Croonian Lectures

ON THE

LOCALISATION OF DISEASE.

DELIVERED BEFORE THE

ROYAL COLLEGE OF PHYSICIANS.

BY

EDWARD H. SIEVEKING, M.D.,

PHYSICIAN TO H.R.H. THE PRINCE OF WALES, AND TO ST. MARY'S HOSPITAL; PRESIDENT OF THE METROPOLITAN COUNTIES BRANCH OF THE BRITISH MEDICAL ASSOCIATION; ETC.

LECTURE I. (Concluded.)

IN order that we may not lose ourselves in vague generalities, let us now try to fix more precisely the exact question that we have to answer. A given disease is before us, in which at the same time we find some affection that brings a certain organ or tissue prominently before our notice; and at the same time there are symptoms which indicate that the entire organism or constitution of the individual is more or less involved. The former we term the local, the latter the general phenomena of disease. Is the local disorder merely an expression, a climax, of the general turmoil; may we regard it simply as the crisis or culminating point of the disturbance created throughout the economy? Or is the diseased organ the real *fons et origo mali*, the *point de départ* of the general disturbance, the spark which has led to the conflagration?

Whether we are yet in a position to give a categorical reply which shall suffice for all contingencies, is at least doubtful. I fear that the present state of science, or rather the powers at my disposal, are inadequate to surmount the numerous difficulties that present themselves. But there can, I think, be no doubt of the important bearings of the inquiry which daily thrusts itself upon the student of morbid phenomena; while I believe that in a correct solution of it we shall also find a solution of many practical difficulties and of many of the contradictions and anomalies presented by the history of medicine, in regard to the variations and fluctuations in certain modes of proceeding. Even when we differ from a friend, the candid mind will seek to understand his motives and his reasonings, and be willing, though unable to adopt them, to admit what is just and true in them. So, in judging of our predecessors or contemporaries, it is only fair to put ourselves into the point of view which they occupied, or, if their proceeding was entirely empirical, to see whether our advances in science can explain and justify the proceedings adopted by them.

When I was a student, the rule still prevailed to bleed in every kind of accident. To the inquiry why this was done, the reply was given that it was to prevent inflammation. If the pertinacious student suggested that it might be as well to wait for the inflammation before the remedy was used, he obtained no further response; and he felt himself snubbed—a sensation which I trust no earnest stu-

dent of the present day ever experiences in contact with his teachers. But, although I am not now going to defend or advocate this obsolete practice, I cannot but think that a justification may reasonably be pleaded on the ground that the injury, of whatever nature, by confining the patient and thus preventing suddenly the adequate consumption of the tissues or of the blood required to maintain health, indirectly induced a general plethora. That this plethora is no myth, is sufficiently demonstrated by evidence that will appear later on in connexion with other considerations. Mr. Hilton dwells upon this matter more fully; and, in speaking of the influence of rest in disease, forcibly points out how congestion of the liver and the lungs may be traced to forced rest necessitated by serious traumatic injury.

"I believe" (to employ Mr. Hilton's own words) "the congested liver which leads to jaundice, results from the forced rest to which the liver is subjected in the recumbent position; the circulation through the organ, up to the period of the accident, having been aided by active respiration and ordinary exercise. The withdrawal of these aids leads to congestion of the liver, and thence to jaundice. In other cases, the congested liver may terminate in inflammatory softening and abscess. The same kind of congestion of the lungs at their bases and posterior obtuse margins may, and frequently does, take place under the influence of difficult and inefficient inspiration, dependent upon the difficulty of moving the posterior parietes of the chest, while the patient is in the horizontal posture. The circulation through those parts of the lungs is not completed; and, as the quantity of the blood circulating up to the period of the accident was adapted to a free and complete respiration, this want of balance between the area of respiration and the quantity of blood circulating causes pulmonary congestion and pneumonia."

