On the nature and treatment of hereditary disease : with reference to a correlation of morbific forces / by J.M. Winn.

With the Author's Compts

ON THE

NATURE AND TREATMENT

OF

HEREDITARY DISEASE

WITH REFERENCE TO A

CORRELATION OF MORBIFIC FORCES

BY

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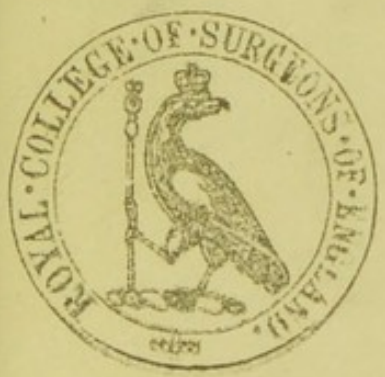

LONDON

ROBERT HARDWICKE, 192 PICCADILLY

1869

LONDON: PRINTED BY
SPOTTISWOODE AND CO., NEW-STREET SQUARE
AND PARLIAMENT STREET

TO

W. R. GROVE, Esq. Q.C. V.P.R.S.

ETC.

This Essay is Dedicated

BY

THE AUTHOR

4 Harley Place, Harley Street
Dec. 14, 1868

THE NATURE AND TREATMENT OF HEREDITARY DISEASE.

EVERY MEDICAL MAN conversant with the treatment of insanity, and who has had opportunities of knowing intimately the family connections of his patients, can scarcely have failed to detect, after careful enquiry, evidence of some form of constitutional disease, in one or more members of the same family. If he has not discovered the existence of decided insanity—for friends and relatives generally endeavour to conceal such fact—he will most probably have learnt, that few have escaped some hereditary taint, developed in the form of phthisis, scrofula, or epilepsy. Not only is this vicarious action of morbific forces seen in different members of the same family, but it is also frequently met with in the same individual.

In the course of my own experience I have often found the symptoms of insanity supervene on the subsidence of disease of the lungs; and, in the same manner, phthisis has followed the recovery from different forms of mental disease. Still more remarkable has been the manner in which I have seen skin disease alternate with attacks of insanity. These facts forcibly suggest a correllation of *morbific* forces.

I could adduce an endless variety of instances in support of this theory, but they are of such frequent occurrence, and must have fallen so often under the observation of medical men, that I shall content myself with mentioning only a few; and in relating these, I shall briefly notice only the salient points in each case.

Psoriasis, followed by acute mania. Mrs. ——, æt. forty, had been troubled for many years with a scaly eruption on the arms and back. A short time before I saw her (when she was acutely insane) the rash had disappeared. In a few weeks after she had been under my care, the maniacal symptoms subsided, and about the same time the psoriasis reappeared.

Epilepsy, acute mania, and phthisis, in children of one family. Miss ——, when fifteen years of age, had unequivocal symptoms of phthisis. Her brother was attacked with acute mania when he was nineteen; and another sister with epileptic fits at the age of seventeen. Two of their cousins and their aunt died of phthisis.

Phthisis, followed by acute mania. Mr. ——, æt. twenty-four, was advised to go to a warmer climate, on account of decided symptoms of a cavity in one lung. Whilst abroad, the lung disease was arrested. This amendment was speedily followed by an attack of acute mania; and when I first saw him he was incoherently insane, but the cavity in the lung had completely healed.

Religious mania, succeeded by phthisis. Miss ——, æt. nineteen. In this case, the malady had been developed by a mistaken and fanatical zeal on the part of her religious instructors. Although her life had been one of the

most perfect innocence and purity, she fancied herself wicked and sinful. She ultimately died of phthisis.

Scrofula, followed by suicidal melancholia. Miss ——, æt. twenty-five. This young lady had been a martyr to strumous ailments, which eventuated in an acute form of suicidal melancholia. She completely recovered, and when I saw her, two years afterwards, had had no return of scrofulous or insane symptoms.

Phthisis in one generation; monomania in the next. Miss ——, æt. twenty-seven. This was a case of chronic monomania of suspicion. Her uncle died of phthisis.

Melancholia in the father; scrofula and phthisis in the daughter. Count ——, a very distinguished foreigner, and a man of brilliant talent, became insane in after life, and died in a French asylum. His daughter, a very scrofulous child, died of phthisis when she was only ten years of age. As far as I could ascertain, there was no constitutional taint on the mother's side.

