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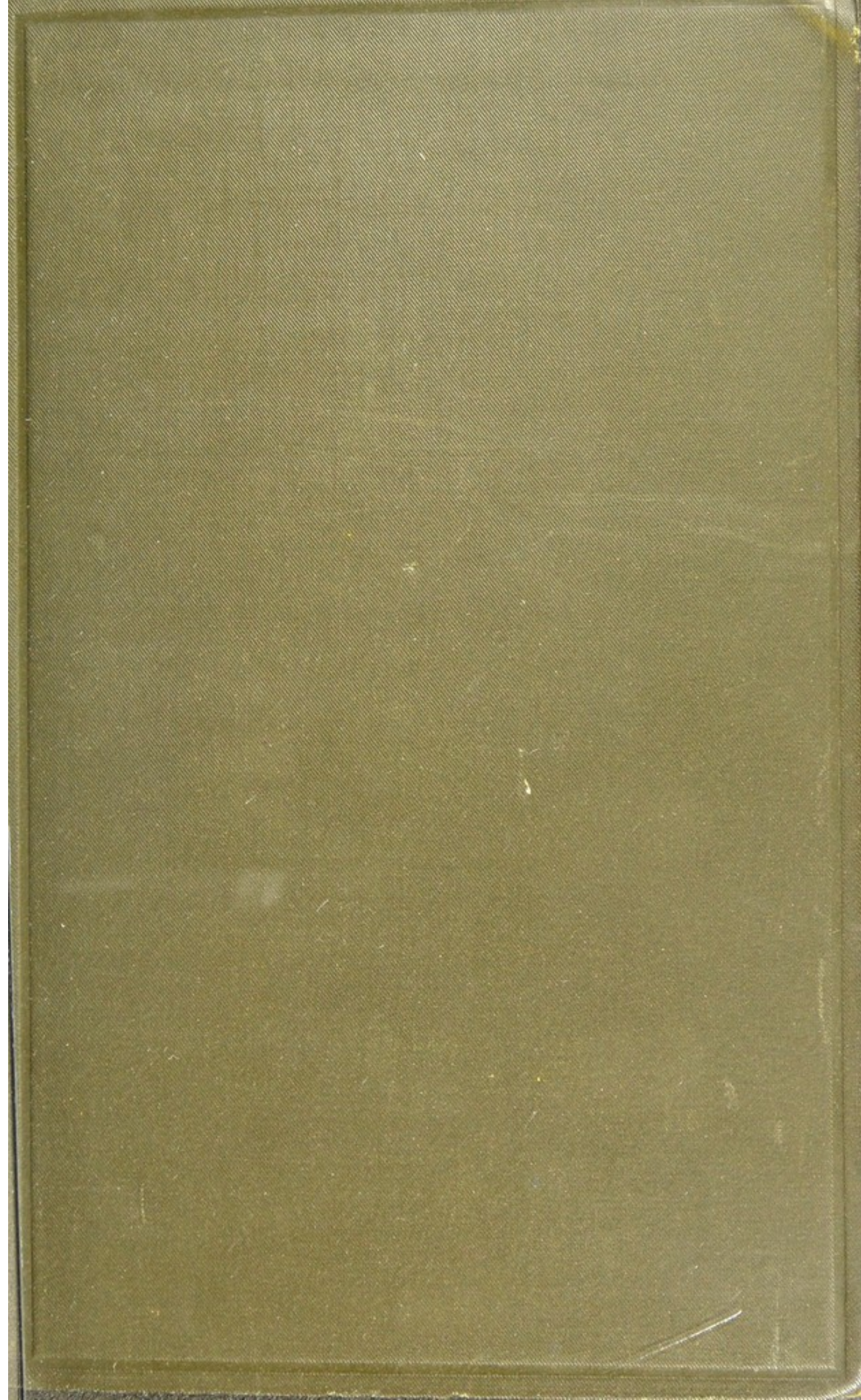
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ILLUSTRATIONS
OF
UNCONSCIOUS MEMORY IN DISEASE
INCLUDING
A THEORY OF ALTERATIVES

BY
CHARLES CREIGHTON, M.D.

LONDON
H. K. LEWIS, 136, GOWER STREET
1886



PREFACE.

Two or three things remain to be emphasised in this place. The first is that none of my illustrations of unconscious memory in disease are psychological. The second is that, although the illustrations chosen are drawn from a wide field, they are advisedly restricted in number; I should not wish, therefore, to be held as applying the principle of morbid habit and alterative cure beyond the limits specified or suggested in the text. Lastly, there is nothing new in details of treatment, but merely a new reading or rationale of everyday practice. That an exposition of treatment thus restricted in scope may still be practical, is affirmed by Sydenham: "Etenim in eo praecipue stat Medicina Practica, ut genuinas indicationes expiscari valeamus, non ut remedia excogitemus, quibus illis satisfieri possit; quod qui minus observabant, empiricos armis instruxere, quibus Medicorum opera imitari queant."

11, *New Cavendish Street, London;*

October, 1885.



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ILLUSTRATIONS

OF

UNCONSCIOUS MEMORY IN DISEASE.

THE question which will naturally occur to those who may read this essay is one that I had to consider carefully before beginning to write it. Has the word "memory" a real application to unconscious organic phenomena, or do we use it outside its ancient limits only in a figure of speech? On the answer to that question will depend whether the manner of representing certain familiar kinds of ill-health in the following chapters is merely an allegory or whether it is a new truth in pathology. The forms of disease with which I am concerned are chiefly the chronic. They include those catarrhs, fluxes, eruptions, and the like, that persist beyond their natural cycle or when the incitement is no longer there; various kinds of paroxysmal seizures which recur from time to time without obvious or sufficient provocation; functional errors of certain organs becoming neuroses by use and

wont; habitual injurious elements in the diet and general manner of life leading to diathesis and inherited proclivity; together with various other degrees and kinds of inveterate structural and functional error which sum themselves up in infection.

If I had thought that unconscious memory was no more than a metaphor, and the detailed application of it to these various forms of disease merely allegorical, I should still have judged it not unprofitable to represent a somewhat hackneyed class of maladies in the novel light of a parable. None of our faculties is more familiar to us in its workings than the memory, and there is hardly any force or power in Nature which everyone knows so well as the force of habit. To say that a neurotic subject is like a person with a retentive memory, or that a diathesis gradually acquired is like an overmastering habit, is at all events to make comparisons with things that we all understand.

For reasons given mostly in the first chapter, I conclude that retentiveness, with reproduction, is a single and undivided faculty throughout the whole of our life, whether mental or bodily, conscious or unconscious; and I claim the description of a certain class of maladies according to the phraseology of memory and habit, as a real description and not a figurative.

The reality of the memory-doctrine in disease appeals to us most directly when we come to treatment, of which I shall have a good deal to say by way of illustrating the proposition that alterative action is habit-breaking action. A familiar quotation will bring that

issue clearly before us. Macbeth demands of the physician in attendance on his conscience-stricken wife :

“Canst thou not minister to a mind diseased;
Pluck from the memory a rooted sorrow;
Raze out the written troubles of the brain;
And, with some sweet oblivious antidote,
Cleanse the stuff'd bosom of that perilous stuff
Which weighs upon the heart?
Throw physic to the dogs,—I'll none of it.”

But there are other memories, out of the sphere of our conscious life and beyond the responsibility of our wills, whose hapless origin is medicine's opportunity. In such cases the practitioner does really essay to pluck from the memory “a rooted sorrow,” or to raze out “the written troubles of the brain;” and his means of doing so are among the most familiar and time-honoured articles of the *materia medica*.

By way of discovering a basis in fact for the doctrine of unconscious memory and its applications to various forms of persistent, recurrent, diathetic, and infective sickness, I submit the following prolegomena on Memory and Organic Memory, promising the reader at the same time that these are all the metaphysical matters which I shall find it necessary to trouble him with.

CHAPTER I.

PROLEGOMENA ON MEMORY AND ORGANIC MEMORY.

WE are told by the younger Scaliger that the two things which his father thought most about as mysteries of nature were Memory and Gravitation. On this Dr. Alexander Bain used to comment, in his lectures on Logic and Psychology, that Gravity is no longer a mystery in the strict sense of the term, and that the natural mystery which might fittingly be placed beside Memory was Generation. Let us consider first what is implied in memory, and next what is implied in generation; and after we have done so we shall be in a position to inquire whether those shadowy figures, standing as if at each end of the long vista of living nature, are not one and the same mystery, and each of them the less mysterious because it has a sort of counterpart or correlative in the other.

The memory is built upon the foundation of persisting impressions. That which persists comes up again; we say that it persists because it comes up again. Of persistence itself we know nothing; what we do know is an impression brought back. Persistence, or the property of retentiveness, is by inference placed at the foundation of all our mental life: "Re-

tentiveness, commonly understood by the familiar names 'memory' and 'recollection,' is essential," says Bain, "to the operation of the two powers [the sense of difference and the sense of agreement]; we could not discriminate two successive impressions if the first did not persist mentally to be contrasted with the second; and we could not identify a present feeling with one that had left no trace in our framework." But that which enters directly into our experience is an impression coming up again; memory, recollection, recalling, reproducing, is the fundamental fact of our mental acquisitions.

Dependent upon it is consciousness itself; it is when an impression comes back variously discriminated or identified under present suggestion that we are conscious. To use a favourite figure of speech, nearly all the impressions of our life and of the ancestral life are at any given moment behind the scenes; under some call of association, one steps forward and then another, and these play their part for a brief space on the stage. Our conscious life is the sum of these entrances and exits; behind the scenes, as we infer, there lies a vast reserve which we call the unconscious, finding a name for it by the simple device of prefixing the negative particle.

This vast reserve of the unconscious is the subject of the philosophical system of Hartmann. In the first volume of his work that author gives a systematic exposition of all that belongs to the sphere of the unconscious—the '*Phaenomenologie des Unbewussten*.'

"I beg of the reader," he says, "that he take no preliminary exception to the notion of unconscious idea, because at the outset it may have little positive significance; the positive meaning of the term cannot be built up except in the course of the inquiry. At the outset it must suffice that we mean by it an unknown cause of certain processes which fall outside the sphere of our consciousness, but are not of an alien nature."

