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ORIGINAL ARTICLES.

DARWIN'S DOCTRINE OF EVOLUTION IN EXPLANATION OF THE COMING INTO BEING OF SOME DISEASES.

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SECTION III.—*Basis of the Argument for the Doctrine of Evolution as applied to Pathology.*

As a basis of argument in support of the doctrine of evolution as applied to pathology, and for the recognition of a common ancestry in some diseases, I would instance:—Examples of non-specific conditions or ailments developing more specific characters—such as the ordinary stages of a common inflammation—a pimple, a vesicle, a pustule, or a scab, foreshadowing and typifying diseases in which one or other of these lesions (as stages of the disease) predominate, other characters being subordinate.*

Some pathologists have already accepted it as a fact that certain often so-called *morbid poisons*, the contagia of erysipelas, pyæmia, and tuberculosis, are intimately related to the common ferment, or ferments of *putrefaction*; and that the most vehement of these contagia can be developed by the artificial culture of successive transmissions in the living body from the comparatively mild contagium of any *common*

* *Millican*, p. 107; *Collins*, *loc. cit.*, p. 44.

inflammatory process.* Professor Sanderson's papers † also show that the occurrence of tubercle (characterised by more or less well marked features) may be derived by cultivation from such a common inflammation as that induced by a chemical irritant. And it therefore "concerns us to remember that apparently every *common inflammatory process* includes more or less of textural changes which are necrotic and of septic tendency." ‡ This doctrine of a common disorder acquiring specific power is not a new one. A class of cases is mentioned by Dr. Charles Creighton, § in which the mere contact of human beings in an average state of health and cleanliness sets up various epidemic disorders among the inhabitants of remote islands where strangers rarely come. Mr. Darwin, in his *Voyage of the "Beagle,"* quotes instances of this in the South Seas, on the excellent authority of Williams the missionary: and it is to typhus that Mr. Darwin compares these cases. "It would almost appear," he says, "as if the effluvium of one set of men shut up some time together was poisonous when inhaled by others, and possibly more so if the men be of different races." Sir Thomas Watson has also maintained the same doctrine, and relates the following facts:—

"The English troops that served in Egypt in 1801, under Sir Ralph Abercromby, suffered much from the ophthalmia of that country, which is always brought on by exposure to cold after being heated, by the glare of the white and parched ground, by the dust in the air, and such like causes peculiar to the climate of Lower Egypt. No one, in those days, thought that Egyptian ophthalmia was a specific infection. But some of the English soldiers returned with it uncured, and it soon became contagious in the home garrisons; and it was found, after a lapse of eight or nine years, that there were no fewer than 2,317 soldiers pensioners upon the public bounty from blindness in consequence of ophthalmia. Those who knew the disease as it occurs in Egypt denied that it was contagious, and those who saw it in England were as positive that it was contagious. Watson reconciles the two views. He says that 'there is nothing absurd nor unlikely in the supposition that diseases may first arise from some other source, and then become capable of spreading by con-

* Simon, Art. "Contagion." Quain's *Diction. of Medicine*, vol. i, p. 292.

† See successive yearly volumes of *Reports of the Medical Officers of the Privy Council for 1868 to 1877*.

‡ Holme's *System of Surgery*. First edition. Art. "Inflammation." Quoted by Simon.

§ "Address on Pathology." *B. M. Journal*, 4th August, 1883.

tagion;’ and he says elsewhere, ‘My own creed upon the matter is this—that the disease may, and often does arise, independently of contagion, from the agency of ordinary causes of inflammation; and that, *having so originated, it acquires contagious properties, which develop themselves only under circumstances that favour the propagation of most of the contagious complaints.*’ A parallel to the Egyptian ophthalmia of 1801 may be found in certain cases of syphilis described by Baron Larrey in his surgical history of the same campaign. The Alexandrian syphilis, which the French troops contracted freely, was peculiarly free from ‘grave symptoms’ and ‘easily cured;’ but it proved very ‘obstinate and difficult to destroy’ in those who brought it back with them to France.”

A similar doctrine was also held “by the thoughtful and talented writers who were known in Germany fifty years ago as *The Natural History School*. And in anything that concerns the natural history of disease we may go direct to Sydenham, who was the author of the phrase; and in Sydenham we shall find a very explicit statement of the doctrine. In the language of the humoral pathology of his day he says, ‘The humours may, under certain circumstances, be raised to the dignity of a substantial form or to a species—a specific disease being one that takes its rise in the specific exaltation, or specification of some juice of the body; and he expressly mentions the antecedent condition of the humour before it had put on its species—*antequam hanc indurat speciem.*’” Hence Dr. Creighton concludes that this doctrine of a common disorder acquiring specific properties has not been absent from the thoughts of those who lived in the philosophical period of medicine.

