. Thus, an officer writes: 'On one occasion when I returned from foreign service my father turned to me and said, "I thought you were in London," thinking I was my brother—yet he had not seen me for nearly four years—our resemblance was so great.'

The next and last anecdote I shall give is, perhaps, the most remarkable of those that I have; it was sent me by the brother of the twins, who were in middle life at the time of its occurrence: 'A was again coming home from India, on leave; the ship did not arrive for some days after it was due; the twin brother came up from the coast to receive A, and A, his old mother was very nervous. One morning A rushed in, saying, "Oh, mother, how are you?" Her answer was, "I am well, but I have a vague and terrible uneasiness; I know you are not really A." And it was a little while before A could persuade her that he was the real person.'

Enough has been said to prove that an extremely close personal resemblance frequently exists between twins of the same sex; and that, although the resemblance usually diminishes as they grow into manhood and womanhood, some cases occur in which the resemblance is lessened in a hardly perceptible degree. It must be borne in mind that the stage of development, when it occurs, need not be ascribed to the effect of different natures, but that it is quite possible that it may be due to the appearance of qualities inherited at birth, though dormant, like gout, in early life. To this I shall recur.

There is a curious feature in the character of the resemblance between twins, which has been alluded to by a few correspondents; it is well illustrated by the following quotations. A mother of twins says: 'There seemed to be a sort of interchangeable likeness in expression, that often gave to each the effect of being more like his brother than himself.' Again, two twin brothers, writing to one another, after analysing their points of resemblance, which are close and numerous, and pointing out certain shades of difference, add: 'These seem to have marked us through life, though for a while, when we were first separated, the one to go to business, and the other to college, our respective characters were inverted; we both think that at that time we each ran into the character of the other. The proof of this consists in our own recollections, in our correspondence by letter, and in the views which we held of matters in which we were interested.'

In explanation of this apparent interchangeableness, we must recollect that no character is simple, and that in twins who are close together there is a strong resemblance each other expression in the one may be matched by a corresponding expression in the other, but it does not follow that the same emotion should be the dominant one in both cases. Now it is by their dominant expressions that we should distinguish between the twins; consequently when one twin has temporarily the expression which is the dominant one in his brother, he is apt to be mistaken for him. There are also cases where the development of the two twins is not strictly pari passu; they reach the same goal at the same time, but not by identical stages. Thus: A is born
The larger, then B overtakes and surpasses A, and is in his turn overtaken by A, the end being that the two twins, as it were, become closely alike. This process would aid in giving an interchangeable likeness at certain periods of their growth, and is undoubtedly due to nature more frequently than to nurture.

Among my thirty-five detailed cases of close similarity, there are no less than seven in which both twins suffered from some special ailment or had some exceptional peculiarity. One twin writes that she and her sister 'have both the defect of not being able to come down stairs quickly, which, however, was not born with them, but came on at the age of twenty-seven.' Another pair of twins have a slight congenital flexure of one of the joints of the little finger; it was inherited from a grandmother, but neither parents, nor brothers, nor sisters show the least trace of it. In another case, one was born ruptured, and the other became so at six months old. Two twins at the age of twenty-three were attacked by toothache, and the same tooth had to be extracted in each case. There are curious and close correspondences mentioned in the falling off of the hair. Two cases are mentioned of death from the same disease; one of which is very affecting. The outline of the story was that the twins were closely alike and singularly attached, and had identical tastes; they both obtained Government scholarships, and kept house together, when one sickened and died of Bright's disease, and the other also sickened of the same disease and died seven months later. In no less than nine out of the thirty-five cases does it appear that both twins are apt to suffer at the same time. This implies so intense a constitutional resemblance, that it is proper to give some quotations in evidence. Thus, the father of one twins says: 'Their general health is closely alike; whenever one of them has an ill, the other would be affected in the same within a day or two, and they usually recover in the same order. Such has been the case with whooping-cough, chicken-pox, and measles; also with slight bluish attacks, which they have successively. Latterly, they had a feverish attack at the same time.' Another parent of twins says: 'If anything falls on one member, identical symptoms nearly always appear in the other; this has been singularly visible in two instances during the last two months. Thus, when in London, one fell ill with a violent attack of dysentery, and within twenty-four hours the other had precisely the same symptoms.' A medical man writes of twins with whom he was acquainted: 'Whilst I knew them, for a period of two years, there was not the slightest tendency towards a difference in body or mind; external influences seemed to produce any dissimilarity.' The mother of two other twins, after describing how they were ill simultaneously up to the age of fifteen, adds, that they went through each attack within a few hours of each other.