Mr. Erichsen, in a valuable paper communicated many years ago to the Royal Medical and Chirurgical Society, gives evidence to the same effect.

To return to the main question. It is scarcely necessary to say that I exclude from the consideration all traumatic injuries. Here the presence of a purely local affection is undoubted, though the manner in which reaction is effected and the course it runs depends upon antecedents peculiar to the individual's constitution. With regard to all diseases properly so-called, unless the direct introduction of a poison or a parasite can be satisfactorily demonstrated, I am disposed to regard the local disease as an expression of a general taint, rather than general phenomena as an influence propagated from the morbid focus. There are always both the *révotus* and the *avtrivotos*—the stroke and the reverberation; but I conceive that the history of disease, whether studied in the individual or in the community, whether judged by its antecedents or by the treatment that is commonly and successfully pursued, points but to that one conclusion, if not in all, certainly in the vast majority of the diseases that we have to deal with. Under this view, physiological pathology is a science and preventive medicine a reality; under the opposite view, the one becomes a congeries of isolated morbid realities, the other an abstraction which it would be futile to attempt to realise.

And, furthermore, it appears, and I intend to bring forward corroborative evidence, that all disease

is primarily referrible to some nutritive derangement. The cause of the derangement may reside in the various phases and conditions of the digestive process; in the *plus, minus*, or altered quality of the ingesta; in the manner in which assimilation is carried on; or in the manner in which the depurative processes are realised by the various organs of secretion and excretion. The forms of morbid action belonging to general disease which cannot be referred to some abnormal state of nutrition are but comparatively few in number. They are mainly those which the nosologist groups together under the name of zymotic diseases; and, although they appear to be directly attributable to a poison introduced from without, you will probably be disposed to admit that the receptivity of the individual, or (as others term it) his proclivity to the disease, is generally determined by the manner in which his nutritive functions are performed. It is the "vital condition", as Dr. Handfield Jones so truly observes (*Clinical Observations*, p. 175), which determines the reactions that take place in our patient; but that vital condition, physically speaking, depends essentially upon nutrition in the widest sense.

It is clearly, in a practical point of view, of very considerable importance whether we hold that the disease commences at an individual spot and spreads from there to contaminate or somehow involve the remainder of the body, or whether the local affection is merely an index of a constitutional state to which our attention should first be directed. I apprehend that, if we analyse the practical conclusions of various writers and different periods of the history of medicine, their apparent contradictions may generally be resolved into an unconscious leaning to one or the other extreme. Doubtless, all physicians with any ordinary appreciation of the phenomena of disease have realised the two great phases of morbid action to which I am adverting; but it appears also equally evident that many, even of the highest eminence, seek to exalt the pathological conditions of single organs into independent entities; or we should not meet with such frequent and unfortunately futile endeavours to *simplify* therapeutics, by determining statistically the superiority of individual drugs, not for their power of controlling vital phenomena, but for their influence in combating the disease of a particular organ.

In one of the most complete monographs of the day, Dr. Thudichum analyses the curriculum of the trichina in the human body. It shows us, in a painfully irresistible manner, how the parasite is introduced into the stomach and intestines, and with what certainty it penetrates into the muscular and other tissues. Under certain circumstances, the new home which it provides for itself proves its tomb, and the infested individual may become a cemetery of defunct trichinae. But this unfortunately is an exceptional case. A variety of diseases—nosological entities—are simulated by the trichinae, according as they predominate here or there. The symptoms have frequently resembled those of typhoid fever (Zenker in Virchow's *Archiv*, xviii, p. 561; and Simon's *Seventh Report*, p. 351); so much so, that one of our most learned fellows confesses that he feels confident of having repeatedly regarded cases of trichinae falsely in that light.*

