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THE THEORY



OF

CANCEROUS INHERITANCE.

BY

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"As the births of living creatures," wrote Bacon in 1625, "at first are ill-shapen, so are all innovations which are the births of time."* This I venture to believe is true in its application to the subject which it is my intention to discuss to-night. I believe that the pregnancy, so to speak, of the non-identity of cancer with heredity has begun; that the metaphorical embryo is satisfactorily developing; that time will enable us to chronicle a new birth in the history of a foul disease; and that in the future we shall be able to shew unequivocally that there is no such thing as the hereditary transmission of cancer. And the facts, in my opinion, are accumulating to this end. What, if we cannot shew directly that cancer is not hereditary, can the surgeon hope for from operative treatment? What more than despair can the suffering patient exhibit, whose disease has been pronounced to be hereditary by the attending surgeon? These are matters to us it must be confessed, of the greatest importance. When therefore we calmly weighthe direful results to which cancer as a disease gives rise, upon the grounds even of humanity, it is right that each particle of evidence bearing upon its supposed hereditary transmission should be sifted and exposed to the ptyalinistic effect of scientific research for the purpose of proving its value.

And now cancer is said to be hereditary. Upon what grounds? Let me discuss, with your permission, this matter somewhat fully. The laws governing inheritance, as Darwin observes in the "Origin of Species," are for the most part unknown. It is

^{*} Essays. Cf. Innovations.

impossible to say why the inheritance of family characteristics should be limited by age, sex, or conditions of life; and it is still more difficult to understand why in some instances a child, instead of inheriting the peculiarities of its parents, should resemble its uncle or aunt, grandfather or grandmother, or some ancestor even still more remote. It has been well said by La Place that "the surest method we can adopt for our guidance in the search after truth consists in raising phenomena by induction to laws and laws to facts;" and it is conceivable that the adoption of this principle is admirably adapted for an inquiry which relatively is so obscure as the hereditary transmission of natural or morbid peculiarities. Heredity nevertheless is, as is well known, operative as a fixed principle in accordance with three definite and unvarying laws. There is in the first place direct heredity, where some peculiarity is transmitted immediately from the parent to the offspring. Then we have indirect heredity, where the peculiarity is derived from an uncle or aunt. Lastly, there is atavic heredity, where a child inherits some striking feature peculiar to its grandfather or grandmother, or which has been known to belong to some remote ancestor. Now cancer is held to be hereditary because the disease has occurred consecutively amongst the members of certain families, and because its occurrence has been considered to be consonant with the principle of the hereditary transmission of structural peculiarities. Sir James Paget has observed-and I must apologise here for introducing his well-known statistics—that amongst the cancerous patients whom he saw at the hospital one in six could give a family history of cancer. In the course of time he made similar inquiries amongst his private patients, and he then deduced the fact that one person out of every three who came to him with cancerous disease had knowledge of the previous manifestation of cancer in the family. With this record, unsupported as it may be by collateral facts, we stand thus: that cancer is apparently hereditary, and not only hereditary, but hereditary to a high degree. evidence disclosed by these facts concisely expresses the grounds upon which cancer is considered to be hereditary; and dealing with the question in a general sense, I will now proceed to lay before you the reasons which impel me to dispute the

conclusions to which statistics of this nature are calculated to lead.

In the first place, it is essential again to refer to the fact that the theory of cancerous inheritance is based simply and solely upon the consecutive appearance of the disease in certain families. Apart from and beyond this peculiarity it fulfils in no sense whatever the characters of an hereditary disease. "Heredity," says Quatrefages, "which is essentially a preserving agent, becomes an agent of variation when it transmits and accumulates the modifying actions of the conditions of life."* Does cancer, I may ask, become an agent of variation? Do the conditions of life, which we believe to be favourable to the production of the disease, in any way impress themselves upon the human offspring sufficiently to enable us to recognise any influence of heredity in their appearance? Is there such a thing as a cancerous diathesis, equivalent to what we understand by the gouty diathesis, the tubercular, or the syphilitic? Occasionally a child is born whose parent before lactation is completed becomes the subject of cancer of the breast. Now here, in the midst of a disease which is active, is it not natural to expect some impress of it, if nothing more, to be visible in the offspring? But are we able to say, "Oh, here is a child who will become cancerous"? Or, because this child's parent was cancerous, therefore it will suffer in this way or that? No. A child inherits no pains or penalties from a cancerous parent. It possesses no special pathological or structural features which might have come to be regarded as pathognomonic of cancerous disease. It does not necessarily exhibit any ill health, or differ in any respect from a healthy child born of healthy parents. And what is true of the child is true also of the adult. Therefore the conclusion seems obvious and indisputable that, whilst syphilis, gout, and phthisis, which are correctly described as constitutional diseases, permanently modify the structure and functions of the body, cancer cannot be included in this category, for, commencing as a local disease, its effects, it is true to say, are never transmitted. A man may be gouty without having had an attack of gout, the origin of his gout having been hereditary.