Trousseau has a very remarkable case (in the chapter on Asthma in his important work *Clinique Médicale*). In the edition of 1863, it is in vol. ii, p. 427. It was quoted at length in the original French, in *Mr. Darwin’s Variation under Domestication*, vol. ii, p. 252. The following is a translation:

'I attended two brothers so extraordinarily alike, that it was impossible for me to tell which was which without seeing them side by side. Their physical likenesses extended to every organ; his head, so to speak, a yet more remarkable pathological resemblance. Thus, one of them, whom I saw at the Neufchômes at Paris, suffering from phrenic ophthalmia, said to me, “At this instant my brother must be having an ophthalmia like mine.” And, as I had exclaimed against the assertion, he showed me a few days afterwards a letter just received from him by his brother, who was at that time at Vienna, and who expressed himself in these words: “I have my ophthalmia; you must be having yours.” However singular this story may appear, the fact is none the less exact: it has not been told to me by others, but I have seen it myself; and I have seen other analogous cases in my practice. These twins were also asthmatic, and insomniac to a frightful degree. Though born in Marseilles, they never were able to stay in that town, where their business affairs required them to go, without having an attack. Still more strange, it was sufficient for them to get away only as far as Toulon in order to be cured of the attack caught at Marseilles. They travelled continually, and in all countries, on business affairs, and they remarked that certain localities were extremely hurtful to them, and that in others they were free from all asthmatic symptoms.

I do not like to pass over here a most dramatic tale in the *Psychologie Moribond* of Dr. J. Moreau (de Tours), Médecin de l’Hôpital de Bicêtre. Paris, 1859, p. 172. He speaks of two twin brothers who had been confined, on account of monomania, at Bicêtre. . . .

Physically the young men are so nearly alike that the one is easily mistaken for the other. Morally, their resemblance is no less complete, and is most remarkable in its details. Thus, their dominant ideas are absolutely the same. They both turn themselves subject to imaginary persecutions; the same enemies have sworn their destruction and employ the same means to effect it. Both have hallucinations of hearing. They are both of them melancholy and morose; they never address a word to anybody, and will hardly answer the questions that others address to them. They always keep apart and never communicate with one another. An extremely curious fact which has been frequently noted by the superintendents of their section of the hospital, and by myself, is this: From time to time, at very irregular intervals of two, three, and many months, without appreciable cause, and by the purely spontaneous effect of their illness, a very marked change takes place in the condition of the two brothers. Both of them, at the same time, and often on the same day, rose themselves from their habitual stupor and prostration; they made the same complaints, and they come of their own accord to the physician, with an urgent request to be liberated. I have seen this strange thing occur, even when they were some miles apart, the one being at Bicêtre and the other residing at Saint-Anne.

Dr. Moreau ranked as a very considerable medical authority, but I cannot wholly accept this strange story without fuller information.

Dr. Moreau writes it in too off-hand a way to carry the conviction that he had investigated the circumstances with the sceptic spirit and scrupulous exactness which a strange phenomenon would require. If full and precise notes of the case exist, they certainly ought to be published at length. I sent a copy of this passage to the principal authorities among the physicians to the insane in England, asking if they had ever witnessed any similar case. In reply, I have received three notes, but none to be compared in their exact parallelism with that just given. The details of these three cases are painful, and it is not necessary to my
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...general purpose that I should further allude to them.