"When the lung-tissue is largely invaded by the parasite, pneumonia of the severest and most intractable kind is established. One of the principal symptoms of trichiniasis is oedema, which accompanies the immigration of the trichinae into the muscles. The oedema can be explained by the assumption that those trichinae which miss the muscles enter the lymphatic spaces, and there cause irritation, swelling, and congestion, in the same manner as they cause it in the mucous membrane of the intestines. They produce the erythema, and other peculiar eruptions such as miliaria; they produce the local irritation of nerves, the burning, and the remarkable general perspirations. From the lymphatic spaces, they gain access to their continuation, the lymphatic vessels, and ascend; another time causing abscesses of the lymphatic glands of the groin or the pit of the shoulder, or abscesses in other parts of the skin not particularly provided with lymphatic glands. The irritation of the heart, which shows itself of a peculiar type, is most naturally explained, as the irritation produced in the fibres and nerves of the heart itself by the many minute animals penetrating its tissue, and causing a large increase in its activity of nucleation. The pneumonia, which is so fatal at a comparatively late step of the disease, I take to be caused by the arrest of late and already large trichinae; and, if embolia have anything to do with this form of inflammation of the lungs, I assume the trichinae to be the primary emboli." (Simon's *Report*, p. 362.)

Trichinous pneumonia is stated to appear suddenly during the course of the other symptoms; to affect mainly the left lung; and always to present the shape of a wedge, the base of which is at the circumference of the lung. The dangerous character of the pneumonia is much enhanced by the diaphragm and other respiratory muscles being infested with trichinae, so that the functions of these parts are interfered with.*

I bring forward these observations of an independent inquirer on trichinous pneumonia, because they illustrate the exceptional production of disease of an internal organ by a direct local irritant, as well as the futility of attempting to treat similar symptoms by similar means, unless the cause of the symptoms can also be shown to be identical. In the instance detailed, an irritant is introduced directly into the tissue of the lungs by the migration of the trichinae from the stomach and intestinal canal. No amount of health in the individual can influence the propagation, development, and wanderings of the parasite; its removal or death are the only means by which the health of the patient can be restored who has unfortunately consumed trichinous meat. It is not impossible that the zymotic forms of disease may be attributable to a similar mode of irritation; the analogy appears so strong to

Vol. i, p. 879), in an account of the symptoms and history of trichiniasis, states that the only important symptom of typhoid fever absent in the disease, is the enlargement of the spleen. He adds, that it is very probable that some of the co-called epidemics of typhoid fever in former days were caused by the propagation of trichinae in the human body.

* Dr. Thudichum states that a preparation from the biceps of a child, aged 5½ years, which died on the seventy-ninth day, was found to contain fifty-eight trichinae. The preparation being estimated to weigh one-fifth of a grain, one grain of such muscle would contain on an average one hundred trichinae. Dr. Thudichum calculates that an adult victim to trichiniasis may have as many as twenty-eight millions, if his entire muscular system be affected in the ratio as the child's biceps just mentioned; and that although their individual length is but about five millimètres (0.2 inch), the whole length of these twenty-eight millions put together would extend to ninety miles.

* Dr. Aitken (*Science and Practice of Medicine*. Fourth edition.