Consumption and mania in seven children of one family. Mr. ——, æt. about twenty-five, consulted me for an attack of profound melancholia. He was one of a family of eight children. One sister and two brothers died of phthisis, two sisters died insane, and one sister (still living) is extremely eccentric; only one sister has escaped disease. The mother died of pulmonary consumption. The father, who had been in every respect healthy, died at the age of eighty-three.

In the cases which I have enumerated, reference has been made to only one group of hereditary diseases, viz.: —mania, epilepsy, phthisis, scrofula, and skin diseases

(which are often merely forms of scrofula). In the present state of enquiry I refrain from including in this class gout, rheumatism, asthma, blindness, and deafness, which are so frequently hereditary ; yet it is extremely probable that a more intimate acquaintance with the phenomena of this division of hereditary diseases will enable us to refer them to the same category as the former.

Although the symptoms of phthisis and insanity appear to have nothing in common, this does not prove that they are owing to different causes. Other examples can be adduced in the animal economy, as well as in the material world, of one cause producing different effects. For many years I have been struck with the frequency of the occurrence of carbuncle in individuals of a gouty diathesis; yet, what can apparently be more opposite than the symptoms of carbuncle and an ordinary attack of gout? One, an affection of the skin and cellular membrane, terminating in the death of the cellular tissue; the other, an acute inflammation of a joint, ending for the most part in resolution. The worst case of carbuncles I ever met with was that of an individual who had suffered from repeated attacks of podagra. The usual symptoms of gout had, however, been for some time in abeyance before the commencement of his fatal illness, and the carbuncular disease, of which he died, was evidently the vicarious action of the same subtle morbific force as that which had previously caused his sufferings from gout.

Mr. William Harvey, the originator of the successful mode of treating excessive corpulency, which has been

erroneously termed the Banting-system (because Mr. Banting was the subject of it), did great service to medicine some time since, by showing that many cases of deafness, which had not before been recognised, were simply forms of gout, and were curable by the same remedies as are applicable to that disease.

The history of zymotic diseases, with regard to their origin, nature, and treatment, may be cited as examples of diseases presenting marked special differences, and yet being subject to the same general laws, and necessarily suggesting a similarity of morbific force.

I may incidentally mention that insanity is not uncommon in gouty families. I recollect attending one gentleman whose two brothers had suffered from severe and repeated attacks of gout, from which he had been free. It seemed, however, that in his case the disease had assumed the form of acute melancholia. It occurred to me that the insanity was probably related to gout; I therefore administered remedies suitable to that disease, and the patient rapidly recovered.

I have occasionally noticed the appearance of cancer as well as scrofula in families predisposed to insanity. Dr. Gull mentioned, in his address at the meeting of the British Medical Association at Oxford, that scrofulous children were not uncommonly the offspring of parents who had had cancer. I have recently attended an insane gentleman whose sister died of cancer of the œsophagus. The above examples will suffice to show the reasonableness of supposing that one force can produce various forms

of morbid action. This argument is amply borne out by analogy, if we refer to the phenomena of the purely material world.

The researches of Grove, Faraday, and others, lead to the impression, that forms of motion of an apparently different character, and which were formerly considered to be the result of different forces, are merely different manifestations of the same physical force. Grove, in his admirable essay on the Correlation of Physical Forces, observes: 'The attraction and repulsion of amber is very unlike the decomposition of water, and yet they are the same force.'

Faraday, in his 'Experimental Researches,' published in 1859, advocates the same view of the affections of matter. He remarks: 'I urge that the conservation of force ought to be admitted as a physical principle in all our hypotheses, whether partial or general, regarding the action of matter.'

Grove includes heat and light in his correlation of forces. He says: 'Heat, light, electricity, chemical affinity, and motion are all correlative, or have a reciprocal dependence; that neither can be said to be the essential cause of the other, but that either may produce or be convertible into any of the others—thus heat may mediately or immediately produce electricity; electricity may produce heat; and so of the rest, each merging itself as the force it produces becomes developed.' Mr. E. Brayley, however, in an article on the 'Correlation of Physical Forces,' which he published in the sixth volume of the English Cyclopædia, after giving an able exposition of Grove's

views, doubts whether the present state of science warrants his including heat and light in the same class as the other physical forces. Mr. Brayley remarks (at column 491): 'Heat and light appear to have the power of producing the other forces from the moment of their own origination, and the broad induction from the actual state of our knowledge of this radiation, is, that they originate in union and—in an absolute sense—are inseparable.' Whether we receive this exception or not, the discoveries of Faraday, Orsted, and Grove, go very far to substantiate the theory of a correlation of physical forces.