The book opens with a passage quoted from Kant ('*Anthropologie*,' § 5): "To have ideas and yet not to be conscious of them—therein seems to lie a contradiction; for how can we know that we have them when we are not conscious of them? However, we may still be mediately aware of holding an idea, although we are not directly conscious of it." These plain words of the great Königsberg thinker, says Hartmann, give the point of view of the philosophy of the unconscious. They imply, however, that the unconscious is an inference; the whole "phenomenology" of it rests on a "metaphysic" or philosophical groundwork of inferential knowledge. That a systematic exposition of instinct, reflex action, the germs of volition, and the like, is any the worse for that no one will say; still, the fact remains that the unconscious of Hartmann's treatise has no better name than one constructed by prefixing the negative particle. Other foundation than that these things are out of consciousness Hartmann does not lay for his superstructure.

It would thus appear that the basis of all that lies

behind the scenes is the mere negation of consciousness; and it must needs be so if the latter is capable of no analysis. In the last resort, however, it is not consciousness that we come to, but memory. Some such admission is made by Hartmann himself when he says (ii, 9): "*Das Bewusstsein erhält seinen Werth erst durch das Gedächtniss.*" But if consciousness be what it is by virtue of memory, the author of the *Philosophy of the Unconscious* makes singularly little account of memory throughout his exposition. It may be doubted if the word occurs in his two volumes, except in the sentence just quoted and in the sentence following it: "But to the unconscious we can ascribe no memory."

While the system of Hartmann altogether ignores, and even denies the existence of unconscious memory, it exalts "unconscious will" into a place of first importance. Every act of will is a reflex effect, and, conversely, every reflex effect is an act of will. The objection will naturally arise that if such words as "will," "volition," "voluntary action," are to have a meaning proper to themselves and distinctive, that meaning is that the action is always a conscious one and never a reflex, automatic, or unconscious one; and that would hold good whether we take automatic actions to be a degradation of actions once voluntarily and consciously practised, or whether we follow Mr. Spencer in regarding them as on the upward road to volitional rank.

But if "unconscious will" is a paradox trans-

gressing the legitimate use of words, is not "unconscious memory" in the same condemnation?

If we turn to Mr. Herbert Spencer, who deals with the same class of evolutionary problems as the German dialectician, we shall find that he does actually place memory and will on the same footing: "Memory, Reason, and Feeling simultaneously arise as the automatic actions become complex, infrequent, and hesitating; and Will, arising at the same time, is necessitated by the same conditions. As the advance from the simple and indissolubly coherent psychical changes to the psychical changes that are involved and dissolubly coherent, is in itself the commencement of Memory, Reason, and Feeling, so, too, it is itself the commencement of Will." But elsewhere Mr. Spencer speaks of "organic memory," meaning thereby the faculty of unconscious retentiveness whose real existence is here in question. Organic memory or unconscious memory, as we shall contend, is no mere form of words or figure of speech, whatever be the case with "unconscious will." The real basis for the doctrine of unconscious memory is found in the biological phenomena of generation.

Hartmann's omission of the principle of unconscious retentiveness (with reproduction) from his 'Philosophy of the Unconscious,' will explain his omission of all reference to the Scottish school in his chapter on "Forerunners in the Doctrine of the Unconscious." I give in a note * Hamilton's reference to Stewart's

* Hamilton, in his edition of Reid (p. 551) says: "Mr. Stewart has made an ingenious attempt to explain sundry of the phenomena

treatment of the subject, and the bearing of that on the original form (in Hartmann's estimation) of the philosophy of the unconscious, in the writings of Leibnitz. Of considerably greater importance is Hamilton's own view of memory and its relation to that which is "out of consciousness."

"Consciousness supposes memory," says Hamilton, "and we are only conscious as we are able to connect and contrast one instant of our intellectual existence with another." Now, if we scrutinise more closely Hamilton's use of the word "memory," we shall come at once to the cardinal point in the problem of the unconscious: "Memory, strictly so denominated, is the power of retaining knowledge in the mind, but out of consciousness: I say, retaining knowledge in the mind, but out of consciousness; for, to bring the *retentum* out of memory into consciousness, is the function of a totally different faculty. . . . We must further be endowed with a faculty of recalling it out of unconsciousness into consciousness; in short, a reproductive power. This reproductive faculty is

referred to the occult principle of habit, in his chapter on Attention, in the first volume of his 'Elements of the Philosophy of the Human Mind.' It is to be regretted that he had not studied (he even treats it as inconceivable) the Leibnitzian doctrine of what has not been well denominated *obscure perceptions or ideas*—that is, acts and affections of mind, which, manifesting their existence in their effects, are themselves out of consciousness or *apperception*. The fact of such latent mental modifications is now established beyond all rational doubt; and on the supposition of their reality, we are able to solve various psychological phenomena otherwise inexplicable. Among these are many of those attributed to habit."

governed by the laws which regulate the succession of our thoughts—the laws, as they are called, of mental association. . . . By *reproduction* it should be observed that I strictly mean the process of recovering the absent thought from unconsciousness, and not its representation in consciousness.”

The *retentum* out of consciousness is the same as the vast reserve behind the scenes, the unconscious ; it is to it that memory pertains, says Hamilton ; it is a store or aggregate of memories. Memory in this Hamiltonian sense is otherwise named by him Conservation ; whereas Reproduction, or the recalling into consciousness, is something over and above. On this Bain makes an important criticism : * “ Hamilton’s *Conservative* faculty, taken by itself, would be another name for Memory or Retentiveness. But when we take this with the third in the list, the *Reproductive*, including the Laws of Association, a very serious objection arises. Of Conservation apart from Reproduction, we know nothing. That I have a thing in my memory, means that, on a certain prompting, I can reproduce it, or make it present. Conservation, without reproduction, would be a nonentity ; reproduction carries with it whatever we mean by conservation.” The re-entrance, the recalling, the reproduction is indeed the ultimate fact. Of conservation apart from reproduction, as Dr. Bain says, we know nothing ; conservation by itself would be a nonentity. Where, then, is the basis in knowledge for the *reten-*

* ‘Senses and Intellect,’ appendix, p. 639.

tum, for the vast reserve behind the scenes, for the unconscious ?

Two years after the publication of Hartmann's 'Philosophy of the Unconscious' (1868), an address was given before the Vienna Academy of Sciences, by Dr. Hering, Professor of Physiology at Prague, on "Memory as a general Function of Organised Matter."* Hering's object is "to bring under one survey a large number of seemingly diverse phenomena, belonging in part to the conscious and in part to the unconscious life of the organism, and to consider them together as expressions of one and the same fundamental property of organised matter, namely, the property of memory or reproductiveness. . . . It will be readily admitted, on closer scrutiny, that memory is not to be viewed as strictly pertaining to consciousness, but rather as a property of the unconscious. What I was conscious of yesterday and am again conscious of to-day—where was it from yesterday until to-day ? As something of which I am conscious, it does not last ; and yet it comes back. . . . That which lasts is the peculiar attunement (*Stimmung*) of the nervous substance, in virtue of which it will give out to-day the same note that it gave out yesterday, if the strings be touched aright. The single bond uniting the several phenomena in our consciousness lies in the unconscious ; and, as matter and the unconscious are the same, physiology may

* ' Ueber das Gedächtniss als eine allgemeine Function der organisirten Materie.' 2te Auflage, Wien, 1876.

with perfect right designate memory, in an extended use of the term, as a property of the brain-matter, the manifestations of which do indeed come in great part into our consciousness, but in another and not less essential part go unnoticed."

The step forward taken by Hering is to substitute Unconscious Memory for the Unconscious. Although the language of his essay would sometimes lead us to suppose that he holds the untenable position of Hamilton, that memory pertains to the *retentum* or to that which is out of consciousness; yet in bringing the facts of Generation and embryological development into his view of Unconscious Memory, Hering supplies the data, at least, of a positive basis of knowledge for the vast reserve behind the scenes, or a basis other than that which is got by prefixing the negative particle to Consciousness or to Conscious Memory. This brings us to the second of the two questions proposed at the outset, What is implied in Generation?

In generation is implied the action of the male seed on the egg, and the unfolding of parental characters from the latter. The form of these elements is the simplest of all organic forms. They have nothing to show for their boundless authority. According to the simplicity of their structure, is the fulness of their representative powers. External markings distinctive of the species do indeed occur in the pollen-grains and seeds of plants, in the eggs of birds and other ovipara, and to a very slight extent

in the sperm-particles of animals. These distinctions, whether in the vegetable or animal kingdom, are merely external and at best inconsiderable. Uniform simplicity and practical identity of form and structure is the grand characteristic of every male seed and of every germ respectively. To speak of certain molecular arrangements of their particles, or of countless actual gemmules in their substance, is merely to take refuge from a unique difficulty in an illusory form of verbal analysis. There is a more serious objection to the hypothesis of Pangenesis, in the doubt whether the gemmules contained in the sperm-particles take any material share in the building up of the embryo, or whether they do not act merely "by contagion," as Harvey thought, or, as Aristotle held, whether the male seed gives more than the form, the egg supplying the substance. According to Harvey, the spermatic influence of the male is a "derived essence which doth operate with a vast discretion and providence beyond all the bounds of art, and doth render the egg prolific even when itself is fled and vanished."

The germ and sperm acting in concert have plenary powers from the whole body; all that they possess they owe not so much to being cells sharing in the general life of the body, but to their election to a high office, to their ordination, as it were. The individual characters and qualities of the father and (or) mother, the accumulated and integrated characters of the species, are somehow carried forward in these most simple of all organic forms. The structural and functional

acquisitions of years and ages are summed up in them or condensed into them. The male seed, as Harvey observes, is a "derived essence;" it carries within it the "forma, vel anima, vel idea" of the parent; it is in a sense an abstraction and yet it is a particle of living matter. It means courage or timidity, generosity or meanness, tallness or shortness, colour of hair and eyes, a mole on the back, or perhaps the gout; and yet it is a minute spermatozoon (or several such) with its structure evidently adapted for mere sculling or self-propulsion.

These properties of the germ and sperm we ascribe to them by inference, because as a matter of fact the parental and ancestral characters do unfold themselves in the course of development, growth, and maturation. All the memories of the individual and the traditions of the species are implicitly present in them. Dr. Bain says:* "The reproduction of each living being from one or from two others through the medium of a small globule which contains in itself the future of a definite species, is the greatest marvel in the whole of the physical world; it is the acme of organic complication."

Instead of the acme of organic complication, I should prefer to say the acme of organic implication; for the reason that the sperm-and-germ elements are perfectly simple, having nothing in their form or structure to show for the marvellous potentialities within them.

I now come to the application of these considerations to the doctrine of unconscious memory. If

* 'Logic,' ii, 274.

generation is the acme of organic implicitness, what is its correlative in nature, what is the acme of organic explicitness? Obviously it is the fine flower of consciousness. Generation is implicit memory, consciousness is explicit memory; generation is potential memory, consciousness is actual memory.