some writers, that the parasitic origin of certain fevers has been strongly advocated. Sir Henry Holland, following Kircher and Linnæus, discusses the whole question of insect life as a cause of disease, and is of opinion that it serves as an explanation of the origin of epidemic and contagious diseases, and especially of cholera. The doctrine does not at present enjoy the support of the profession; for a careful analysis of the phenomena, and an absence of the direct evidence of the supposed parasite, equally discountenance the hypothesis. Although the parasitic origin of the zymotic diseases is at least problematical, their origin from an irritant or poison introduced from without appears in the majority of instances to be indisputable. And the history of the disease in the individual, no less than its spread among the community, equally demonstrate that the facility with which the poison fastens on the individual or diffuses itself among the community is in the direct ratio to the nutritive vigour that prevails. The poison may be applied in equal strength to different organisms; in one it takes hold and develops itself in the most virulent form; in the next, it produces effects of a trivial and passing character; in the third, its manifestations may be so slight that, but for our knowledge of its prevalence, we should fail to recognise it. So far as we are able to account for these differences, they do not depend on an unreasoning fate; but are governed by the laws of nutrition with as much tendency to our benefit and as much uniformity as the normal growth of any organic being. We have not yet discovered the nature of the different poisons that engender zymotic disease; nor have we, up to the present time, been able to isolate them, and place the *corpus delicti* under the microscope, as we are able to do with the trichina; but we do know that we may reduce the power of the poison to a minimum by putting our house in order, by placing our physical powers in the best possible condition to resist its influence, by securing to all the different parts of our organisms the highest training, or, in other words, the most perfect nutritive development. All sanitary doctrine would be mythical, all human progress a fable, were not disease and the causes of disease governed by laws, which God has given us the means of ascertaining and inquiring into. Limited as our knowledge is, yet it is, I think, sufficient to assure us that it is not altogether futile, and that, by perseveringly seeking to unravel the apparent mysteries of Nature in an earnest and devout spirit, she will reveal herself to us; not, indeed, if we value gold higher than truth and the esteem of the outer world higher than that of our own professional brethren.

The many contradictions existing between various systems of medicine and between individual teachers who have the same people and the same forms of disease under observations, do not appear to me reconcilable, unless we are agreed on a certain basis of observation. That that basis must be a physiological one, seems to be incontrovertible; and it is impossible to read much of what is written at the present day without feeling that a red line of physiological colouring runs through the works of all conscientious writers.

"Holding," says Dr. Handfield Jones, "the belief that disease is an extremely varying and inconstant thing which utterly refuses to adjust itself to strict

definitions, or to be bound by a settled reckoning of days and hours, I cannot think that the proposal which has found much favour in the eyes of some of our best physicians—to ascertain the natural history of all diseases, as an indispensable preliminary to forming any opinion as to the effect of remedies—is likely to lead to any result. The fundamental idea of the proposal is, that the several pathological states to be examined can be regarded as uniform and constant, each case of each kind being truly similar to those which are ranked with it. Were this so, at least to any considerable extent, the problem would be conceivably soluble; but, as the case actually exists, the idea seems to me impracticable. For, if one thing be impressed upon me more than another by increasing experience, it is the great diversity which exists between the several morbid states, and which have an outside show of similarity in their location and symptoms."

I adduce these quotations from a recent inaugural address by Dr. Handfield Jones, because they completely convey my own meaning. At the same time, with all the diversity which meets us in disease, and granting all that Dr. Handfield Jones states without reservation, we may, I think, still seek for unity in our diversity; only our unity is not to be regarded as a nosological entity, but as a perversion from the physiological standard. I can arrive at no other conclusion regarding disease taken as a whole, than that it is essentially referrible to a derangement of nutrition, and that the morbid influence may affect nutrition in one or more of the following ways. Nutrition may be primarily at fault in the digestive apparatus proper, through unwholesome, excessive, or deficient ingesta; nutrition may be rendered imperfect and irregular through a primary nerve-influence and its sequelæ; nutrition may deviate from the normal standard through a primary influence on the organs of respiration and oxygenation; or it may, I think, be stated that a primary morbid influence causing a derangement of the secretory and excretory or emunctory and purifying functions, may so derange the nutrition of the body or of individual organs as to induce the phenomena of disease.

These various derangements of nutrition are practically not always to be separated into the classes suggested; for they become complicated with one another and effect an interchange of elements, which is occasionally embarrassing. Still the student of disease will, I think, on consideration, admit the general truthfulness of the classification; and, in tracing the modifications in nutrition or in the metamorphosis of the tissues associated with and leading to typical morbid conditions, find the predominance of one or the other features. It is more consonant with our present knowledge to regard all disease arising within the body as the manifestation of the derangements here shadowed forth, than as nosological entities referrible to a blind cause unconnected with the physiological history of our race.