There is another curious French case of insanity in twins, which was pointed out to me by Professor Paget, described by Dr. Bann in the *Annales Médico-Psychologiques*, vol. i., 1863, p. 312, of which the following is an abstract. The original contains a few more details, but is too long to quote: François and Martin, fifty years of age, worked as railroad contractors between Quimper and Châteaulin. Martin had twice had slight attacks of insanity. On January 25 a box in which the twins deposited their savings was robbed. On the night of January 23-4 both François (who lodged at Quimper) and Martin (who lived with his wife and children at St. Lorette, two leagues from Quimper) had the same dream at the same hour, three A.M., and both awoke with a violent start, calling out, 'I have caught the thief! I have caught the thief!' They are doing mischief to my brother!' They were both of them extremely agitated, and gave way to similar hallucinations, dancing and leaping. Martin sprang on his grandchild, declaring that he was the thief, and would have strangled him if he had not been prevent...
not a single instance have I met with a word about the growing dissimilarity being due to the action of the first free will of one or both of the twins, which had triumphed over natural tendencies; and yet a large proportion of my correspondents happen to be clergymen whose bent of mind is opposed, as I feel assured, from the tone of their letters, to a necessitarian view of life.

It has been remarked that a growing diversity between twins may be ascribed to the tardy development of naturally diversities; but we have a right, upon the evidence I have received, to go further than this. We have seen that a few twins retain their close resemblance through life; in other words, instances do exist of thorough similarity of nature, and in these external circumstances do not create dissimilarity. Therefore, in those cases, where there is a growing diversity, and where no external cause can be assigned either by the twins themselves or by their family for it, we may feel sure that it must be chiefly or altogether due to a want of thorough similarity in their nature. Nay, further, in some cases it is distinctly affirmed that the growing dissimilarity can be accounted for in no other way. We may therefore broadly conclude that the only circumstance, within the range of those by which persons of similar conditions of life are affected, capable of producing a marked effect on the character of adults, is illness or some accident which causes physical infirmity. The twins who closely resembled each other in childhood and early youth, and were reared under not very dissimilar conditions, either grew alike through the development of normal characteristics which had lain dormant at first, or else they continued their lives, keeping time like two watches, hardly to be thrown out of accord except by some physical jar. Nature is far stronger than nurture within the limited range that I have been careful to assign to the latter.

The effect of illness, as shown by these replies, is great, and well deserves further consideration. It appears that the constitution of youth is not so elastic as we are apt to think; but that an attack, say of scarlet fever, leaves a permanent mark, easily to be measured by the present method of comparison. This recalls an impression made strongly in my mind several years ago by the sight of a few curves drawn by a mathematician friend. He took monthly measurements of the circumference of his children’s heads during the first five years of their lives, and he laid down the successive measurements on the successive lines of a piece of ruled paper, by taking the eighths of an inch as a base. He then joined the four ends of the lines, and so obtained a curve of growth. These curves had, on the whole, that regularity of sweep that might have been expected, but each of them showed occasional hails like the landing places on a long flight of stairs. The development had been arrested by something, and was taken up for after growth. Now, on the same piece of paper my friend had also registered the various ailments of his children, and corresponding to each illness were the dots of these hails. There remained no doubt in my mind that, if these illnesses had been warded off, the development of the children would have been increased by almost the precise amount lost in these hails. In other words, the disease had drawn largely upon the capital, and not only on the income, of their constitutions. I hope these remarks may induce some men of science to repeat similar experiments on their children of the future. They may compress two years of a child’s history on one side of a ruled half-sheets of foolscap paper if they cause such successive line to stand for a successive month, beginning from the birth of the child; and if they mark off the measurements by laying, not the 0.1 inch division of the tape against the edge of the pages, but, say, the 10.0 inch division—in order to economise space.

The steady and pilifess march of the hidden weaknesses in our constitutions, through illness to death, is painfully revealed by these histories of twins. We are too apt to look upon illness and death as capricious events, and there are some who ascribe them to the direct effect of supernatural interference, whereas the fact of the maladies of two twins being continually alike, shows that illness and death are necessary incidents in a regular sequence of constitutional changes, beginning at birth, upon which external circumstances have, on the whole, very small effect. In cases where the maladies of the twins are continually alike, the clock of life moves regularly on, governed by internal mechanism. When the bands approach the hour mark, there is a sudden check, followed by a whirring of wheels; the moment that it touches it, the stroke falls. Necessitarians may derive new arguments from the life histories of twins.