Although it is convenient and justifiable thus to state the correlatives, the implicitness or potentiality of generation has its own counterpart in the explicitness or actuality of embryonic development, growth, and mature life. In like manner, at the other end of the scale, the explicitness or actuality of consciousness has to be set off against the implicit or potential character that pertains to the vast reserve behind the scenes at any given moment, to the *retentum* out of consciousness, or to the unconscious. These are the strict correlatives, each to each; and if we take each couple by itself we are still left with the uniqueness of our subjective phenomena, and with nothing to play off against consciousness except its own negation, the unconscious.

But if we bear in mind that memory underlies every manifestation of consciousness, or that, as even Hartmann incidentally admits, "das Bewusstsein erhält seinen Werth erst durch das Gedächtniss," we may speak of our unique experience always by the synonym of conscious memory, and therein find the means of bringing it into relation with something else. It may be brought into line with the process of unfolding or becoming actual which starts from the other end,

namely, with organic development and growth; and it may thus be styled the acme of organic explicitness and actuality. Memory touches the highest point of implicitness in generation and the highest point of explicitness in consciousness. Development and growth are the unfolding of the one; the retreat behind the scenes into the domain of the unconscious is the upfolding of the other. By thus interchanging the members of the correlative couples we obtain a material support for the two subjective terms; we pair off Conscious Memory with Development and the Unconscious with the Germinal.

At the same time we find that justification which we set out to seek, namely, for applying the language of memory to other than subjective states. Embryonic development, growth, and the continuity of organic life are the actual and explicit manifestations of that memory which was potential, implicit (and known to exist by inference only) in the sperm-particles and egg; just as consciousness is the actual and explicit manifestation of that memory which is potential, implicit (and known to exist inferentially) in the vast reserve of the unconscious which is at any given moment behind the scenes.

Memory then, as Hering says, is a general function of organised matter; and the word will be used in the sequel in no figurative sense. The first application of it will be to certain processes of the organism which recur periodically in the ordinary course of healthy life.

CHAPTER II.

*MEMORIES OF DEVELOPMENT IN CERTAIN
PHYSIOLOGICAL PROCESSES.*

THE two illustrations that I am able to give of physiological memories of development have both been worked out by me in former writings. They are instances of the periodical development of structure and function, the one relating to the structure and function of the breast, and the other to the formative process of the corpus luteum, decidua, and placenta.

A certain peculiarity of the mammary function has arrested the attention at all times and has been invested with a superstitious interest.

It is the fact that in the new-born child the breasts secrete milk—the “Hexenmilch,” or witch-milk of German midwives. In preparations of the breast from the new-born guinea-pig, the production of this milk may be followed up at leisure ; it is the fluid contents of the mammary cells at the highest point of their development or specialisation as such. The production of some such fluid (more probably mucous than milky) in the cells of the developing acini may be seen at earlier stages, but the full distension or accumulation is not reached (in the human species, in the guinea-pig,

and probably in many other mammals as well) until the very time when the foetus is born.

Such distension (which I have figured)* is the acme of development; it is the highest point of a continuous series of developmental changes in the primitive cells. The cells of the acini are so fully distended with fluid that a lobule of the breast looks just like a lobule of young fat; then the cells burst, and their contents pass into the ducts (where they may be easily seen in microscopic sections of the prepared gland), or are expressed at the nipple as the milk of the new-born. Having parted with their ripe contents, the acini contract to small solid clusters of nuclei; and so they continue all through childhood and youth. It is only when the young female becomes pregnant that they ever expand again. When they do expand they follow precisely the lines of their development; the cells fill with fluid (mucous at first, milky afterwards), they become more and more distended and then they break up into milk. As lactation persists the product is formed from cells in a much more rapid way, which hardly reveals them in the stages of distension; but such distension can easily be seen in the breasts of animals a few days before delivery, when the "evolution" of the breast (as one may name the periodical unfolding) has almost reached its climax.

Summing up the parallelism between the development of the breast and its periodical "evolution" and

* "The Development of the Mamma and of the Mammary Function," *Journ. of Anat. and Physiol.*, Oct., 1876.

active continuance, I formerly wrote:* “The development of the breast is its first period, the functional periods of the mature breast are successive repetitions of its development. . . . The periodicity of the breast begins with the existence of the breast as a distinct organ; its development is its first period, and its subsequent periods are all repetitions of its development.”

Again, the suckling of the young, or the continuous function of lactation, is a *habit* acquired on the basis of the developmental memory: “Lactation always follows upon a slow unfolding of the secretory structure and a gradual rising of the secretory force. Lactation is the rising secretion maintained for a longer or shorter period at its highest point. If a full period of the breast’s activity be represented graphically, a line sloping upwards would represent the evolution, a line continued horizontally would represent the lactation, and a downward extension of the line would stand for the unfolding and subsidence. Lactation is the function of the organ continued for a time from its highest point at a uniform level; it is a period of variable length interposed—one may say, artificially interposed—between the original waxing and waning periods of the organ. It is not the unfolding and up-folding processes that are subordinate, but it is the period of lactation itself” (l. c. p. 114).

* ‘Contributions to the Physiology and Pathology of the Breast, &c.,’ Lond., 1878. Chap. V, “Development of the Mammary Function.”

The other physiological illustration that I shall take of memory of development is also concerned with reproduction or the continuance of the species ; and it has a wider range of interest than the former, inasmuch as it is largely an affair of new growth of cells and tissues. It is the illustration of the corpus luteum, the decidua, and the placenta.

According to observations by Born,* the great central mass of the extensive ovary of the foetal foal consists, towards the end of its intra-uterine period, of a collection of large protoplasmic cells somewhat like liver-cells, traversed by vessels and ultimately subdivided by the loops of vessels into alveolar groups. It is to this tissue that the ovary of the unborn foal owes its great size ; what constitutes the chief part of the mature ovary is then only a thin layer or plate on the surface. At the age of one year most of the large protoplasmic cells have disappeared, and the ovary is then absolutely smaller than it was before birth, notwithstanding the growth of its permanent tissues ; in two or three years more not a trace remains of the enormous central collection of liver-like tissue. This foetal structure is not peculiar to the foal's ovary, although it is probably more extensive in that animal than in other mammals ; it is always well marked in young ovaries of the dog, and very obvious traces of it may be seen in the vascular or central zone of the cat's ovary.

* "Ueber die Entwicklung des Eierstockes des Pferdes," 'Archiv für Anat. und Physiol.,' 1874, p. 132.

The point that concerns us here is brought out in a remark by Born with reference to the corpus luteum of the mare: "The corpus luteum reminds us so strikingly of the foetal collection of cells that we might consider it to be a *temporary restitution of that long-vanished structure*" (l. c., p. 148). And not only in superficial resemblance but in essential structure and histogenesis, the corpus luteum is in fact a periodical restitution of the great central mass of liver-like cells in the foetal ovary. Where there are several large corpora lutea in an ovary of pregnancy, the organ practically returns to its foetal condition of a narrow surface belt in which lie the immature Graafian follicles, and of an enormous central collection of large protoplasmic cells. Whatever the foetal deposit of cells may mean, the corpora lutea of pregnancy are periodical repetitions or reproductions of it. This is a parallel case to the breast, only that we are here dealing with structural effects where the correlated function is obscure. In both cases the periodically recurring incidents of mature life are memories of development.

But the corpus luteum is only an intermediate link in the evidence to be drawn from much more interesting periodical new formations—the decidua and placenta. As I have elsewhere written ;* "There is the closest parallelism between the corpora lutea that form round the original nest of the ovum in the ovary, and the

* "The Formation of the Placenta in the Guinea-Pig," 'Journ. of Anat. and Physiol.,' July, 1878, p. 541.

formations that arise at a number of points on the surface of the uterus (oviduct). The decidual capsules are, generally speaking, the same in number and in the time of their occurrence, as the corpora lutea, and the tissue in both cases is essentially the same. The decidual capsules may be regarded as the modern and efficient representatives of nutrient or enclosing structures, of which the corpora lutea in the ovary are the obsolete but still persisting types. The primitive decidual swelling which afterwards grows round the ovum and encloses it, begins before the arrival of the ovum at the spot. The actual decidual capsule is an adaptation of a more general growth of tissue, and the actual placenta is a still greater specialisation of a portion of it at the attached border."

Shifting the scene then, from the interior of the ovary to the surface of the adjoining uterine horn or oviduct, we may there follow the remarkable series of adaptations, whereby the tissue of the egg-capsule becomes at one spot the great glandular organ of intra-uterine nutrition, the placenta. In the structure of the placenta, we may seem to have come a long way from any memories of embryonic development; but the primitive decidual tissue of which it is an intelligible adaptation or improvement is the same as, or the equivalent of, the corpus luteum, and the latter, as Born says, is, as it were, a "temporary restitution" of the long-vanished foetal ovarian parenchyma. The placenta keeps the periodicity and it keeps the essentials of the structure; in its elaboration of structure

also, "we have," as I have elsewhere said,* "a reversion in the midst of mature life, to vessel-making and blood-making such as the body goes through otherwise only during its development."

The grand characteristic of the placenta is that the thick protoplasmic walls of its vessels and sponge-work of capillaries are themselves the secreting tissue, the secretion dropping from them direct into the blood-stream as it flows slowly past. That is certainly a unique thing among the organs of the mature body; in all other instances of special contributions to the blood as it flows past, there is a membrane interposed between the blood and the metabolic tissue, or, in other words, the blood is contained in capillary tubes while the glandular cells are seated on their walls.†

The prototype of a tissue which is at one and the same time the substance of the vessel's walls, and the source of what circulates within them, must be sought for in embryonic phases, and it will be found in early stages of the *area vasculosa* and of the embryonic *mesoblast*.

In two respects then, the structure of the placenta is a periodically recurring memory of embryonic

* Article "Pathology," 'Encycl. Britan.,' 9th. ed., xviii, 1885.

† Harvey compared the placenta to the liver; the comparison would hold if the walls of the portal veins gradually became thick and protoplasmic, and passed by direct continuity into the liver-cylinders, and if the blood, instead of issuing by the hepatic veins, came round to certain points on the liver surface favorable to exudation, and there parted with its recent acquisitions to be taken up by plasmatic absorptive tissue like that of the chorion and its vessels.

development: firstly, in the mode whereby its new vessels are carved out of the matrix tissue; and secondly, in the retention of protoplasmic or actively formative characters by their walls.

CHAPTER III.