Could we conceive a human being in a state of absolute health, under the influence of no hereditary taint, and with all organs and functions in the most perfect condition, we might be able to determine the normal standard of all the functions. As it is, we only know them approximately and by extensive statistics. Still the modern system of inquiring into the derangements of function, as exhibited by the secretions, the respiratory and circulating media, the temperature, and other measurable data, is based

on an approximative knowledge of a healthy standard; and all are employed to determine the variations in the nutritive elements alluded to, and are used as indications of disturbed health or approaching recovery, in the exact ratio in which they depart from the normal condition of nutrition. Mr. Ford (*Medico-Chir. Trans.*, vol. xx) gives us a case of a remarkable and perhaps unique* recovery from what would generally be considered a fatal wound, illustrating the wonderful reparative powers of Nature where all the nutritive functions—in other words, health—are in the most perfect condition. It is analogous to what both the physician and the surgeon daily experience in illustration of the varying powers of individuals to throw off morbid influences, while it affords a valuable suggestion as to the means by which we may with the greatest certainty compass the chief objects of medicine—viz., the removal of disease and physical suffering, by anticipation, as well as by direct cure. The case is, briefly, that of a Fingo who, in an engagement with Caffirs, was transfixed by an assegai, which entered opposite to the eleventh rib three inches from the spine, and passed out at the right hypochondrium. The anterior opening was equidistant from the umbilicus and the cartilage of the ninth rib. In dragging out the weapon, the man drew out a considerable portion of the lung. The protruding lung was five inches in length, and of considerable thickness. Reduction was impracticable; so Mr. Ford placed a ligature round it, and brought the edges of the wound together. Adhesion took place between the latter in three days; and, the piece of lung having been cut off, the man continued to progress towards a speedy recovery. Without any further treatment than a dose of Epsom salts, the man in a fortnight had quite recovered, and, at the time of the report, was able to run, throw his assegai, and perform any other active feat as well as any of his most agile companions.

A state of health such as that enjoyed by Mr. Ford's Fingo is clearly exceptional; but, as he was not a metaphysical abstraction constructed out of the inner consciousness of an army surgeon, he may be regarded as an embodiment of the great and chief aim of medicine—to place the human race in such a state of physical development—to secure so perfect a balance of the powers and so high a state of nutrition of all the textures in every member of our species, that we may be able to resist morbid influences to the fullest extent our constitution is capable of, or neutralising the results with the greatest possible readiness, if the powers of resistance are insufficient to prevent their entrance. These two points involve the aims of preventive and curative medicine—both of the highest importance to mankind, but not equally appreciated, because the one requires a high state of intellect and foresight to induce its adoption; the other affords more or less speedy relief to present suffering. The two pass by insensible gradations into one another. But while, in curative medicine, we can never do without the dictates of preventive medicine, the latter is calculated to render the former altogether unnecessary; and, of all the uses that statistics have been put to, probably none is more beneficial than that which