Before entering more fully into the question of morbific forces, it will be advisable to make a few remarks on vital or healthy force. The introduction of the term vital force has been of the greatest use to physiologists, by grouping facts together which could not be explained by the ordinary laws of physics. No one presumes to give a precise definition of its meaning, or to explain its nature; but it is used to indicate the secret cause of the energies of life.

It would be impossible and unnecessary in a brief essay to recount all the theories that have been brought forward to explain the phenomena of life by physical laws only. I cannot, however, refrain from alluding to the interesting and suggestive remarks made by Dr. Bence Jones, in the Croonian Lectures recently delivered at the Royal College of Physicians, on 'Matter and Force,' and to another paper read by Dr. Thompson Dickson at the last meeting of the British Association, in which he contends that vital potentiality is force, that this force is something

more than inertia, and that this force is convertible into, and is correlate with, the other forces.

From Dr. Bence Jones's lectures, to which I have referred, I select the following remarks, which are only a few out of many that are equally suggestive. 'The progress of animal chemistry proves more and more clearly that the matter of the body has no special chemical properties peculiar to life; but that matter within possesses the same chemical energy which it possesses out of the body. Life has no power to create or to destroy any chemical force in the matter of living things; but the very slightest difference in the circumstances under which any chemical action occurs produces a variation in the effects that are produced.'

'The brain, the nerves, the muscles, the electric organs, the textures in general—all these are machines set in action chiefly by the potential energy or tension in the food, textures, and air; the supply of oxygen, hydrogen, and carbon, being the first necessary conditions.'

With a full appreciation of the great value of Dr. Bence Jones's researches, I cannot help thinking that he has generalised too hastily in supposing that all the phenomena of life may be referred to purely physical causes. That many of the subordinate functions of the living body can be fully explained by chemical laws no one can doubt; there is, however, a vast deal in the operations of the brain and nervous system which in our present state of knowledge can only be accounted for by admitting the existence of other than physical forces. These other forces may be correlative although different from the ordinary energies

inherent in inorganic matter. We cannot separate the idea of force from matter; in fact, as Faraday observed in his 'Experimental Researches,' published in 1859, 'We know matter only by its forces.' Admitting therefore the necessary existence of force, or forces, in the human body, and allowing the use of the term vital or healthy force, it naturally follows that there may also exist a *morbific* force or forces antagonistic to this vital force.

For many years past my attention has been strongly drawn to the subject of hereditary disease, and I have felt more and more convinced that one and the same latent force obtains in all who are predisposed to the various hereditary diseases of which I have given examples; and I only suggest the use of the term morbific force as an induction (until a better can be substituted), to represent this latent energy, which may lie dormant for a generation or more, until developed by some exciting cause. Moreover, I firmly believe that hereditary disease is much more frequent than is generally supposed, and that a vast number of cases of insanity that have been attributed to some moral or physical shock, which has apparently produced them, are really only the manifestations of latent disease, brought into existence by external accident. Feuchtersleben, in his work on 'The Principles of Medical Psychology,' translated by the Sydenham Society, gives it as his opinion that one-half of the cases of insanity that are met with owe their origin to hereditary causes. Drs. Bucknell and Tuke, in their 'Manual of Psychological Medicine,' give the proportion as one-third.