*REMINISCENCES OF EMBRYONIC ACTIVITY IN
REPAIR AND IN NEW GROWTHS.*

THE illustrations of developmental memory in the foregoing chapter are physiological, relating to reproduction or the preservation of the species. In order to exemplify on a sufficiently broad basis the principle of unconscious memory that we are about to apply to certain important groups of diseases, it will be necessary to give some brief account of two or three pathological instances of memory or recollection of embryonic phases inhering in the simple tissues.

“The powers for development from the embryo are identical with those exercised for the restoration from injuries ; in other words, the powers are the same by which perfection is first achieved, and by which, when lost it is recovered.” This is the statement of Paget, and it is illustrated by him in the first instance by reference to the remarkable reparative power in *Hydra* and other polyps. A further collection of instances of the power of restoring lost parts by the invertebrata, is given by Darwin to illustrate his hypothesis of pangenesis, or of countless gemmules each with its proper formative value.

In the repair of a wound or sore by granulations, the pre-existing tissues of the part are the basis of the repair; they undergo a transformation, they become formative, they furnish the materials out of which the lost structures are more or less perfectly restored. The power that they put forth is, as Paget says, the same as that exercised for development from the embryo. In other words, the tissues of an injured part revert to embryonic characters. Highly vascular tissues return most rapidly to the embryonic state: the distinction between the vessel-wall and the peri-vascular or inter-vascular tissue disappears; an area of tissue pervaded by vessels, changes into a corresponding area of what the late Professor Boll called "*Gefasskeim-gewebe*," that is to say, embryonic vasoformative tissue. The youngest phase of granulation tissue is of that nature, the new blood-vessels being channels in the midst of it bounded by rows of flattened cells. In the case of a severed tendon, a kind of tissue where the vascularity is small, we are better able to follow the activity of individual cells. The flattened cell-plates emerge from their obscurity to become solid cubical elements, and the identity of these with the granulation cells is obvious from the fact that they undergo their changes while retaining their natural position in the midst of the wavy bundles of fibres. The cell-plates of tendons are highly specialised derivatives of the embryonic mesoblast; the perivascular cells and other connective-tissue elements are less specialised derivatives of the same.

All alike return to their primitive embryonic characters; they become so much mesoblast again, and in so doing they become what Boll calls "*Gefasskeim-gewebe*."

Besides the making of vessels, the embryonic mesoblast has another and even more fundamental property—the making of blood; and, according to Stricker, the ordinary red blood may actually be seen to be produced in granulation tissue along with the new vessels. But the strength of the hæmatoblastic memory is shown even more strikingly in the production of a modified kind of blood—in the production of pus around the growing points of granulation tissue. Wherever the less intense or less hurried form of revived hæmatoblastic activity of connective-tissue cells can be studied, as in blood-cysts and cavernous blood-tumours, the hæmatoblast is seen to disengage its reddish protoplasm in the form of buds which become the red blood-discs; meanwhile its nucleus has been cleft into several fragments, which cling more or less closely to the buds of reddish substance as they proceed to detach themselves. But these nuclear particles have no permanent share in the red blood-discs; they come together again, and make up a cell with its nucleus divided into three or four, which is all that survives of the original hæmatoblast. In the fluid formed around the vascular points of granulation tissue, this residual element with nucleus cleft into three or four is the pus-corpuscle; the protoplasm originally surrounding it has been disengaged, but not in the form of definite reddish buds; it has simply

melted into the fluid part of pus, losing all traces of individuality. According to this reading of the phenomena, which I have expounded with descriptive details and figures elsewhere,* the well-known appearance of three or four nuclear particles in a pus-corpuscle is evidence of the essentially hæmatoblastic nature of the process, the same being a memory which the common binding-tissue and other adult tissues of mesoblastic origin never quite lose.

Again, in the repair of a broken bone we have evidence even down to old age that the "osteoblastic tendency or memory is strong in the tissues within and around a bone, above all in the periosteum and in the young or red marrow" (Art. "Pathology," l. c.).

It is well known that the tissues of repair, both those of the soft parts and the callus of bone, have close analogies to certain new growths of the tumour kind. But there is the grand difference between them that the new growth of repair is self-limited, whereas the new growth of tumours is indefinite. The former is a memory of development which is effaced after a time by the re-established continuity of mature life; the latter is a memory of development which fixes itself in the midst of the tissues as a *habit*. Practically the whole of the mesoblastic series of tumours can be shown to be due to revived embryonic activity; some of them may have sprung, as Cohnheim supposed that they all did, from actual centres of embryonic tissue left behind here and there in the

* Art. "Pathology," 'Encycl. Brit.,' xviii, 1885, figs. 9, 10, 25, and 28.

body; but the larger number of them are owing to a reversion of some tissue of the connective series to its mesoblastic characters, just as in granulations, although the occasion is not usually so obvious as in granulation tissue.

Although there is a sufficiently clear line, for practical purposes, between the new growth of mesoblastic tumours and the new growth of repair; yet there are some among the former which come near to the reparative process in the tendency to self-limitation or in the comparatively slight hold that habit has obtained over them. The best instances are tumours with a cystic tendency. Wherever the revived embryonic activity is accompanied by evidences of embryonic function, we find cystic softening in the interior, the fluid being sometimes sanguineous but more often clear or turbid serum. The revived mesoblastic activity may proceed on the formative lines purely, or on the formative and functional combined; in the former case we have the memory of development becoming a habit, and in the latter case there is some chance of self-limitation.

The best instance of self-limitation going with mesoblastic function is in the case of those remarkable cavernous tumours or blood-tumours growing from the connective tissue of the liver, which have the well-known tendency to cicatrise in places. Whenever functional traditions of the mesoblast fail to assert themselves duly in a case of revived embryonic activity, we have a persisting and growing tumour—

spindle-celled, with or without pigment, round-celled, myxomatous, giant-celled, and the like. There are few of these mesoblastic tumours of the soft parts, or of bones as well, in which traces of the embryonic functions of the tissues may not be found by careful search and analysis.* But the functional memory is feeble, and the result is that the structural effects are either undecided, confused and grotesque, or if the type be uniform, as in many sarcomata of soft parts, it corresponds to nothing actually existent among embryological tissues. In many such cases the embryonic memory becomes a confirmed habit, and in not a few such cases the habit impresses itself upon other organs and parts in the form of secondary tumours due to infection.

The best illustration of the doctrine of embryonic memory as applied to tumours is a dermoid cyst of the ovary. This kind of tumour, as I have elsewhere written,† “shows to the fullest extent what the embryonic mesoblast can do in the way of fantastic new productions. Not only blood and bone, but teeth, skin, hair, glands, muscle, and nerve are produced as the tumour-constituents of these remarkable new growths. Their usual seat, and the invariable seat of the most perfect of them, is the ovary; and the ovarian is just that mesoblastic tissue upon which the

* See a paper by the author, “Illustrations of the Pathology of Sarcoma, from cases of Subcutaneous Cystic Tumours,” ‘Journ. of Anat. and Physiol.,’ April, 1879.

† “Pathology,” l. c., § 4.

memories of development are as if concentrated ; for it is from an ovarian cell that the embryo grows in the perfect likeness of the parent. These selected cells of the ovary, or, in other words the ova, are specially charged with the recollections of the past history of evolution and growth ; and the rest of the ovary appears to possess the same lively memory, if not to the same extent, yet to a much greater extent than mesoblastic tissue elsewhere. The stroma of the ovary is the best example in the body of embryonic spindle-celled mesoblast ; only in some animals does it become normally fibrous, and in any animal it may revert to embryonic characters with the greatest ease at the generative periods or at other times, and even in extreme old age."

With these illustrations of mesoblastic cells and tissues retaining the memory of their embryonic and developmental phases, I shall now pass on to the more practical consideration of morbid habit.

CHAPTER IV.

HABIT AS A CAUSE OF LONG-STANDING CATARRHS.

THE occurrence of the word "habit" in the title of this chapter offers a convenient opportunity for making some remarks on the use of that term in medical writings.

In medical writings down to quite recent times we frequently read of the habit, of the influence of medicines on the habit, of the way in which mercury passes out of the habit, of the habit acquiring a febrile tendency, and so on. Habit was in fact equivalent to constitution, crasis (or mixture of the humours), temperament, or even the body or organism in general. Habit in that peculiar sense, or rather its Greek equivalent, has come down to us from Aristotle; and its universal use in medical writings, where other words would have been less ambiguous, is an evidence of the domination of the Aristotelian philosophy. It was one of Aristotle's favourite idioms to employ under certain circumstances ἔχειν (*habere*) with the adverb instead of εἶναι (*esse*) with the adjective (e.g. ἔχειν κακῶς, instead of εἶναι κακός). Accordingly the word ἔξις (*habitus*) became the corresponding abstract noun. It never meant anything more than a condition

or state, and in old medical writings it is common to find the Latin equivalent *habitus* used interchangeably with *status*. "Ἔξις survives for us in cachexia, which is simply Aristotelian for bad condition.

Such is the origin of the classical, mediæval, and even modern talk about the habit. In an essay on "Habit physiologically considered," by the late Dr. Symonds, of Bristol, reference is made to the traditional medical way of speaking of the constitution or individual state as the habit, the writer being evidently under the impression that the learned usage was not irreconcilable with the everyday meaning of the word. "Perhaps in all senses of the word," he says, "we shall find a connexion with its etymology, and that it has reference to something which has been held (*habitus*), retained after being acquired; something added to the individual, and henceforth always associated with him." No doubt the old phrase "habit of body" is now and again used in modern writings to express something acquired and retained, some habitual tendency, or the like. But that is not the meaning of the phrase in medical Latin, where *habitus* had no suggestion of *consuetudo*. It is well to understand clearly at the outset that it is habit in the everyday English sense of use and wont, and not in the Aristotelian sense of ἔξις, that is to be the subject of the following chapters. It is possible that constitution, temperament, crisis, dyscrasia, cachexia, and the like could be shown by an exercise of ingenuity to have a good deal to do with use and wont; but that

subject is altogether remote from my purpose. I come at once to the more obvious illustrations of morbid habit.

The memory of development which the common binding tissue and other tissues of mesoblastic descent never quite lose, is a faculty of reproduction that pertains to the individual cells. But everywhere in the body we have to reckon with the nervous system; and as the nervous system is in an especial way associated with memory, in all the commoner acceptations of the term, it will be desirable to consider shortly at this stage how far the co-operation of a piece of nervous mechanism is necessarily implied in the existence of unconscious memory.