brings home to us direct demonstrations of the power we possess in anticipating and preventing disease and its sequelæ, suffering and early death. If we find that the mortality in London has been reduced from 42 per 1000, which it was between 1681 and 1690, to a present average of 25 per 1000, this shows the encouraging fact that the mortality is reduced by improved hygienic measures by 17 in the 1000. In other words, science saves the life of, on an average, 25,000 individuals annually in London alone, who, if the death-rate of 1690 still prevailed, would have sunk into an untimely grave. These facts, which I owe to a kind communication from Dr. Headlam Greenhow, received further confirmation, or rather the argument to which they are applied is enhanced, by the fact that the death-rate in the Cavendish Square District of Marylebone is only 16 in 1000, or equal to that of the healthiest district in all England, showing how much has already been done to prolong life by following the laws ascertained by a careful perusal of the book of Nature.* On the other hand, these numbers indicate how much remains to be done; because, if the death-rate of one large district of the metropolis is capable of so great a reduction upon the general average, it is patent that it is a duty of the commonwealth to secure a similar state of things throughout the capital, and that we ought not to rest satisfied until a minimum mortality is produced in the whole country. Nowhere is the neglect of preventive medicine more glaring than as exhibited by the statistics of infant mortality. Nearly one-fourth of the total mortality is still, in some parts of England, due to the deaths occurring under one year. Although, in his address before the Social Science Congress held during the past year, Dr. Lankester shows that the death-rate in London during the last thirteen years, owing to zymotic or miasmatic diseases, is not satisfactory, we find that, on comparing more distant periods of time, the improvement is very great. In each of the ten years between 1681 and 1690, 63.3 persons out of every 10,000 inhabitants of London died of fever. Sixty years later, the average annual death-rate from the same cause, calculated for the ten years from 1746 to 1755, had fallen to 53.9. The present death-rate of the class of fever is only 38.5 in 10,000, showing a diminution of 24.8 since 1685, and of 15.4 during the last hundred years. (Dr. Greenhow, *On the Present Death-Rate of London.*) And this reduction has been accomplished in the face of an unprecedented increase of bricks and mortar, swallowing up thousands of acres of open land; and of a corresponding increase of a population that is daily multiplying all the predisposing and exciting causes of disease, unless controlled and watched over by an enlightened government, willing to be instructed and guided in its turn by those who have devoted their lives to the study of Nature's laws.

If the view be correct, that all diseases have one common basis in disordered nutrition, we obtain at once a clue to the great variations in the form, symp-

* Its extreme rarity is evident, from the fact that nothing of the kind has been witnessed at St. Bartholomew's or Guy's by Mr. Paget or Mr. Birkett.

* In France, we are told by Dapin, the duration of life has been increasing, equal to fifty-two days for each year from 1776 to 1842, or nine and a half years for the whole period. The increase *per annum* was at no time less than nineteen days, although that revolutionary and warlike nation shed seas of blood, not only in her cities, but upon every battle-field of Europe. Other illustrations of the gradual improvement in the value of human life in civilised countries, may be found in Comegys' preface to his translation of Renouard's *History of Medicine*. London: 1856.

toms, type, and reaction to medicines, that constitute the charm of our profession, while they give the caviller opportunity to suggest puzzles that we are unable to solve, if we regard disease only as a nosological entity. We see here, too, a ready means of determining the exact relation of acute and chronic, of organic and functional disease; these varieties of morbid forms being dependent upon, and in the exact ratio of, that primary or secondary derangement in the nutrition of the body which we are daily becoming more capable of measuring with mathematical exactness. We must be careful, in making our estimates of disease, not to be led away by any accidental circumstances, such as the effects upon individual life, according to the point at which it exhibits itself. An epithelial growth may be assumed to be due to the same morbid perversion, wherever it occurs; but the effect on the patient will differ materially, if it be placed on the lips, on the vocal cords, or on the orifice of the bladder. (Edema of the prepuce, or oedema of the epiglottis, may result from analogous morbid conditions, and both may be amenable to similar treatment; but, while the patient can scarcely die of the one, he may with difficulty survive the other, more from the accident of localisation, than from the essence of the diseased elements upon which the oedema rests.

I should be sorry if my remarks were misinterpreted to mean an absence of law in any morbid phenomena. Certainly their prominent occurrence in a particular part of the body is determined by laws as uniform and irrefragable as any other change in Nature; but those particular laws appear to have no direct bearing upon the question that we have under discussion.

At my next lecture, I propose, sir, with your permission, to adduce individual phenomena and actual cases of disease, and to analyse them, so as to illustrate in a more directly practical manner the theory of disease which I have ventured, but crudely and imperfectly, I fear, to bring before you. I confess that to me it seems to harmonise many seeming incongruities both of nosology and therapeutics, while it recognises what must always be the only ultimate basis of all organic science, whether in its normal or its abnormal manifestations, *videlicet* physiology.