With regard to the frequency of hereditary phthisis,

the late Dr. Theophilus Thompson, in his 'Clinical Lectures on Pulmonary Consumption,' after referring to his statistical tables, says: 'You will learn that amongst a thousand patients questioned on the subject, above one-fourth mentioned having lost a parent by it.' M. Hérard and M. V. Cornil, two of the most recent French authorities on this subject, in their work entitled 'De la Phthisie pulmonaire, Étude anatomo-pathologique et clinique,' make the following statements as to the frequency of hereditary phthisis: 'Les difficultés que nous venons de signaler dans l'étude de l'hérédité tuberculeuse nous expliquent comment, sur cette grave et importante question, les auteurs sont si peu d'accord. Entre M. Louis, qui considère la phthisie comme rarement héréditaire (environ dans $\frac{1}{10}$ des cas), et M. le professeur Monneret, qui estime au contraire qu'elle se transmette presque constamment des parents aux enfants, toutes les opinions se trouvent représentées.' With regard to their own experience, they say: 'Sur un relevé de cent malades interrogés avec un soin minutieux, tant en ville qu'à l'hôpital, nous trouvons l'hérédité non douteuse chez trente-huit d'entre eux.' My own experience leads me to coincide with the statements of the last-mentioned authors.

As respects the nature of the morbific force, which we presume to be the primary cause of this hereditary predisposition to disease, we cannot explain it any more than we can that of vital or physical force. It is, however, quite conceivable that a deleterious power may be inherent in the molecules of the nervous system. This hypothesis is more plausible than the commonly received

notion that hereditary predisposition is owing either to some *materies morbi* in the blood, or to excessive sensibility or excitability of the nervous system, which implies little more than a peculiarity of temperament.

The late Dr. Todd, in his 'Practical Remarks on Gout, Rheumatic Fever,' &c., published in 1843, says: 'It has been argued by some that the hereditary transmission of gout is strongly in favour of its being a disease of the solids. I am entirely at a loss to discover a single sound argument in support of this opinion. It is, indeed, opposed to the analogy of all diseases known to be hereditary, for in all of these the blood is contaminated, either primarily or secondarily, as in phthisis, diabetes, cancer, and the hæmorrhagic diathesis. The generative act is in its essence one of secretion; the embryo being the result of the combination of two secretions, the one formed by the father, the other by the mother. The secretion is composed of matter separated from the blood of each parent respectively; and it is obvious that the body which results from the union of both must partake of the qualities of both.' A few words will be sufficient to show that this theory is founded on error. I have taken Dr. Todd's exposition of this theory, as he was one of the highest authorities on the subject, not only from his great medical experience, but also from the celebrity he has acquired as a writer on physiology. The argument he has deduced from the function of generation cannot hold for a moment. He must be wrong in supposing that in the generative act the secretion of the mother can take any part. All we know of conception—and it still remains a

wonderful mystery in spite of microscopic investigations—is, that the ovum in the mother is impregnated by the seminal secretion of the father. There is no foundation for the assertion of Dr. Todd, that the simple mucous secretion of the mother, during the generative act, has anything to do with impregnation beyond facilitating the passage of the semen and spermatozoa from the vagina and uterus to the ovum in the Graafian vesicles of the ovary. The ovum is $\frac{1}{120}$ part of an inch in diameter, and the germinal spot (the *punctum saliens*), which may be supposed to comprise all the space necessary for the origination of the future being, is only $\frac{1}{1000}$ part of an inch in diameter; and as regards the amount of spermatic fluid required in the fecundation of the ovum, Spallanzani and Prevost and Dumas have proved, by experiment on the lower animals, that the proportion of seminal fluid required to vivify an ovum is as one to 1,064,000,000. Is it possible that the blood corpuscles of both parents can be mingled in such a minute sphere as this? It is very easy to suppose that the blood of the mother can convey a *materies morbi* to the embryo when it is developed into a fœtus through the circulation of the placenta, but in the very earliest stage of the ovum, before the circulation of blood is established in its textures this act seems improbable. There is no such mode of transmitting hereditary disease between the male parent and his offspring. The hypothesis is more tenable that during impregnation of the ovum by the spermatozoa, or by a minute particle of the seminal fluid, some infinitesimally small portion of matter, endowed with morbific force, is conveyed to

the germinal spot, and that it is by this means that the hereditary taint is communicated.