We will now consider the converse side of our subject. Hitherto we have investigated cases where the similarity at first was close, but afterwards became less; now we will examine those in which there was great dissimilarity at first, and will see how far an identity of nurture in childhood and youth tends to assimilate them. As has been already mentioned, there is a large proportion of cases of sharply contrasted characteristics, both of body and mind, among twins. I have twenty such cases, given with much detail. It is a fact, that extreme dissimilarity, such as existed between Euan and Jacob, is a no less marked peculiarity in twins of the same sex, than extreme similarity. On this curious point, and on much else in the history of twins, I have many remarks to make, but this is not the place to make them.

The evidence given by the twenty cases above mentioned is absolutely accordant, so that the character of the whole may be exactly conveyed by two or three quotations. One parent says: ‘They have had exactly the same nurture from their birth up to the present time; they are both perfectly healthy and strong, yet they are otherwise so dissimilar as two boys could be, physically, mentally, and in their emotional nature. Here is another case: ‘I can answer most decidedly that the twins have been perfectly dissimilar in character, habits, and likeness from the moment of their birth to the present time, though they were reared by the same woman, went to school together, and were never separated till the age of fifteen.’ Here again is one more, in which the father remarks: ‘They were curiously different in body and mind from their birth.’ The surviving twin (a senior wrangler of Cambridge) adds: ‘A fact struck all our school contemporaries, that my brother and I were complementary, so to speak, in point of ability and disposition. He was contemplative, poetical, and literary to a remarkable degree, showing great power in that line. I was practical, mathematical, and linguistic. Between us we should have made a very decent sort of a man.’ I could quote others just as strong as these, while I have not a single case in which my correspondents speak of originally dissimilar characters having become assimilated through identity of nurture.
of some wonder whether nurture can do anything at all beyond giving instruction and professional training. It emphatically corroborates and goes far beyond the conclusions to which we had already been driven by the cases of twin accidents. Nevertheless all the cases succeed in passing down the current, and they travel, in the long run, nearly the same rate. So it is with life in respect to the several accidents which seem to have had a great effect upon our careers. The one element, which varies in different individuals, but is constant in each of them, is the natural tendency; it corresponds to the current in the stream, and inevitably asserts itself. More might be added on this matter, and much might be said in qualification of the broad conclusions to which we have arrived, as to the points in which education appears to create the most permanent effect; how far by training the intellect, and how far by subjecting the boy to a higher or lower tone of public opinion; but this is foreign to my immediate object. The latter has been to show broadly, and, I trust, convincingly, that statistical estimation of natural gifts by a comparison of successes in life, is not open to the objection stated at the beginning of this memoir. The cases are arrested, first by one chance obstacle, then by another; and again, how their onward course is facilitated by a combination of circumstances. He might ascribe much importance to each of these events, and think how largely the destiny of the sick had been governed by a series of trifling accidents. Nevertheless all the cases succeed in passing down the current, and they travel, in the long run, nearly the same rate. So it is with life in respect to the several accidents which seem to have had a great effect upon our careers. The one element, which varies in different individuals, but is constant in each of them, is the natural tendency; it corresponds to the current in the stream, and inevitably asserts itself. More might be added on this matter, and much might be said in qualification of the broad conclusions to which we have arrived, as to the points in which education appears to create the most permanent effect; how far by training the intellect, and how far by subjecting the boy to a higher or lower tone of public opinion; but this is foreign to my immediate object. The latter has been to show broadly, and, I trust, convincingly, that statistical estimation of natural gifts by a comparison of successes in life, is not open to the objection stated at the beginning of this memoir. The cases are arrested, first by one chance obstacle, then by another; and again, how their onward course is facilitated by a combination of circumstances. He might ascribe much importance to each of these events, and think how largely the destiny of the sick had been governed by a series of trifling accidents.

THE VENTILATION OF HOSPITALS.

The subject of public and private hygiene is being daily more and more studied by medical and scientific men; and the general public also is gradually learning that it is to be found the means of preventing the fearful epidemics which in every country have devastated the world, and the many diseases which crowd our hospitals with sufferers. So much is this the case that the Council of King's College determined that henceforth hygiene, public health, and sanitary science should be duly honored within its walls, and founded a Professorship of Hygiene. The first course of lectures was delivered by Dr. Guy, the first Professor, in 1870, and has since been published as a volume under the title of Public Health. It gives a history of the prevalent and fatal diseases of the English population from the earliest times to 1851, and is not only the most interesting, but also enables us from experience of the past to derive the most valuable instruction for the future.