In conclusion, I beg to sum up in a few words,

"Der'langen Rede kurzen Sinn,"

in order that we may know the exact point from which we start at our next meeting. Pardon the aphoristic and involuntarily dogmatic form of the following paragraphs.

All disease is a perversion of the normal nutrition of the body. This perversion may be due to various influences acting by the ingesta, through arrest or other irregularities in the metamorphosis of the tissues, and determines, according to its character or duration, what are distinguished as functional or organic diseases. There is no essential difference between functional and organic disease; *ceteris paribus*,* the former indicating a less, the latter a greater, amount of nutritive perversion; the difference is one of degree, and not of kind. The localisation of disease is not its essential feature, but

rather an incidental result, produced by the congenital weakness of an individual organ, the influence of climate, of telluric conditions, of habit of life; but, wherever it assumes a "local habitation and a name", the basis on which it rests is the main point for the physician to attend to, in order that he may rectify the fundamental error of nutrition, while he puts the affected organ in such a condition as is most calculated to restore it to its healthy balance with other organs. There is much disease unnamed and unrecognised. At present we deal with it as an indolent farmer deals with the weeds which spring up in some of his richest soils: we wait till it has grown and forced itself upon our notice before we seek to destroy it. To continue the simile of the husbandman, our duty is so to cultivate and modify the soil that it shall not nourish the noxious seed; or, if that be in all cases impossible, still to first means to scorch or wither up the parasite before its roots have absorbed all the virtue of the parent earth.

THE LATE DR. WHEWELL. The *Lancet* contains some particulars by Dr. Humphry respecting the death of the late Master of Trinity. Up to the accident which caused his death, Dr. Whewell had shown no sign whatever of failure of mental power, though at the age of 71 he could not be, bodily, the active man that he had been. His pulse usually ranged between forty and fifty, and occasionally it intermitted. He had long been disposed to somnolency, and his tendency to sleep at the various meetings he was called upon to attend was well known, though he seemed to have the faculty of sleeping with open ears, so that after all little escaped him. After the accident he never quite lost his consciousness; he made some remark directly after it; and on his way home, when stopping at Dr. Paget's door, three miles from the place of the fall, though he had not been perceived to open his eyes, he inquired whether they were stopping at a friend's house, closely adjacent, thus showing that he had been observant of the route. There were, however, from the first, signs of partial paralysis, which gave his medical attendants much concern. The total damage which had been sustained by the brain, consisting of an extensive extravasation in the interior and slighter extravasation at two parts on the exterior, without injury to the skull, is explained, Dr. Humphry thinks, by the diseased condition of the vessels and the atrophic state of the brain. When the vessels of the brain are sound they rarely give way, and there is seldom a lesion of the brain substance unless the violence has been sufficient to break the skull. Here the strength of the skull was quite disproportionate to the resisting power of the brain, and the latter gave way, under a jar which was insufficient to cause any mischief to the former. This increasing disproportion between the weight and strength of the skull and the weight and strength of its contents is no uncommon anomaly in advancing years. The brain shrinks, and the skull at the same time thickens, perhaps from the lessening of the pressure of the brain upon its interior. The shrinking of the brain was not associated with any noticeable impairment of intellectual power, except the somnolency. The local paralysis of the hand and side of the mouth, which gave the doctors anxiety from the beginning, was, as it usually is, the result, and, therefore, the indication, of a local definite lesion. It told that the jar had caused more than a mere concussion, that it made a rent, and from that a man rarely recovers.

* *Ceteris paribus* is here not a mere figure of speech; it means that the elementary disturbance of each must be alike, in order that they may bear comparison. The organic disease resulting from a simple inflammation may not be put on a level with one based upon a cancerous predisposition.