A remark of Hering's on the nervous connexions of the ovary will bring this question to an issue. Having pointed out that all parts of the body are in intercommunication by means of innumerable nerve-twigs and the central organs, he proceeds to say (*l. c.*, p. 15): "We see also that the developmental process in every germ that is destined to be an independent creature reacts powerfully on the conscious and unconscious life of the whole organism. Does not this show to us that the organ of germ-formation stands in closer and more important relation to the rest of the body, and to the nervous system in particular, than other organs, and conversely, therefore, that the conscious and unconscious events of the organism at large find in the ovary a louder echo than elsewhere? Herein we have a plain enough indication of the direction in which lies

the physical bond between the inherited properties of an organism and that peculiarity of the germ by virtue of which it is able in its turn to reproduce the maternal qualities."

Whatever the peculiar sympathies of organs during the pregnant state be due to, it can hardly be maintained that they have an obvious nervous mechanism. The breasts, the ovaries and the uterus are just those organs of which the experimental nerve-physiology has been able to make nothing. So far from the "organ of germ-formation" (the ovary) being in closer relation to the nervous system than other organs, there is no great organ of the body whose function, apart from its vascularity, is so entirely beyond nervous interference. The reproductive process as a whole affords us the best illustrations of deeply rooted memories; but its organs are as a matter of fact those with which nervous mechanisms have least to do.

The memory which has nervous mechanism at its service is no doubt peculiar or unique in certain respects; but there is another sort of memory, no less tenacious, which is largely independent of the nervous system or of its co-ordinating, directing or controlling influence. Although some of the best instances of morbid habit are developments of memory on a nervous footing; there are other instances, such as the mesoblastic tumours already mentioned, where nervous mechanism is practically excluded; and there are a good many more where the nervous agency, although present as a co-ordinating power, is of

secondary importance as regards the persistency or inveteracy of habit.

The maladies that seem to offer the most familiar illustrations of that kind of memory and habit are catarrhs become chronic. These are among the commonest and most troublesome of disorders. In many of them, such as those where there is no abiding or structural cause, the chronicity stands in need of theoretical elucidation; while the treatment, for all its undoubted success, continues to be random and empirical, and remains to be brought under some rational principle.

Let us take the common case of catarrh of the respiratory or the urethral mucous membrane. The first effect of the excitation, whether a chill or the contact of infective particles from a previous case, is to make the ordinarily moist mucous membrane dry, swollen, red, tender and irritable. Then a discharge begins which becomes by degrees thick and opaque, and by corresponding degrees diminishes until the mucous membrane remains at its ordinary moistness. If the catarrhal process be analysed, it will be found that the total suppression of the ordinary moisture of the mucous membrane, which is the direct effect of the turgescence following the upsetting stroke, is succeeded by an altogether unusual action of the epithelial cells. The suppression of the moisture is not followed at once by a restoration of the same; the return to the ordinarily moist and comfortable state of the surface is a work of time, a definite and uniform series

of steps remaining to be gone through. What are those uniform stages?

Briefly stated, they are a return, for a short time, to a more elementary, primitive, or embryonic kind of epithelial function. To quote a general principle that I have stated elsewhere: "Nothing marks so generally the disease-incidents of life as crudity or recrudescence in the activities of cells, tissues, organs, or mechanisms. In other words, we shall find much in pathology to show that, when the organism goes wrong, it retreats to broader ground, or reverts to modes of life which it had come through." The catarrhal secretion of a mucous membrane is such a retreat to broader ground, a step backwards for a time. The ordinary moisture of an epithelial surface comes from the individual epithelial cells, but it comes from them by a refined and delicate process which does not seem to touch their integrity or cause any great convulsion of their structure. The most that one can see of the process is a small bead of mucus detaching itself from the free end of the cell. But in the catarrhal state the refinement and subtilty of function is lost for the time being. The mucus forms in an obvious cavity of the cell, often the nucleus becomes free in the cavity, the cell is disintegrated, the fluid is produced at the expense of the epithelial cell bodily, and is accompanied by a large quantity of solid or nuclear elements—the catarrhal cells.

This is a crude or cumbrous way of producing secretion which may be studied in perfectly healthy

states of many of the lower animals and in some of the more recent glandular acquisitions of the higher animals, such as the breast in its periodical states of unfolding and subsidence. There are certain facts also to show that the epithelial functions in the earlier periods of life are more apt to be attended by cellular or nuclear by-products (such as the great number of lymphatic follicles or collections of lymphoid cells in the digestive mucous membrane of the child). It is, indeed, unnecessary to strain the facts in order to make out catarrhal secretion to be a reversion to a more primitive type of epithelial activity.

The retreat is only for a time ; by degrees the function advances again to its more perfect or finished type. It is needless to illustrate the fact that a cold in the head, or a gonorrhœa, lasts a definite and, as it were, a prescribed time. The cycle is a curve which is on the whole remarkably uniform. But, supposing that a gonorrhœa becomes a gleet, how do we state the fact in terms such as those that we purpose using ? The primitive or developmental memory becomes a habit ; the temporary display of embryonic activity—the inevitable reparative sequel of the injury—threatens to usurp the ground for good.

This, then, we shall find entering into our definition of some morbid habits—that the continuance is continuance on a lower plane, that the activity which tends to persist is an activity that has been resuscitated from the past. Of forms of morbid habit which are not built upon the foundation of developmental reminiscences we

shall have examples in the sequel. But it seems to be an essential point in the formation of habit without the aid of nervous mechanisms, or with such aid subordinate, that the continuing process shall be a process of the rudimentary or developmental type.

A gleet, then, is a functional habit of the urethral epithelium on the basis of a temporary return to a primitive type of activity, or on the basis of a transitory catarrh; and it is none the less a functional habit that the mucous membrane as a whole may assume corresponding structural alterations. Rooted or incessant bronchial catarrhs, where there is no congestion from heart disease, are of the same nature; so also are some persistent or recurrent diarrhœas. The mucous membrane acts so when the ordinary incitement to such action is wanting, or upon provocation so slight as would not have induced the action but for the old memory of it.

The most convenient way of continuing the subject will be to introduce the question of treatment. In such cases of chronic disorder (and in others to be mentioned in the sequel) it is the chronicity that has to be treated even more than the disease. If the habit were but once broken, the normal functional and structural life of the organ or part would reassert itself in the natural course of things. The usurpation would be at an end, the protracted incident would be closed. The class of remedial agents which perform the important service of breaking a morbid habit are the old established, highly valued, but vaguely defined class of *alteratives*.

The group of alteratives is not always made to include the same remedies; its limits correspond very much to the particular writer's notion of how an alterative acts. Dr. Brunton thinks that an alterative acts on various digestive and histolytic ferments; his chief instance of the group, accordingly, is nitro-hydrochloric acid; and his other alteratives are nitric acid, chlorine and chlorides, iodine and iodides, sulphur and sulphides, potash and its salts, mercury and its salts, phosphorus, hypophosphites, antimony, arsenic, taraxacum, sarsaparilla, hemidesmus and guaiacum, mezereon and dulcamara.

Professor Binz on the other hand, places mercury at the head of his list of alteratives, and follows with gold, iodine and iodide of potassium, bromide of potassium, arsenic, phosphorus, copper and zinc. Where there are such differences among recent writers we are safe in following historical usage. I shall accordingly start with Plummer's original alterative pill.

Plummer had no theory of the action of his alterative pill; it simply occurred to him to try antimony in a case of inveterate psoriasis where calomel had failed, at the same time correcting the emetic property of the antimony, by mixing with it nearly as much calomel, "which would either determine its operation downwards, or give it a chance to pass into the blood and penetrate the small canals [the Boerhaavian fancy] without exciting salivation."*

* "An Alterative Mercurial Medicine," by Andrew Plummer, M.D.,

pounded of equal parts of sulphurated antimony and calomel (originally three of the former to two of the latter), together with extract of gentian and a drop or two of oil of cloves. In his case of inveterate psoriasis six pills containing fifteen grains of the powdered mixture were to be taken in twenty-four hours, three in the morning and three at night. After a four weeks' course of the alterative, all trace of the disease had vanished, and there had been no return down to the date of his paper two years after. His next case was also an inveterate skin disease in a man aged 24, "a foulness of the face from many large red spots and pimples" which came out suddenly after taking cold; the disease yielded to a course of the pill. The next two cases were indolent buboes following gonorrhœa or venereal sore, and his fifth case was a gleet of six months' duration "after the cure of a gonorrhœa," which ceased absolutely when the alterative pill had been taken for a fortnight.

Not to go beyond the case of gleet for the present, the cure of it by Plummer's pill was literally an alterative cure. What the medicine did was to break the habit. Small quantities of antimony and calomel gave the epithelial cells of the urethra (and many other cells besides) something special to do; the metals created a diversion, and gave the much more deeply ingrained habit of normal epithelial function a chance to come in again, or to reinstate itself. That is, of course,

Professor of Medicine in the University of Edinburgh. 'Edin. Med. Essays and Observations,' i, 42.

only one way of putting it; but it will suffice for the present purpose. Other figures of speech would be that the drugs paralysed the morbid action for a sufficient time, that they opened the door to the normal habit, that they gave the old-established, orderly and quiet routine of the urethral mucosa the opportunity that it was waiting for.

That such action of drugs is literally alterative will be admitted when we reflect that the same result is often achieved, in that and other chronic catarrhs, by more general kinds of *change*—by taking a holiday, by some strong mental prepossession, by some added zest of living, by some opportune fillip to the whole bodily and mental life. “There is also a period,” says Watson, “in catarrh which has gone on unchecked when you may accelerate its departure—‘speed the going guest’—by a good dinner, and an extra glass or two of wine.” Alteratives are indeed, practically innumerable. But it is not always possible to command them. The most assiduous seekers after change too often pass from one state of boredom to another. The adroitness of alterative cure is shown in surprising the morbid habit, taking the routine without warning, entering into possession by a kind of strategy. Such cures often come unawares; the patient finds one day that his long-standing and neglected cold is gone or going, and not only can he point to no remedy applied of purpose, but he cannot even think of anything that he has casually done or left undone to which he may give the credit. No doubt there are often causes

working together and leading up to the result—such remedies as would be called stimulant or tonic.*

In therapeutics the two former words imply respectively depression and want of tone, and these are large assumptions to make in a good many of the cases of inveterate and troublesome catarrhs or other persisting every-day ailments. Where the general fitness and tone remain the same, there may be produced a magical effect on the ailing part, and that effect is literally an alterative one. My reading of the events is that the morbid habit is broken, the interposed or usurping memory is overborne, the rightful tradition becomes once more dominant.