The phenomena of recurrent insanity militate against the theory that the morbific force, of which we are treating, is located in the blood. I recollect one especially remarkable case of this kind. The patient, a highly-educated gentleman about forty years of age, and of unexceptionable moral character, was subject to attacks of acute mania of the most violent character. During the intervals between the attacks, his mental and bodily condition were those of a person perfectly free from disease, and formed a striking contrast to his maniacal state. The paroxysms were marked by outbursts of uncontrolled passion, violent gestures, and the use of obscene and blasphemous language. After the lapse of a few weeks this terrible commotion would subside, leaving the patient calm and rational. It was like the clearing of the atmosphere by a thunder-storm, and supports the theory that there were latent morbific forces in the system which became developed by some exciting cause, leading to a disturbance of the nervous molecules, bearing some resemblance to that which we observe in electrical phenomena. No one can doubt that this was an expenditure of *force*, and in every sense of the word we may term this energy *morbific*. In this case we cannot suppose that in the intervals of health the elements of disease were floating in the blood. The blood, we know, is incessantly coursing through the bloodvessels, conveying every effete or useless particle of matter to the secreting organs for elimination, and we can hardly conceive that many hours could elapse before these

elements of mischief would be removed from the system, provided that all the organs of the body were at the time in a healthy state. It is more probable, as I have already observed, that the forces which produced the disease were connected with morbific molecules in the nervous system.

The same arguments which I have adduced for the locality of the morbific forces in insanity will apply with equal force to epilepsy. The two diseases are so often associated in the same individual, that it is impossible not to infer a similarity of origin. An attack of epileptic convulsions bears a strong analogy to one of acute recurrent mania. After an interval of apparently perfect health, the patient is seized with a paroxysm of what may be termed intense nervous excitement; differing from mania in the fact of the morbific force being situated in a different part of the nervous centres. In one, that portion of the brain appears to be affected which is supposed to be the seat of the perceptive faculties; in the other, that part which is the centre of motive power. In one the paroxysm lasts for weeks; in the other generally for a few minutes only. In both we witness the accumulation of morbific force, which expends itself in the one instance in maniacal violence, and in the other in convulsive movements.

With respect to tubercular disease (which includes phthisis and scrofula), it is not so easy to determine the precise portion of the nervous centres in which the morbific force chiefly resides. Yet in the slower but more fatal course of phthisis we see the silent workings of a deadly force, of which the tubercular deposit is only the effect. As the pathological changes which take place in the lungs

in pulmonary consumption indicate defective assimilation, it may be assumed in these cases that the morbific force lies in the nervous matter connected with the function of nutrition.

The examples which have been given will substantiate my argument that hereditary disease is not transmitted by the blood, but through the medium of the molecules of the nervous system. That the minutest particle of matter is capable of inoculating the body with the most malignant disease is instanced by the subtle manner in which zymotic maladies are propagated. The poisons of the cobra and of the rabid dog may also be mentioned to prove the terrible power of the morbific force which may exist in very minute particles of matter.

I may here observe that in giving examples of morbific force I have confined myself entirely to animal poisons, not including in my enquiry chemical or mechanical forces. I also exclude congenital malformations of the brain, which belong to an entirely different class from that which I have under consideration.

With respect to the origin of hereditary disease, the oldest historical works give us scarcely any information. The earliest records refer to insanity and epilepsy. All we can say about them is that they must have had a commencement, but their origin is involved in the greatest obscurity. Possibly they came into the world with sin, but on this point Revelation does not afford us sufficient grounds to speak with any degree of certainty. The variety of races, however, shows how peculiarities in the physical conformation of the parents, induced by peculiar habits, have

been transmitted to their offspring; and in the same manner we may infer that disease, engendered by vicious courses in our progenitors, may be entailed on their descendants.

The consideration of the origin of hereditary disease naturally brings us to the subject of prophylactic treatment, and this will comprise the two deeply important questions of marriage and hygiene.

The subject of marriage is one in which the health and happiness of mankind is so much involved that it demands the earnest attention not only of medical men but of philanthropists, and indeed of all who have time and leisure to bestow on it. Nothing can be more difficult to determine than the degree of moral and social responsibility which are incurred in the marriage of those who are conscious that they are themselves the victims of hereditary taint, or at least are members of a family whose ancestors or relatives are known to have been so. There cannot be a doubt as to the danger of two individuals marrying where there is a hereditary taint on both sides. It is not necessary, if the view that I have introduced be correct, that the form of disease exhibited should be precisely the same; it is sufficient that it belongs to the same class.