^{* &}quot;The Human Species." International Scientific Series, vol. xxvi., p. 258.

A man may suffer from the effects of inherited tuberculosis without being actually tubercular. A child may be syphilitic in its face, in its teeth, in its eyes without being actively syphilitic. the disease having been derived by inheritance and remedied at the time by treatment. These are examples of diseases which are unquestionably hereditary; and in the case of cancer, assuming it to be hereditary, analogy would lead us to expect a similar condition of things to prevail. But no. There is no such thing, even in the most recent text-books on medicine, as, say, a cancerous stomach, a cancerous neuralgia, a cancerous ache or pain, without cancer. A person is either cancerous or he is not, and he is not so until he becomes so, by exhibiting unequivocally in some organ or part the disease in its primary form. It is clear, then, that if he has inherited cancer he has not inherited much. For obviously cancer must be an exceptionally benign disease, before it becomes cancer, in those cases indeed in which it is believed to be inherited; for a man with an inherited cancerous taint must patiently wait until the near approach of the last scene of all which ends his strange eventful history, before his morbid patrimony can become an accomplished fact. Now there is something here which calls for special comment. Either the man is exceedingly accommodating for being good enough to wait, or the disease is to be specially commended for exercising such patience. It is pleasant to be able to record this fact. The disease exhibits a feature here which enables us to assign to it even a personality which is worthy of example. Sometimes, however, man frets it into activity before its time by smoking clay-pipes and rummaging about in soot, but then in these cases of course he has only himself to blame. Those of us who are convinced that cancer is hereditary must unquestionably admit that the disease is generally called upon to exhibit a real condition of masterly inactivity. But is this belief scientific, is it philosophical? I hold that it is not so.

Now, it will appear plain from all these remarks that I emphatically oppose the belief in the hereditary transmission of cancer. Well, this is precisely the case. I deny unconditionally, upon grounds which seem to me to be incontrovertible, that the theory is tenable. In other words, to

formulate my opinion, I hold that cancer as a disease is never transmitted. But if cancer as a disease is not hereditary, in what manner can the occurrence of consecutive cases of the disease in certain families be explained? It is possible to reply to this in two or three ways, and the first which I will consider here is that of predisposition. Now, I am not sure that it is not impossible to inherit a predisposition to cancerous disease. It may be that parents are able to transmit to their offspring a predisposition to cancer. But what is the inheritance of a predisposition in comparison with the inheritance of a disease? They are two vastly different things. The one can be made to perish by rendering the surroundings inimical to its existence. The other is a reality, an unalterable fate. It is by no means true, universally, that heredity implies simply a tendency to this or that disease.* Does the new-born infant of syphilitic parents inherit simply a tendency to syphilis, when its wizen appearance, its scaly eruption, the gross display of colour upon its nates betoken the active transmission of its parents' disease? Such an infant, if it survived, would in after years, nay indeed throughout life, display to the observant surgeon, not the tendency which had come to it by inheritance, but the fate to which it had been born.

Now, what is predisposition, resolved into its simplest terms, and reduced to a definition founded upon scientific fact? It is almost impossible to define it. Presumably it implies some transmitted functional insufficiency of organs as a whole or of tissues as a part. There need not probably be any particular structural departure from normal growth, but conceivably simply a diminution of vitality, an inherent want of power in some organ or part which has followed as the result of particular or general disease in the parent. Analogically perhaps predisposition may be described as the shadow of a disease. A disease without its substance, a reflection as it were in the offspring, distinct from the repetition, of the morbid types common to one or both parents. It is, however, impossible to generalize except to a very small extent in matters relating to the hereditary transmission of morbid peculiarities, and consequently conjecture

^{*} British Medical Journal, Sept. 26th, 1885, p. 607.

carried farther in this direction would be more prone than otherwise to lead us into error. Now, common experience has taught us the power we possess of causing an inherited tendency to a disease to subside, by adopting certain measures of precaution which are known to be inimical to its existence. This fact is too well known to require more than simply mentioning. But it is not possible to over-estimate its importance; and I will here briefly refer to its application in regard to cancer.