It is not without good reason that the profession has at all times prescribed the remedies known as alteratives. Grey powder, blue pill, calomel, sublimate, Plummer's pill are constantly prescribed for all kinds of ailments, and it is impossible to believe that they would be so universally recommended and taken if they did not answer. But they are often given on altogether fanciful theoretical grounds, and on indications of the symptoms that are purely irrelevant. A factitious diagnosis of "sluggish liver" or the like is set up, and some form of mercury is prescribed for its cure; the practitioner knows from tradition and from his own experience that some form of mercurial will do good in the particular case; and either he assigns no reason at all for his prescription, or he arraigns

* I shall refer in the last chapter to the general nature of alterative action and to the contention of Dr. James Ross that it is essentially a stimulant action.

the liver, or disordered secretion, or what not. Without attempting to analyse the good effects, in so great a variety of cases, of the famous Abernethian practice of blue pill at night with rhubarb, or a saline purge in the morning, I shall take the particular case of persistent intestinal catarrh of children treated by grey powder.

The benefits of the mercurial in such cases are explained for the most part at random. Thus Binz (who speaks, however, of calomel and not of grey powder) says that the action is "styptic," and then goes on to add that the combination of mercury formed in the intestine (sublimate) somehow "inhibits" the perverted process of fermentation to which the catarrh is really due—as if that were a styptic action. Another common theory is that the mercurial, by its purgative action, sweeps out the diseased secretions from the bowel. To this it has been properly objected (by Dr. John Drysdale) that "the diseased secretions are the effect and not the cause of the disease; and therefore this procedure would be about as rational as attempting to cure a cold in the head by blowing the nose, or a hæmorrhage by wiping away the blood." The homœopathic explanation, as stated by the same author, is that grey powder replaces the catarrh by inducing a mercurial catarrh will last only as long as the mercury remains.

The alterative class of drugs, says Dr. Drysdale, "is really little better than a receptacle for all those remedies that cannot be forced into any other class

and to which the pride of fancied rationalism is unwilling to give their true name—*specifics*.” At the risk of being charged with the pride of fancied rationalism, we may decline to take the homœopathic doctrine of specifics as the last word in the theory of alterative cure. That doctrine is based upon a certain hopeless view of pathology, often stated by Hahnemann and repeated even by so good a pathologist as Dr. Drysdale himself, that it is impossible to know the ultimate causes of disease, that “our knowledge does not enable us to determine the ultimate pathological nature” of the intestinal catarrh, although “we know that we could cure it if we could find a medicine capable of producing in a healthy subject a precisely similar pathological state.”

It would be wrong to overlook the *similia similibus* principle, as one of the many contributory explanations in the great volume of therapeutical action. The principle has obvious applications; thus, Astley Cooper points out that “cubebæ appears to produce a specific inflammation of its own on the urethra which has the effect of superseding the gonorrhœal inflammation;” and it may be added that cubebæ is one of the most trustworthy remedies in recurrent bronchial catarrhs, where there is no abiding cause such as disease of the heart. There can be no objection to saying that grey powder cures the intestinal catarrh of children by establishing a catarrh of its own instead of the former, and terminable at will; or that the irritant action of cubebæ supersedes the urethral catarrh or the bronchial

catarrh. Some writers prefer to say that the drug antagonises the diseased action; but we are obviously describing the same phenomenon, whether we say "antagonises" or "supersedes." "When we use a drug," says Professor H. C. Wood, "we are only in fact producing one disease in the body in order to overcome another disease."* These are very nearly the original words of Hahnemann:† "Let us imitate Nature, which frequently cures one disease by exciting another; and let us choose a substance whose action closely resembles the original disease." . . .

But the doctrine of one disease overcoming another, whether in Professor Wood's hands or in those of Hahnemann and his sectarian followers, has only a limited application. It applies mostly to chronic diseases; and it ought to be remembered to Hahnemann's credit that he was originally aware of that, although he made the mistake, which so many enthusiasts have made, of drifting into a universal system. That doctrine has only a limited application; but within those limits the application is a true and fruitful one. To make the explanation rational, we still want some principle in the pathology, such as the doctrine of memory or habit.

The alterative cure, or the "specific" cure of the secretaries, is possible only where the morbid process continues when its exciting cause is no longer in operation.

* See the discussion on this point between homœopathic practitioners and others in the 'Transactions of the International Medical Congress,' Lond., 1881, i, 487.

† 'Hufeland's Journal,' 1796.

The familiar maxim of treatment is that, if the cause be removed, the disease will get well of itself. Many troublesome attacks of illness give the lie to that maxim; they persist when the cause is no longer in operation or after their natural cycle is completed; they persist by the power of memory or the force of habit. It is then that an alterative acts; it acts by effacing the memory, or by breaking the habit. And if the alterative be a toxic agent, that is to say, a drug, it effaces the memory of morbid action by substituting an action like it; the latter is terminable at will, and by the time it is stopped the memory or habit of morbid action, threatening to become a second nature, will have been broken. The usurper being thus displaced by stratagem, the natural rule of the organ or part once more comes in. The disease gets well of itself, provided we remove not only the cause, but also the memory. Where there is an abiding cause of catarrh, or where serious textural changes have at length been produced by long persistence of the catarrhal habit, an alterative cure is not to be thought of; because all that an alterative can do is to efface the memory or break the habit.

These two indications to remove the cause of irritation, and to efface the memory of morbid action which it tends to leave behind it, have always to be kept in view together; they correspond roughly to the treatment by regimen on the one hand, and by drugs on the other. A certain enlightened class of practitioners "have no great belief in drugs" as they say, because

a disease tends to get well of itself as soon as the patient is removed from his unfavorable conditions or placed beyond the reach of those things that made him ill. There are others who give such old-fashioned prescriptions as blue pill, or Plummer's pill, or calomel, assigning all sorts of reasons. The empirical practice is manifestly right, because this wise world of ours approves of it; and the rationale of that practice is that ill-health tends to outlive its cause, that it continues by the force of habit, or comes back by the power of memory, that it will not get well of itself so long as any recollection of it is left, and that the well-tried class of alteratives are in reality habit-breaking drugs.

I shall have several other opportunities of applying this principle to the treatment of chronic, or recurrent, or paroxysmal disease, and I shall reserve the discussion of the more intimate mode of action until I come to the chapter on the alterative cure of syphilis and to the general review in the concluding chapter.

CHAPTER V.

*SKIN ERUPTIONS PERSISTING BY POWER OF
MEMORY.*

THE case on which Dr. Plummer first tried his "alterative medicine" was a typical instance of an inveterate class of diseases wherein the action of metallic remedies is sometimes marvellous. The cure was one of psoriasis in a lady aged thirty. The eruption had been better and worse from time to time; when Plummer took the case in hand the scalp was covered with scabby crusts extending down the forehead to the eyebrows and nose, and along the temples to the ears. He treated the patient with calomel until salivation began; after that the salivation was kept up for four weeks at the rate of nearly three English pints *per diem* by means of a small dose of calomel every second or third day. When this flux began to decline, the head was fomented, and the crusts fell off. The head was shaved twice, after which the hair grew in as thick as it had been originally. This was at the beginning of winter; and it looked as if the cure were complete. But very early in the spring, the scurf began to appear again on the temples, and it very soon spread to the head and face. Calomel and

antimony in combination were then given (fifteen grains *per diem*), the head being meanwhile fomented to loosen the crusts; and in four weeks there was not a trace of the disease remaining.

The inveteracy of this psoriasis, its persistent coming back at the same spots, its tendency to encroach on sound skin, are evidence that memory and habit were strong in it. That the cellular activity was in any sense embryonic, as I believe the catarrhal process in mucous membranes to be, I am not prepared to assert. In fact, when we come to chronic skin diseases, we find that the memory, retentiveness, or habit, is dependent less upon any true reversion to embryonic characters in the cellular process than on the *implication of the nervous system*. If skin diseases are analogous to catarrhal states, they are rather reflex than direct effects, and are much more intimately bound up with nerve-mechanisms than the catarrhs which have been already considered. This is the first degree of implication of the nervous system in morbid habit which we have had to consider; hereafter we shall have to notice all degrees of the same, up to purely conscious states and volitional actions. The embryonic cellular or the developmental character of the morbid process is one basis of habit; the dependence of the process on nerve-mechanisms is a basis of habit no less. It is necessary to recognise the existence of the one basis and of the other; in the case of embryological or developmental memory, the cells return to their spontaneity and self-governing properties, acting

as independent units although often acting in groups; in the case of nervous retentiveness, the initiative and command are in the power of the nerve-mechanisms (reflex, automatic, or conscious-voluntary). Taking pathological processes in systematic order, we are occupied for a time exclusively with the former; but we soon advance into the domain of the nerves and nerve-centres, and the first definite region that we come to is the province of skin diseases.

Some of the skin diseases are quite clearly associated with the nerve-supply of the skin, such as herpes zoster, and the herpes about the mouth and chin that often accompanies or follows quinsy. Other skin eruptions are not less certainly the reflected consequences of disordered digestion, such as many of the cases of nettlerash, of lichen, of eczema. Symmetry on the two sides of the body, predilection for certain spots, definiteness of figure and the like, are equally indications of the nervous basis of these and other eruptions. Even in the cases where proof of nervous implication is most difficult, there are affinities to clearer cases which justify us in bringing the whole group of skin diseases (making due allowance for the parasitic nature of some of them) under a general law of nerve-implication. Thus in disorders so widely apart as nettlerash, pemphigus, and psoriasis, such affinities are discoverable. The fact that nettlerash may be produced directly by the sting of a nettle, that localised eczema may follow the application of a poultice, or may even follow the direct contact with eczema (as in a case which

I have heard related by Dr. G. E. Paget, where a mother got a patch of eczema on the particular part of her forearm on which she habitually rested the eczematous head of her child while washing it), or that lichen may proceed from the direct action of heat on the surface,—such facts in nowise conflict with the more general doctrine that skin affections are usually the reflected nervous manifestations of disorder elsewhere.*

Now the grand peculiarity of skin diseases, is their independent persistence, or their continuance when the cause that excited them is no longer there, their facility of coming back at the same spot on little or no provocation, and their tendency to extend beyond the original points of eruption. Even nettlerash is not always evanescent; it may remain for days after the digestive or other irritant that caused it is no longer operative. Herpes may enjoy a still more prolonged independent existence. The psoriasis in Plummer's case not only came back time after time, but it spread from the temples to the forehead and

* The following illustration of a reflected skin eruption occurred lately in the case of a gentleman whom I attended. Suffering during the night from severe neuralgia, at a point corresponding to the entrance of the inferior dental nerve into the tunnel in the vertical ramus, he got up and made a mustard poultice, which he kept applied for several hours over the affected side of the face and neck. Next morning his neuralgia was gone; but in the course of the forenoon the upper eyelid began to be red, swollen, and painful, and shortly after a crop of herpes came out on the outer half of the lid. My reading of the events was that the herpetic eruption over one twig of the ophthalmic was the equivalent or exchange for neuralgia of the inferior dental, the good offices of mustard coming between.

down the sides of the nose. Eczema is usually localised at first, and as it persists, it is apt to become general.