Another interesting illustration of this doctrine is to be found in the possible and probable evolutions of small-pox, regarded as a skin disease which has acquired in course of time an independent and infective existence—“an ill-smelling condition of the human skin which one person may impart to another—one which “has been reproduced with the greatest accuracy and fidelity in millions of copies for hundreds of years; and the extraordinary closeness of its mimicry has given rise to the opinion that the disease is really the uniform effect of some unknown poison. But the anatomical structure and evolution of the pock Dr. Creighton considers to be too elaborate to be the simple and direct effect of an extrinsic poison; it is not like a flea-bite, or like the nettle-rash which comes out in some peculiarly constituted person after eating

shell-fish. The pock is a complicated affair, and there is a history written in it, a history of character acquired bit by bit, as in the evolution of living things, a history which has been transacted within the body; and the stages of this history are run through with more or less completeness in every case of the communicated disease. The papules had developed fluid in their summits, they had grown in a peculiar way, spreading in breadth, the original centre had become a distinct depression; and in the course of this evolution certain partitions had been formed in the interior of the pock. Further, the pock is more deeply rooted in the skin than most skin diseases known to us; for its base goes down to the vascular layer of the corium, and, when it scabs it, leaves a considerable defect of substance—a peculiarity among skin diseases which can hardly be matched unless it be in some of the tropical forms of impetigo. This skin disease is ushered in by much constitutional disturbance or fever; and, as in some other skin diseases *which are not contagious*, the fever abates when the eruption has come out, and the subsequent constitutional disturbance is exactly in proportion to the number of the pocks.”

It is remarkable that all this complicity of anatomical structure, of stages of evolution, and of characteristic fever, should have preserved its unity and individuality through so many transmissions, in all sorts and conditions of men, and in all parts of the world.

The disease possesses now an independent existence in a high degree; and Dr. Creighton proceeds to inquire into its history previous to the acquisition of this independent existence. He shows, on the authority of Professor Hirsch,* that we must go to tropical countries—to Hindostan, and to the interior of Africa—for its original seats, and that we must go back to a very remote antiquity to find the beginning of it. Small-pox is peculiarly an African disease (Lichtenstein, *Pruner*); and was originally a disease of the black skin; “and it is in keeping with that historical and geographical induction to find that the black skinned races are by far the most susceptible of the disease nowadays, when it is set up only by contagion.”

In speculating on the rise and development of small-pox out of some common and frequent disorder of the black skin, under such influences as tropical heat and moisture, or under the peculiar conditions of life accommodation for the living, which obtain among the swarming populations of tropical

* *Hand-book of Geographical and Historical Pathology.*

countries, "one naturally thinks of a complex form of *febrile lichen*—a skin disease which Dr. Gregory admits *that he could not always diagnose from small-pox*; and if we imagine a widely prevalent kind of febrile lichen to follow somewhat the same development that Willan describes in a remarkable case of *lichen agrius*, we should have a not very remote analogy for a stage of existence to small-pox, both in its structural character and in that constitutional fever, before it became the independent and infective disease that we see it now to be. We are at least justified in thinking of some form of tropical skin disease, widely spread within a certain zone, very apt to recur in the individual, and with each recurrence to become more inveterate, and to develop a more complex structure. Given a number of people suffering from such a cutaneous disorder at one time, and some great invasion or migration, and we shall probably have the circumstances under which the skin disease would become communicable, would pass by contagion to the skins of those who had never incurred the disease by natural causes, and pass all the more easily to them if they belonged to an entirely different race, or presented the ordinary contrasts of civilisation and barbarism, of white skin and black."

The acquisition of this independent and contagious existence was probably a very gradual process of evolution; and, comparing it with the original disease, out of which it must have come into being, the following facts are worthy of note:—

1. The contagious small-pox generally occurs but once in a person's life; and in this it offers a remarkable contrast to inflammations, which, having happened once, are, for that very reason, more apt to happen again. Hence the impropriety of ranking small-pox under the head of cutaneous diseases; it would "more rightly be called a blood disease" (Sir Thomas Watson). But, as Dr. Creighton proceeds to show, there need be no antagonism between the view of small-pox as a cutaneous disease, and the view of it as an infection. Small-pox in its primitive stage, before it became the independent disease it is now, "would be precisely that kind of skin disease which, having happened once, is, for that very reason, more apt to happen again. It would recur in the same spots, as in the early stages of leprosy, and it would become more rooted and more inveterate each time it came back. The inveteracy of this morbid condition of the skin, due in part to neglect, would be its first step towards acquiring that remarkable power of semi-independence within the body which it has now acquired; and it is this acquired power that now enables it to