It is indisputable that if we admit categorically that cancer as a disease is not transmitted, there is some reasonable hope for believing that some check could be placed upon it, by turning attention to the causes and conditions with which it invariably seems to be associated. The strongest element undoubtedly in the production of cancer is age. With this of course we could not deal. Yet even the most favourable age, together with, if you will, the strongest family history of cancer, would, I firmly believe, not be sufficient to provoke the disease without some extraneous condition, which perhaps should be described as an exciting cause. And in relation to the various causes and conditions with which cancer is allied we have now an accumulation of facts, some of which up to the present are certain, and the rest reasonably possible. Statistics, to which I have elsewhere drawn attention, have unmistakably shewn that the geographical area within which these islands is included is highly favourable to the disease,* Upon these grounds, therefore, it is evident that the prevalence of cancer amongst us depends primarily more or less upon this fact. Cancer, therefore, in England should be regarded as a racial disease, as distinct from a disease of the individual. By virtue of the climatic surroundings of England, it is probable, that English people as a race are inherently much more liable to cancer than the inhabitants of, say, the Faroe Islands or Iceland, in which the disease is said to be unknown. This susceptibility undeniably forms a part of the national family likeness; it has its counterpart, to name only a single example, in the immunity from yellow fever enjoyed by negroes and their half-breeds. Thus,

^{* &}quot;An Inquiry into the Causes of the Increase of Cancer." (British Medical Journal, April, 1883.)

regarded in this light, the predisposition to cancer in England being racial in its origin, and not individual, the primary origin of the disease in the large majority of persons who suffer from cancer, amongst whom no family history of cancer can be traced, may be in some respects explained. And perhaps it would be expedient for families in whom cancer has appeared more than once to emigrate to some Elysian district in the world, where the disease is unknown. If this was ineffectual, something different could be tried. Cancer leaves savages alone, that is uncivilized men and women. To return to a primeval condition would certainly in these days be a novelty, and I commend this suggestion to those who are in search of such things. It would have some advantages, and might prove popular for a time; but it is doubtful whether the wild men would appreciate the experiment, or reciprocate the feeling of gratification of which all things novel become the source.

I will now briefly discuss the position of cancer in regard to the social position of the patients. What do we learn? Taking Gross's statistics as an example, we find that out of 712 women with cancer of the breast, 88.22 per cent. were or had been married. Of these 83.91 per cent. had borne children, and 16:09 were sterile, while 11:77 per cent. were single. What a remarkable statement is this! We are here again brought face to face with the astounding influence exercised by fecundity upon cancer. Why, here is a subject for treatment by descriptive articles in a certain unenviable journal. The Legislature would probably at once be called upon to introduce "The Permanent Virginity Enforcement Bill, for the Total Suppression of Female Cancer." It is unquestionably certain that if every virgin in England at this moment maintained her status quo ante in this respect until the end of her natural life, the female mortality from cancer in the future would be infinitesimal in comparison with present records. The question of marriage is thus an eminently important one in relation to cancer as far as the female is concerned, and yet it is one obviously far beyond the influence of politicians, moralists, or surgeons.

Let me now, however, draw your attention to the somewhat

remarkable fact that in those families whose cancerous history has been quoted as evidence of the hereditary theory the disease has almost invariably been transmitted in the female line. I say almost invariably, because of course there are exceptions to every rule. Thus, in Warren's case, in Paget's, in Velpeau's, in Broca's, the female members of the families concerned predominately-almost entirely-suffered from the disease. Before, however, determining finally upon the question of hereditary transmission in these cases, it is perhaps as well in the first place to take into consideration certain factors which it is scarcely possible to overlook. For instance, we know that cancer as a disease is not limited in its appearance to one sex. It is true that it is more common in women than in men, but the truth of this only extends as far as the fact that women possess a uterus and functionally active breasts, for both of which organs the disease exhibits a marked predilection. In short, then, assuming the disease to be hereditary, it should be transmitted equally to both sexes, and not expend its virulence upon the female line alone. Again, all women who have borne children are liable to cancer, as statistics have abundantly shewn. Furthermore, the briefest experience of cancer in women is sufficient to reveal the wholesome dread and misgiving with which the disease is regarded, and it is quite comprehensible that the sympathy and mental disturbance excited by a suffering relative succumbing by slow degrees from cancer of some organ might readily become the "fons et origo" of the disease in another member of the family. Thus, the inexorable logic of facts compels the conclusion that if cancer can be met with frequently without any hereditary history, heredity can scarcely be regarded as exercising any potential influence in its production, more especially in those cases where other and more important factors are present, with certain of which the disease is always inseparably associated.

In bringing these facts and opinions before you this evening—and I must freely admit that the latter predominate—I have not endeavoured to exhaust the subject to which they relate. But rather my object has been to extract the most salient features of the case, and appear before you as a counsel with his brief,

urging the claims of a client in whom he has more than an ephemeral interest. The advocacy of a cause of this nature involves the discussion of many complex topics; it necessarily deals with problems of science, of which the solution cannot be too frequently essayed; it leads the inquirer into many a culde-sac of pathology, from which it is often a difficult matter to effect a graceful retreat. But whether or not we shall ever determine the influence of heredity upon cancer, depends confessedly upon whether or not we are prepared to sink the belief which has been bred of unsupported facts, and to struggle onwards, patiently seeking and hopefully expecting some gleam of light to disperse the obscurity of the pathology of the disease.