It is a disputed question whether these diseases are most readily transmitted to the children by the male or the female. The medical profession are at issue on this point. Esquirol and Baillarges (both high continental authorities) think that insanity is more frequently transmitted (about one-third oftener) from the female parent than the male,

and they also believe that, when the mother is insane, it does not affect the sons more than the insanity of the father would; but, on the other hand, as regards daughters, insanity is twice as often transmitted to them from the mother as from the father. As a remarkable coincidence, I may mention that Dr. Theophilus Thompson has noticed that in pulmonary consumption also the disease is more frequently conveyed to the child by the mother than by the father.

The ordinary rule of hereditary transmission is from the parents uninterruptedly to the children, and from them to the grandchildren, frequently with an interruption from the grandparents to the grandchildren. Sometimes the taint is communicated indirectly to the collateral branches.

When I have been consulted as to the advisability of an individual's marrying into a family of which one or more members have suffered from constitutional disease, I have thought it best to lay before him, for his guidance, the following general rules, which I have drawn up with a view to estimate the different degrees of risk which would be incurred as to the transmission of disease, with reference to the various degrees of relationship.

1. If there is a constitutional taint in either father or mother on both sides of the contracting parties, the risk is so great as to amount almost to a certainty that their offspring would inherit some form of disease belonging to the class to which these investigations refer.

2. If the constitutional disease is only on one side, either directly or collaterally through uncles or aunts, and

the contracting parties are both in good bodily health, the risk is diminished one-half, and healthy offspring may be the issue of the marriage.

3. If there has been no signs of constitutional disease for a whole generation, we can scarcely consider the risk materially lessened, as it so frequently reappears after being in abeyance for a whole generation.

4. If two whole generations have escaped any symptoms of hereditary disease, we may fairly hope that the danger has past and that the morbific force has expended itself.

It must be borne in mind that I do not include in these rules any cases of phthisis, insanity, &c., which may have been produced by accidental causes.

It may be objected to precautionary rules of this kind, that they will be of little avail where the affections are strongly engaged. Of course it is a question in which the legislature cannot interfere. The duty, however, of medical science is plain—to point out the best means of preventing physical evils, as it is that of moral philosophy to exhibit the disastrous consequences of a violation of moral laws.

And here I may briefly allude to a vexed question, which seems to demand some consideration, as it bears strongly on the subject before us. It is one that has been regarded as a fruitful cause of disease: I mean the intermarriage of blood-relations. Perhaps the true reason why near consanguinity is deemed an objection to marriage, and why it is so often followed by ill effects, is, that if there should be any latent morbific force in the constitu-

tion of either of the parties (both of whom are derived from a common ancestor), which may have been lying dormant for one or two generations, though the manifestation of it in a former progenitor may have been forgotten, there would be, I believe, in the event of such a union, a double amount of probability that the old hereditary disease would reappear in some form in the offspring. If this solution of the matter be the true one, we may infer that where there is no hereditary tendency to disease, and both individuals are in perfectly sound health, there can be no fair or reasonable ground for objecting to the marriage of cousins.

Although judicious marriage offers the most natural mode of eradicating hereditary diseases, we must not lose sight of another all-important topic—the means of preventing the development of them ; for as it must be taken for granted that they had an origin and a beginning at some time or other, so we may believe that they may have an end. And this brings us to the subject of hygienic treatment, with a view to maintaining the health and suppressing the appearance of disease in those who are supposed to have any disposition to hereditary ailment.

The practical deduction to be drawn from the facts and arguments which I have brought forward is, that if there be *one* morbific cause, which is sufficient to account for the existence of an extensive class of hereditary diseases, there must be only *one* general plan of treatment for the whole, though it may be requisite to modify it to meet the peculiar circumstances of each separate case. This generalisation has the advantage of great simplicity, and

serves to determine and direct our researches in the right channel, thereby preventing the mind from being distracted by a variety of conflicting opinions.

Hygienic treatment cannot begin too soon to be effectual; it should commence with the earliest period of infancy, for it sometimes happens that the symptoms of constitutional disease are manifested soon after birth, and considerably before the period of dentition, in the form of convulsions or some other affection of the nervous system. It is a well-known fact that the brain and nerves of an infant are proportionally very much larger than those of an adult. This appearance of nervous disease in early infancy is strongly in favour of the theory I have advanced, that the morbific force which gives rise to hereditary disease is inherent in the nervous centres.