pass to another person's skin as an individual state of the body, which can be, as it were, abstracted. Its individuality is also proved by the best of all tests of what constitutes an individual—the test of parentage; for the skin disease that springs up in the contaminated body is exactly like the skin disease which must have been originally acquired. But the infected or impregnated body runs through all the stages of the malady—papule, vesicle, pustule, scabbing and scarring—in rapid succession in two or three weeks; and thenceforward it is done with that particular form of disease for ever. In this independent form of disease we have a brief abstract and chronicle of the whole protracted development or evolution of small-pox. It sums up its past; and just as it sums up its past, so it anticipates its future; and starting, therefore, from a non-specific inflammation or common fever, or from such an anomalous enteric fever as Sir Joseph Fayrer has described as occurring in India, may there not arise, under favourable conditions, an inflammation or a fever different from the parent stock and capable of reproducing itself, or of being reproduced when the originating factors are again concurrent? The same argument may apply to cholera, and to the varied forms of enteric fever, such as are alleged to occur in tropical climates.

Concurrently with epidemics of cholera in India, Sir Joseph Fayrer has also described a peculiar fever co-existent with such epidemics which may be similarly used in argument.

May we not therefore consider many typical and so-called specific diseases at present well known as having arisen first in a non-specific inflammation, or in a common fever, thereby recognising a common ancestry among certain well known diseases, now recognised as distinct from each other, and so far new?

Slight variations, moreover, are also being introduced in nature with every successive generation of existences. Many of these variations are transmitted to the generations which follow; and, therefore, in the course of time, from any one parent stock would descend a very large variety of kinds, and with them we should expect to find variation in diseases—constitutional, hereditary, infective and contagious.

But the true settlement of these and such like questions at issue can only be obtained when long and patient study shall have determined under what laws and within what limits the slightest variations and anomalies which characterise individual diseases have been brought about; and it is mainly in the philosophy which pertains to and characterises

the Darwinian hypothesis, that we may look for aid in the elucidation of the question. St. George Mivart, in a series of interesting papers on "Organic Nature's Riddle," published in the *Fortnightly Review* for March and April, 1885, shows that many influences *must* come into play in the origin of new species; and his argument is applicable alike to organic nature and to diseases. One most important influence is "*heredity*."* It is a property of parental origin. It is the innate tendency which each organism possesses to reproduce its like. Another influence is the action of the environment upon nascent organisms. He further adduces evidence to show that certain variations are more apt to be inherited than others—*e. g.*, skin affections, affections of the nervous system, and of the generative organs—that modifications result from the action of unusual agencies on the embryo; and that processes of repair take place the more readily the younger the age of the subject; and it is probable that the action of the environment generally acts more promptly and intensely on the embryo than on the older young—so that the same organism will sometimes assume very different forms—*e. g.*, the *bacterium rufescens* as observed by Professor Ray Lankester.

The effect of changed conditions is also often very striking—such changes telling strongly in favour of the existence in living beings of certain positive inborn tendencies to change in definite directions under special conditions. It is also obvious that the very same influences (*e. g.*, amounts of light, heat, moisture, and so on) will produce different effects in different species—also that the nature of some species is more stubborn and less prone to variation than that of others; so that both the amount and the kind of variability differ in different races; and such constitution, capacities or incapacities, tend to be inherited by their derivative forms; and so every kind of animal must have its own inherent powers of modification or resistance—so that no organism or race of organisms can vary in an absolutely indefinite manner; and, that being so *unlimited*, variability must be a thing absolutely impossible.†

So also Dr. Wilks writes in his address to the British Medical Association that "Hereditary tendencies have much to do with the physical and mental characters of individuals; and that temperaments and idiosyncrasies so evolved are most important factors in the production of our ailments. Also, that our surroundings are in themselves sufficient to produce

* See also Roberts' definition in *British Medical Journal*, 1st August, 1885.

† *British Medical Journal*, 1st August, 1885.

active disease—*e. g.*, a number of conditions tend to the prevalence of the gouty constitution in England, and this may be carried through several generations, while the same conditions operating on an individual predisposed, may actually induce an attack in him. Bright's disease and many other diseases come about through the deleterious operations of our ordinary surroundings, both in the air we breathe and in the food we eat, and not from any well defined specific cause. Nearly all disease is slow in origin and progress, as in the words of Hippocrates, the father of medicine, who wrote that, 'Diseases do not fall upon men instantaneously, but being collected by slow degrees, they explode with accumulated force;' and it must still be the great aim of the physician to seek the causes of disease in our ordinary surroundings, and in the tendencies transmitted to us, and to try to remove them."