One grand peculiarity of skin eruptions, then is that the law of self-limitation tends to be overborne. The law of self-limitation is well seen in most cases of urticaria, even though there be recurrence in some cases and chronicity in a few ; it is also clearly brought out in the well-known fact that herpes zoster usually runs a definite course, and disappears for good, in some cases as quickly as in three or four days. But this definite course or cycle, which is the rule in a nasal or bronchial, or a urethral catarrh, is the exception in a skin disease. Chronicity or habit is certainly not unknown in the former, but in the latter habit is peculiarly apt to usurp the reins. Whether it take the form of mere dogged persistence—*ici je suis, ici je reste*—or of coming back time after time at the same spots, or of encroaching on areas of skin unimplicated before, habit has become the second nature of the eruption ; and the memory or retentiveness doubtless resides in the nerves and nerve-plexuses of the skin.

As in the case of persisting catarrh of a mucous membrane, I shall continue the discussion of these illustrations of morbid habit by passing on to the question of treatment. What are the approved remedies of long-standing skin diseases ? They are arsenic and others of the metals, or in other words, they are the most eminent members of the old class of “alteratives.” Here again the empirical grouping of mercury, silver,

arsenic, antimony, zinc, copper, and the like in an alterative class is literally justified. Their action is simply to break the habit, to banish the usurping memory, to give the indwelling or proper action of the part its long-deferred opportunity of coming in again.

It would be very obviously a mistake, however, to expect that every case of chronic skin disease will yield to a course of alterative internal drugging. It is sufficient for our purpose to find a rationale of those very gratifying cases that do yield to such treatment. Where the result does not follow, other considerations must come into play.

The most important of these is that a persistent skin disease may have an equally persistent exciting cause, such, for example, as the eczema of gout. If the cause be more than habit, then there will be no magical effect from arsenic. Again, it is futile to expect that any drug whatsoever will banish the acne of acid dyspepsia, so long as the acid dyspepsia itself continues; nay more, if the acid dyspepsia had been habitual for a certain time, even if it should ultimately be cured, the acne will probably be permanent and an organised structural new growth. The psoriasis or eczema of bakers and of washerwomen has also the element of persistence in the causation, and the power of an artificially introduced alterative, or of an alterative drug, is to that extent limited. Again, there is the eczema of infancy and childhood, which Mr. Hutchinson thinks may be largely an affair of the

milk and sugar of the diet; so long as the cause is there, the disease will be there, alterative drugs notwithstanding. There are even cases of eczema in children where the practitioner will have no desire to drive away the eruption, or, at all events, to get rid of it summarily. Such eczemas are regarded as an outlet; according to the maxim of household medicine, the disease "is better out than in;" and it is certainly true that the sudden cure of eczema of the head in a child has sometimes been followed by much more serious disease, thoracic or cerebral. Lastly, there are the inveterate skin troubles of old age, the senile prurigo, eczema, &c., whose intractability is rather an evidence of the decreasing strength of the natural powers than of any inability of drugs to break a morbid habit.

Wherever the primary cause is constant in its action, there can be no thought of curing the disease on the ground of breaking the habit, or directly treating the chronicity as a thing in itself. Wherever the primary cause has been itself a habit, probably a conscious voluntary one, such as drinking or high feeding, the induced habit of the skin will be hard to break even when it is no longer the reflex of disorder actually going on elsewhere; it is likely enough to have become a diathesis by itself or independently of the primary diathesis. Or, again, wherever the natural forces of the organism are on the wane, the acquired morbid habit of the skin will have the stronger hold. These are the rational and by no means inconsiderable

deductions to be made in our hopes of curing chronic skin diseases by alteratives.

But when all such reasonable deductions are made, the number of drug-cures that remain is not only considerable but even remarkable. The more purely the chronic skin disease is a surviving memory or habit, the more certain is the effect upon it of an alterative drug. The best instances are those cases of psoriasis where there is no obvious cause for the malady and no accompanying derangement of health. The reputation of arsenic in such cases is too well established in the general experience of the profession to call for particular evidence.

The efficacy of arsenic in eczema is a much more disputed matter; and that is not surprising when we reflect that eczema is not nearly so homogeneous a disease as psoriasis in regard to the cause of chronicity. Doubtless there are cases of eczema where a discriminating practitioner would prescribe an alterative, and prescribe it with effect; but there are many more where he will recognise that the eczema is what Mr. Hutchinson calls a "revealing symptom," and, it may be, even a relieving symptom. A good law of therapeutics need not be compromised by want of discrimination in applying it.

I have already quoted an opinion to the effect that "the class of alteratives is really little better than a receptacle for all those remedies that cannot be forced into any other class, and to which the pride of fancied rationalism is unwilling to give their true name—

specifics." The action of arsenic in certain cases of chronic skin disease is so remarkable that the question of specificity naturally arises for discussion. Thus, in Mr. Malcolm Morris's careful and excellent paper on the "History and Therapeutical Value of Arsenic in Skin Diseases,"* he says of the arsenical treatment of eczema: "I must confess I doubt whether arsenic produces any specific effect in this disease," the specific action having been alleged by others. Again, as regards pemphigus, against which some authorities consider arsenic to be specific, he remarks: "But on the other side it must be said that Hebra in Germany, and Tilbury Fox in England, do not believe in it as a specific. The latter says 'there is no specific for pemphigus; arsenic is declared to be one, but it signally fails to cure the disease, and I have seen quinine in full doses do much more good.' I have myself lately had the opportunity of seeing a case in which arsenic certainly did harm, and which was ultimately cured by quinine."

Specific can never be the last word about the action of any drug. The quotations which I have made from Mr. Morris, clearly point to rational discrimination in the choice of a remedy for different cases of the same malady, perhaps even for different stages of the same case. My contention is that an alterative, such as arsenic, is a habit-breaking drug; it would effect a cure in those cases where the chronicity was pure habit, or where the morbid condition persisted

* Reprint from the 'Practitioner.'

by the power of memory long after the exciting cause had ceased to operate ; and it might under such circumstances be useful alike in a scaly, or papular, or vesicular, or bullous eruption. What it cures is the chronicity or habit or memory of morbid action (be the form what it may) in the skin and peripheral nerves.

But if such eruptions are but the revelations of a disordered state of health still existing, or if they are, according to a homely pathology, the outlet and relief of some disorder of metabolism, of some "acrimony" or acidity, keeping the door open just for so long as there is anything demanding to be let out, then it is clear that an alterative course of treatment directed to the skin, as I understand alterative action, would be premature and out of place. There is something wanted before the alterative, and directed elsewhere than to the skin ; and it is quite possible that the habit-breaking action may not be wanted for the skin at all.

Again, what do we learn from the fact that a certain pemphigus may be cured by quinine, although arsenic had failed to cure it ? It is, perhaps, hazardous to interpret that fact ; but I should be inclined to guess that the pemphigus which quinine cures had depended more upon an implication of the central nerve-control, and that the pemphigus which arsenic cures had come to depend more upon the peripheral plexuses.

But, whether that be so or not, we have numerous analogies showing that one alterative may succeed

where another fails. Arsenic sometimes cures ague when quinine fails, and according to Annesley, calomel and antimony are alone useful in the intermittents and remittents of India in the rainy season, although bark is the grand remedy in general. Again, quinine sometimes cures whooping-cough when zinc fails; zinc sometimes cures chorea when arsenic fails; silver (nitrate) sometimes cures the cholera infantum when mercury (with chalk) fails; and in habitual epilepsy the last drug tried is often the best.

But in adducing ague and whooping-cough, chorea and epilepsy, as instances of morbid habit or unconscious memory effaceable by alteratives, I am anticipating the conclusions of chapters to follow.

CHAPTER VI.

*REFLEX ACTIONS CONTINUING AFTER THE CAUSE
IS GONE.**(HABIT-COUGH, STOMACH-COUGH, WHOOPING-COUGH.)*

It is not uncommon for a person who has had an attack of cold or coryza to go on coughing some time after the catarrh is gone, and for no apparent reason. The individual is in good health, there is no accumulating phlegm in the bronchi, there is in fact nothing but recurring periods of cough, preceded, very likely, by a sense of tickling at the back of the throat. The antecedent catarrh having been forgotten, and the continuity of effects lost sight of, such a cough is often called for convenience, a "stomach-cough;" the stomach is blamed for what the air-passages can no longer be charged with, and the theory is set up that the twigs of pneumogastric nerve coming from the stomach carry to the nucleus impressions of irritation which are for some reason reflected or answered back as if the signal had been made by irritated air-passages; that is to say, the mechanism set in motion is that by which an irritant would have been driven out of the bronchial tubes had there been such.

This is a rather gratuitous piece of theorising ; it has no warrant in known physiological facts, all attempts to irritate the stomach of purpose having failed to produce an act of coughing as the reflex ; and we are safe to follow Cohnheim when he “declines to accept the stomach-cough.”* The converse, indeed, holds good, that irritation of the air-passages may raise so great a commotion among the reflexes as to cause vomiting ; but that takes place mostly in the convulsive cough of infants and young children, either because the movements communicated to the diaphragm do not subside without drawing the stomach into the paroxysm, or because exhaustion of the nervous centre has extended to the proper reflex control of that organ also. On either ground the sympathy is peculiar to the age of infancy or childhood, and it gives no support to the doctrine of stomach-cough.

When a case of so-called stomach-cough is inquired into, the patient will often admit that his cough is merely the dregs of a former cold ; and in many other such cases of unaccountable coughing, there will have been some real irritation of the air-passages not long before, even if it had been forgotten. The cough is an affair of the reflex nerve-mechanisms, and the memory of it may remain when the actual source of irritation is no longer there. The principle of unconscious memory will account for a good many puzzling cases of cough, without forcing it to account for all. How useful an adjunct to our working pathology we

* ‘Vorles. über allgemein. Pathol.,’ ii, 204.

may find in this doctrine of effects persisting through the power of habit or memory, will appear from the following quotation :

“How abundant, how varied” says Graves,* “are the examples of cough we meet with in our daily practice ! How obscure do we find its nature on many occasions, and how difficult and perplexing its treatment ! Where the source of irritation is manifest, where the nature of the disease is simple and easily detected, where after a proper examination we can point to some part of the respiratory system, and say, Here is the seat of the disease—in such cases, indeed, our course is sufficiently clear ; we may proceed with confidence, and practise with success. But how often are we, after weeks and even months of close and painful attention, baffled in our best-directed efforts, and forced to admit the humbling conviction that all our remedies are inefficient and useless, and that our character, as well as that of the profession, is likely to suffer in public estimation ! How often, too, do we discover with surprise, that the cough which we have been treating for weeks as a pure pulmonary affection, depends, not on any primary derangement of the respiratory system itself, but upon the irritation of some distant organ, or upon peculiar conditions of the whole economy !”