The first point that demands our attention is the nourishment of the infant. It is of the greatest importance that it should have the food which nature has provided for it in the mother's breast, and I am decidedly opposed to the system of artificial feeding. Even if the mother is supposed to have a constitutional taint, I do not consider it an objection to her nursing her child, provided she is strong and has plenty of milk, for, as I have previously stated, I do not think that hereditary disease is conveyed through the medium of the blood. If the mother should not have the power of suckling her child, a healthy nurse should be procured.

The three other great requisites for infantine health are air, warmth, and bathing. It must be warmly clothed and taken out into the open air whenever the weather

permits. Attention to these important requirements of food, air, warm clothing, and tepid bathing must not be lost sight of during the whole period of youth.

As soon as intelligence dawns, education must begin. The child must be managed with firmness combined with tenderness. Nothing is more prejudicial to its future mental and bodily health than the capricious behaviour of some parents who are over-indulgent at one moment and needlessly severe at another.

It would be out of place here to enter at any length into the subject of education, but it is necessary that I should say a few words on the danger which accrues to mental and bodily health from the too prevalent practice of over-exciting the brain by a variety of useless studies. It is an established fact that precocious children are often scrofulous ; parents are delighted with an early exhibition of talent, and take a natural but foolish pride in displaying the accomplishments of their child, not knowing that they are thereby stimulating a brain already morbidly active, and are disposed to keep him at his books and studies when he ought to be romping with his companions in the playground. As the child advances in years, the same attention must be paid to hygienic rules, especially during the period of puberty. The modern institution of competitive examinations has been the means of seriously injuring the health of many an ardent youth who had not stamina enough to bear the intense application required for such an ordeal. I have been consulted in many cases where constitutional disease has been developed by this forcing system.

The interval between the ages of fifteen and twenty-five is a most critical period of life to those who are liable to hereditary diseases, especially to epilepsy or phthisis. This fact shows the importance of controlling the sexual passions at this important epoch, but long after this period it will be necessary to follow the general precautions I have recommended.

From long observation I have come to the conclusion that there is a numerous class of persons disposed to hereditary maladies who would have escaped disease had they been careful to choose the profession or vocation best suited to their constitutional powers. No one can choose exactly the circumstances of his position, and no care on our part can secure us from the various accidents and moral shocks which are almost inseparable from the condition of humanity; but as it is generally an accident which determines the particular form that disease assumes, it should be borne in mind that if a person disposed to hereditary complaints is exposed to the debilitating effects of impure air and in-door employment, it will probably be the lungs that will suffer; if to the mental wear and tear of an anxious profession, or if impelled by an eager desire for fame and distinction, he over-exerts his intellectual faculties, he is more likely to become the victim of some brain affection. It is therefore most desirable that he should cultivate a taste for all such pursuits and employments as should keep him constantly in free exercise in the open air, and give occupation for the mind without excessive fatigue. The benefit of change of climate cannot be too strongly insisted on. Many years ago I was re-

quested to attend a gentleman who was apparently sinking fast from the effects of phthisis. As a last resource I sent him to a warm and dry climate in the south of Europe. He perfectly recovered, and lived abroad for about twelve years in the enjoyment of good health. He then returned to England, where he soon after became insane, and it was found necessary to place him in an asylum. This case not only displays the advantages of change of climate, but also gives a striking example of a mutual relation of morbific forces.

In selecting a climate, it is necessary to fix on a *dry* as well as a warm atmosphere. Dr. Ewart, in the last number of the 'Indian Annals of Science,' informs us that phthisis is much more common in India than is generally believed. Dr. Crisp, at a recent meeting of the St. Andrew's Graduates' Association, read a valuable paper 'On the influence of a moist atmosphere in the production of pulmonary consumption,' giving an analysis of 623 cases in various parts of England and Wales, to show that phthisis prevails mostly in places where not only the atmosphere but also the soil is moist, and most especially 'where there is a want of the free circulation of air, from the presence of woods, houses, bad drainage, &c.' One of the greatest advantages of a warm climate is that it enables an invalid to be almost constantly in the open air without risk of cold.