Variation must therefore be regarded as the result of the reaction of the special hereditary nature of each organism upon the stimuli of all the multitudinous agencies which environ it—a combination of "heredity" and "external influences" must be recognised as factors in the process of variation.

And, in addition to the action of these factors, there comes another to be reckoned with—namely, "a peculiar kind of action due to an internal force—an intra-organic activity," the laws of which have yet to be investigated. Comparative anatomy, pathology, and teratology combine to point out the action of this internal force.

Altogether, therefore, it seem undeniable that the characters and variations of species and of diseases are due to the combined action of internal and external agencies, acting in a more or less direct positive and constructive manner, suggestive of an "intelligent purpose, which is as it were incarnate in the living world."

SECTION IV.—*The Doctrine of Evolution not a new one in Pathology.*

The idea involved in the application of "the Theory of Evolution" to "the coming into being" of some diseases is not a new one. It has been floating about, as it were, in men's minds without having been thus definitely formulated long before the time of Darwin.

We have various evidences of this. For example, a work published in France about 1784, written in Latin, has the

following title:—*De Præcipuis Morborum Mutationibus et Conversionibus, Tentamen Medicum*, by A. C. Lorry, a distinguished graduate of Paris, embodies this idea. This work was published after the death of its author, and was edited by his nephew, the celebrated Hallé. The subject had been again suggested to Dr. Lorry by a small duodecimo volume printed at Frankfort in 1646, which has the quaint title—*Quæ ex quibus*, written by one Rodericus à Castro.*

Again, about 1792, Dr. John Ferriar, Physician to the Manchester Infirmary, published a series of *Medical Histories and Reflections* in 4 vols., and a second edition in 1810, in which two of the essays therein published have the following noteworthy titles—namely, “The Origin of Contagious and New Diseases,” in vol. i, p. 261, and “The Conversion of Diseases,” page 17, vol. iv. During the earlier and middle part of the present century we have also some foreshadowings of Darwin’s teachings as applicable to diseases in the discussions which took place relative to “the changes of type in diseases and their tendencies to change.” The type or form of disease being made evident in the order of succession observed to obtain among certain morbid phenomena, it was noticed that such types admitted of modifications from various causes (Copland).

It was also early recognised that the hereditary or natural constitution of the individual was an important element in determining and modifying the type of a disease; also that town life, as compared with country life, was another factor in modifying the type of many diseases; and the particular occupations of individuals furnished still other modifying factors. The characters of epidemics, especially of fevers, were noticed to differ. Typhus fever, for example, since 1843 to 1848, is known to have diminished in its relative mortality; its eruption has appeared earlier, and so also has its critical day (10th to 14th day as a rule, and rarely now prolonged into the 3rd week) in itself a great cause of diminished mortality, for a day’s delay of the crisis in a case of any degree of severity is an immense addition to the risk.†

It was also noted that diseases have arisen which are more or less new, resulting from new combinations of various pathological phenomena. It had been further observed how, in this country, during the past and previous centuries, some epidemics of fever, dysentery, scorbutus, malaria, and influ-

* *Edin. Med. and Surg. Journal*, 1801, vol. iv, p. 331.

† Professor W. T. Gairdner, *Clin. Med.*, 1862, p. 156.

enza, greatly deteriorated the health of the population; and as we have gradually got rid of such severe epidemics, severe and unmanageable types of ordinary inflammatory fevers have become less common. It is also on record that the types of some diseases become modified by complication or combination with other diseases more widely spread; and the doctrine of incompatibility of two or more zymotic diseases concurring in the same subject was shown to be an error. One form of disease has been seen to complicate or overlay another in a manner that at one time was not thought of. On this subject an admirable paper was contributed by the late Dr. Charles Murchison in the *Med. Ch. Review* for July 1859, in which he described the co-existence of variola and scarlatina, of variola and rubeola; so that the co-existence of several of the so-called acute specific diseases have now been clearly shown; and even Pringle, a famous pioneer of military medicine, records how typhus fever and marsh fever occur together; and that bilious remittents have prevailed with small-pox in the West Indies, forming, as a veteran outspoken physician remarked, "the most infernal combination that ever affected the human frame." Moreover, it was held by a distinguished Edinburgh physician, Dr. Craigie, in the earlier decades of this century, that "it is quite possible for the same person to generate two distinct diseases,"* as, for example, malaria, inducing in some an ague, and in others a dysentery. He further makes the observation—an important one for the theory of evolution—that every case of *synochus*, or the ordinary continued fever of this country, commences with the symptoms of simple inflammatory fever; and it is not improbable that *synocha* passes, in certain constitutions and in particular seasons, into *synochus* by insensible shades.†

Further, it has been noticed that as we approach certain well marked geographical regions of the earth, where characteristic types of disease prevail, the confines of these disease realms are found to mingle their types together, so that the diseases of one region merge into, and participate in, many of the characters peculiar to the other. Cholera has now extended and continues to extend its sphere much more widely over the earth than heretofore; fevers have been seen to change their type; and epidemics of all kinds to assume new characters as to their beginnings, their course, and their tendencies to fatal or favourable endings; and, as the late Sir Thomas Watson eloquently expresses the idea, in one of his lectures, "there

* *Prac. Physic.*, vol. i, p. 439.

† *Loc. cit.*, vol. i, p. 286.

are certainly waves of time, through which varied characters and types of disease prevail in succession.”*

The “alliances of diseases” constitute another element in the history of this subject, as illustrated especially by the late Dr. Barclay, of St. George’s Hospital, London.

Again, in 1839, Dr. (afterwards Sir Henry) Holland, F.R.S., published a collection of *Medical Notes and Reflections*, which contain many interesting records bearing upon this question, notably the following chapters:—Chap. II, “On Hereditary Diseases;” Chap. IV, “On the Connection of Certain Diseases;” Chap. XIV, “On Epidemic Influenzas;” Chap. XXIV, “On Diseases commonly occurring but once in Life;” Chap. XXVII, “On the Influence of Weather in Relation to Disease.”

He especially notices examples of the revival of hereditary diseases, absent in one or more generations, and instances several children of the same parents being affected in common with a given malady, of which there were no prior examples in either family; and he remarks that “the extent and sudden development of disease in these instances may in itself be taken as a proof of *new elements* being introduced” (p. 36).

He is also of opinion that “numerous conditions will be found, capable of giving different aspects to the effects of a common cause of disease;” † and he further notices “the variety of anomalous symptoms which arise from scarlet fever imperfectly developed, and from erysipelas,‡ and how too exclusive attention may be given to the eruptive part of certain maladies because of a belief in the more ready diagnosis it seems to afford.”

He notices further that “scarlet fever” has peculiar relations of its own, and is subject to greater irregularities than either measles or small-pox; that it appears more frequently in “incomplete forms;” that it seemingly blends itself more readily with other diseases; and when it prevails as an epidemic amongst children, we find many disorders prevailing which strongly warrant the suspicion of their being derived from the same source, yet so incomplete and irregular in aspect that it is impossible to define them as really forming part of the malady.§ This, he observes, is particularly the case with regard to the forms of cynanche which attend the fever, and which occasionally appears as the only distinct evidence of constitutional disorder. Another class of devia-

* Aitken, *Sc. and P. of Med.* 6th Ed., vol. i, p. 267, *et. seq.*

† *Loc. cit.*, p. 90.

‡ *Loc. cit.*, p. 103.

§ *Loc. cit.*, p. 405.

tions is in the irregular character and progress of the fever; incompleteness in some part of the development of the disease; and its recrudescence some time afterwards without fresh infection, sometimes more regular in type than in the first occurrence;* or, cases where there has been an irregular or incomplete evolution of the disease, succeeded by a number of abnormal symptoms deviating greatly from those wanting to make up the natural type, yet sufficient to afford presumption that they are due to the same morbid condition; these are especially—glandular swellings, abscesses in different parts of the body, eruptions, and gangrene of more or less extensive parts of the integument, and vitiated secretions from the kidneys and bowels. He notices also “the varying liability of the same person at different times to these diseases, and a hereditary tendency to them,”† besides many other similar records of his experience.

In 1852 Dr. S. H. Dickson published, in the *Transactions of the American Medical Association*,‡ a valuable paper “On the Blending and Conversion of Types in Fever.”

(*To be continued.*)

CLINICAL OBSERVATIONS ON SYPHILIS OF THE EAR AND THROAT.

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It is not my intention to enter fully into the subject of syphilis as it affects the ear and throat—which indeed would require a small volume. My object is rather, without referring in detail to all the existing literature of the subject, to bring forward the results of personal experience—and that as shortly as possible.

SYPHILIS OF THE EAR.

1. *The external ear.*—I have, of course, like other authors, seen cases of gummatous ulceration of the auricle which may or may not encroach upon the meatus. Primary sores in the

* *Loc. cit.*, p. 406.

† Holland, *loc. cit.*, p. 490, 410.

‡ Vol. v, p. 127.