Regular daily exercise in the open air—either walking, riding, or driving, according to the strength of the patient—is perhaps the most powerful therapeutical agent in the class of diseases under our notice. In insanity,

phthisis, scrofula, and epilepsy, it is generally admitted to be of immense value. Many years ago, an empiric gained great celebrity for his cure of epilepsy. His plan was simply to order his patients to walk a considerable number of miles during every day. Now, making allowance for the benefit which his patients derived from faith in their adviser, we may conclude that the success lay, in a great degree, in the far larger amount of outdoor exercise which they were induced to take, than most people can be prevailed on to try.

Before quitting the subject of hygienic treatment, I must add a few words on the value of cod-liver oil as a prophylactic remedy. It should be taken in small quantities (I have generally found a teaspoonful three times a day sufficient), but should be continued for such long periods of time as to become almost a customary portion of daily food.

I will now briefly recapitulate the facts and arguments which have been brought forward in this essay :—

1. I have shown, by a series of examples, that hereditary disease frequently appears in different forms in members of the same family, and often even in one and the same individual—the disease passing from one form to another. From these facts I inferred a correlation of *morfibic* forces, analogous to the conservation of physical force.

2. The examples I brought forward were from a large class of hereditary diseases, in which the mutual relation of morbific forces was most conspicuous—namely mania, epilepsy, phthisis, scrofula, and skin affections, not includ-

ing gout and several other maladies, which will probably hereafter be discovered to belong to the same category.

3. The history of the Zymoses was cited, as a parallel, in which diseases presenting special differences are yet subject to the same general laws, and in all probability owe their origin to the same cause.

4. The researches of Grove, Faraday, and others were quoted, which lead to the impression that forms of motion of an apparently different character are merely different manifestations of the same physical force.

5. I made a few remarks on the use of the term 'vital force,' and on its great value to physiologists in grouping together facts which cannot be explained by the ordinary laws of physics; but no one presumes to give a precise definition of its meaning.

6. I referred to the various theories which have been brought forward to account for the phenomena of life by physical laws only. I remarked, that no one could doubt that many of the subordinate functions of the living body can be explained by chemical laws, but that there is a vast deal in the operations of the brain and nervous system that must be referred to the existence of other than physical forces.

7. Having proved the necessary existence of force, or forces, in the human body, and admitted the use of the term 'vital force,' I suggested that there might exist a force or forces antagonistic to this vital force, which might be termed *morfibic*.

8. I suggested the use of this term, 'morbific force,' as an induction chiefly in reference to hereditary disease, to

represent the latent energy (which may remain dormant for a generation or more, unless developed by some exciting cause).

9. I expressed my conviction, that hereditary disease is much more frequent than is generally believed, and quoted several authorities in support of my opinion.

10. With respect to the seat of this morbific force, which I presumed to be the cause of the predisposition to hereditary disease, I suggested that there might be a deleterious power inherent in the molecules of the nervous system, and combated the commonly-received opinion of a *materies morbi* in the blood.

11. I endeavoured to prove, from what little is known respecting generation, that it is almost impossible to imagine an hereditary transmission through the blood of the parents, at the moment of fecundation, in the minute sphere of the germinal spot in the ovum.

12. I deduced arguments, from the symptoms of recurrent insanity and epilepsy, against the theory of transmission through the blood, and in proof of the expenditure of the force which I have called morbific, during the paroxysms of these diseases.

13. I made a few observations on the obscure origin of hereditary disease.

14. I introduced the subject of prophylactic treatment as regards hereditary disease, including the points of marriage and hygiene; and gave a few hints relative to marriage, for the guidance of those who are supposed to inherit constitutional disease. I also alluded to the intermarriage of blood-relations.

15. I drew the deduction, from the facts adduced, that if there was but *one* cause for the existence of a large class of hereditary diseases, there must be *one* general plan of treatment for the whole.

16. Having finished my argument, I proceeded to point out a system of hygiene, with a view to maintaining health and suppressing disease, in those who are disposed to hereditary ailment. I also insisted on the benefit to be gained from change of climate, outdoor exercise, and cod-liver oil.

In concluding this brief essay, I desire to be understood as offering my observations merely as suggestive, and with the hope that they may be instrumental in leading to a more rational view of the nature and treatment of the most painfully interesting class of diseases to which our nature is liable.

LONDON: PRINTED BY
SPOTTISWOODE AND CO., NEW-STREET SQUARE
AND PARLIAMENT STREET