The remarkable case of paroxysms of coughing with which Dr. Graves follows these remarks was given up by him and a colleague as past their skill ;

* ‘A System of Clinical Medicine,’ Dublin, 1843, p. 244.

but the patient was "cured all at once by an old woman," who chanced to recommend a large dose of spirit of turpentine with castor-oil; a large mass of tapeworm was passed, and "from that moment every symptom of pulmonary irritation disappeared." But even that assumed irritation was hardly within the province of the pneumogastric; and it is not improbable that the tapeworm, although it was expelled by the dose, had nothing to do with the cough. Whatever the remote cause of the latter may have been, the turpentine must have had its well-known effects upon the bronchial mucous membrane,—indeed, it was frequently given in Dublin (by Dr. Stokes) for its bronchial effects in the form of "turpentine punch"—and it is just as likely that the seemingly causeless cough was some memory of the ordinary coughing reflexes, in a "neurotic" or very retentive subject, which the deluge of turpentine at length effaced.

The "stomach-cough" being really a habit-cough,—a reflex effect persisting after the cause is gone, or an explosive reflex action of the respiratory mechanism surviving by the power of memory, or an acquired habit of the respiratory centre,—the treatment of it is to break the habit, the indication is an alterative remedy pure and simple. Those who are liable to such causeless paroxysms of coughing know very well that the best cure for them is a change for a few days, some break in the routine of living, some novel interest or added zest, such as comes to one on a journey for pleasure, or under whatever circumstances the uniform

atmospheric pressure of daily cares—"fifteen pounds to the square inch"—is varied ever so little.

Among such alteratives we may reckon the "good dinner with extra glass or two of wine" spoken of by the genial Watson. Where such treatment is not within reach, there is the whole repertory of alterative drugs. Some are doubtless more suitable than others owing to their elective affinities. There should be special indications towards Fowler's solution, inasmuch as arsenic is known from the experience of the Styrian arsenic-eaters to make the respirations deeper and easier, or to be a stimulant of the respiratory centre. Belladonna also would be alterative by virtue of the same special stimulant property. Zinc oxide would be indicated from its success in those cases of whooping-cough mentioned by Dr. A. T. Thomson, where "the cough is kept up by custom acting on a debilitated and irritable habit of body."* This brings us to whooping-cough as a habit-cough on a large scale.

Whooping-cough.—That the cough of whooping-cough may be "kept up by custom" is affirmed not only by the authority quoted, but also by Sir Thomas Watson:† "Under some such treatment as this, the disease will reach its termination in from six to twelve weeks; and it frequently happens that when the child is quite well in all other respects, it still continues to cough. The cough would almost seem to be kept up by the mere influence of *habit*. Now, under these

* 'Elements of Materia Medica and Therapeutics,' 2nd ed., Lond., 1835, p. 514.

† 'Lectures on the Practice of Physic,' 1848, ii, p. 68.

circumstances, change of air will often remove the cough as if by magic ; and the shower-bath, and iron in some shape, will sometimes succeed if change of air be not practicable."

But, at what point in the course of the malady does habit assume the reins ? I venture to say that the whole of the whooping or paroxysmal cough is an affair of memory in the reflex nervous mechanisms, like the post-catarrhal habit-cough of adults. Whooping-cough, as we all know, is often highly catching ; but even when it is caught from others, it is caught as a catarrh—a catarrh which is followed after a fortnight, more or less, by paroxysms of coughing.

There are, indeed, those who ascribe infectiveness (where it exists) to the convulsive cough in and by itself, regardless of any antecedent catarrhal stage. Thus, Cohnheim says (*l. c.*, ii, 206) : " I think that we must consider *tussis convulsiva* to be an infective cough. For, not only is it an old experience that in whooping-cough only a small quantity of secretion is produced from the mucous membrane of the air-passages ; but all impartial observers are agreed that the inflammation in the larynx as well as in the bronchi is in no sort of proportion to the intensity of the paroxysms of coughing. Such being the case, is it too much to assume that the virus of whooping-cough gives rise to the seizures of coughing by direct and immediate excitation of the laryngeal or bronchial mucous membrane, and without the intervention of a laryngo-bronchitis ?"

There may be cases of whooping-cough where the usual catarrh at the outset is too slight to attract attention; but it is not from these that we get the true sequence of events. In a typical case, the paroxysms of coughing are "in no sort of proportion to" the catarrh, for the excellent reason that the catarrh does not coexist with them but precedes them. The paroxysms of cough ending with a peculiar indraught of the breath are the after-effects of catarrh in infancy and childhood, whether the catarrh had arisen in an ordinary way, as in the course of measles, or in those epidemic visitations when pretty well everyone is coughing and sneezing, or whether it had been caught from someone suffering with a cold or suffering with whooping-cough itself.

The true sequence of events is well enough understood in the nursery, where the mother expresses fear lest the child's cold should "turn to whooping-cough." Catarrh in a child may be followed for days or weeks by paroxysms of dry coughing, with no whoop; or, again, there may be only an occasional whoop at the end of the fit of coughing (usually in the night), with few or none of the choking symptoms. Even if the case does really "turn to whooping-cough," the practitioner will be apt to reckon it as a "spurious" instance of that malady, unless he is persuaded that the child had caught it from a previous case of the same.

The distinction between "spurious" whooping-cough and real is one of those refinements that our

patients cannot understand; the symptoms are the same, the treatment is the same, and the issue is not by any means safer in the one than in the other. For my own part, if there is to be any distinction between spurious cases and real, I think the real cases of whooping-cough are those which arise out of epidemic coryza, or out of the catarrh of measles, or as the sequel of bronchitis in a rickety child or during the irritation of teething or under other predisposing circumstances; and that the spurious cases are those which are arbitrarily induced in the healthy by contagious particles from cases of the former class or from other cases of their own class; and I should maintain the reality of the former even if they could be shown, as they probably can be shown, to be very much fewer than the latter. Without entering upon the controversy,* I pass to my more immediate object of analysing the paroxysms of whooping-cough as the after-effects of catarrh in susceptible children, or as the memories of bronchial irritation remaining on the reflex mechanisms of the breathing for some time after the catarrh had subsided.

If whooping-cough is in some striking particulars different from the dry cough that occasionally follows the catarrh of grown persons, it resembles the post-catarrhal cough of adults in being paroxysmal. In both cases the cough assumes the character of violent

* I had written at some length on the question of whooping-cough being always the result of a specific virus; but I find the subject so well treated by Dr. Sturges in the 'Med. Times,' 4th July, 1885, that I will refer the reader to him.

fits after the acute or febrile catarrh has practically ceased, and when there is nothing in the state of the air-passages to account for it. If these paroxysms are due to lingering memories of reflex excitation, it must be admitted that the memory is much worse than the reality. This point will come up again.

The special characters of the post-catarrhal stage of whooping-cough are only such as are proper to paroxysmal coughing in infancy and childhood. They are the familiar characters of a fit of whooping-cough—several quick and shallow expirations, the violent distress of dyspnœa (from a stock of air soon exhausted), a long crowing breath of relief, and that cycle repeated twice or thrice, just as the paroxysm in the adult is made up of one series of coughs after another. The peculiarities of the paroxysm in a child, which make whooping-cough so remarkable a disease, will be best understood by taking into account the peculiar characters of a child's breathing. I take them as follows from Vierordt's '*Physiology of Childhood* :'*

Respirations shallow and frequent, two or three times as rapid as in the adult; abdominal or diaphragmatic in both sexes alike until the tenth year; apt to be more irregular in rhythm during the first year than afterwards; and in particular apt to be interrupted by long involuntary pauses in the breathing, leaving no ill-effects and due to no diseased action. Furthermore, the breathing of the first few months is distin-

* '*Physiologie des Kindesalters*,' Tübingen, 1877, p. 82.

guished not only by the irregularity of the respirations in following one another, but also by the fact that their depth and rhythm change under very slight influences, as when one of those breath-holding pauses is followed by a number of short and shallow breaths and these again by one or two deeper and slower.

As regards the larynx, the posterior space of the glottis, or so-called cartilaginous glottis, is but little developed before puberty, "so that a paralysing effect on the muscles that widen the glottis has a much greater influence on the breathing in the young than in the full grown" (l. c., 84). Male children begin to be distinguished from female in their respiratory apparatus and mechanisms long before puberty. Crowing inspiration may occur in infants when there is nothing amiss.

In these various peculiarities of the breathing in childhood there is a sufficient basis for the peculiar characters of the paroxysmal cough of that time of life. Where the breathing is naturally rapid and proportionately shallow, a paroxysm of coughing is bound to bring on the struggle of impending suffocation, the struggle, namely, to fetch a deep breath. It is this prolonged indraught of air at the end of the three or four expirations that essentially distinguishes the paroxysmal or convulsive cough of infancy and childhood. The whooping or whistling sound that accompanies it is due to the spasmodic state of the glottis, a state of spasm that is itself caused by the exhaustion of repeated expirations. Expiration repeated several

times before any inspiration intervenes brings on dyspnoea in a child, with the convulsive effort attendant thereon; and at the same time it brings on the spasmodic reflex action of the laryngeal muscles which narrow the glottis, so as to produce a falsetto, or crowing, or whooping note as protracted as the relieving inspiration itself. The non-development of the posterior glottidean space in infancy is the anatomical basis of this. It is to be kept in mind that the inspiration of infants may be crowing where there is no cough; and that in paroxysms of whooping-cough itself, the deep indraught that ends the paroxysm may have the whistling or whooping character less marked as the child is farther from its first childhood.

It is certainly a very remarkable thing that a grown person who has caught the infection in a house where there is whooping-cough among the children, should sometimes whoop like them. Whooping in an adult is a ludicrous anachronism; and in the rare cases where it occurs, it betrays some peculiar tendency to mimesis. I should be inclined to say that the mimicry in such cases is more like the contagious mimicry of chorea or hysteria, conveyed by the ear and eye, than any part of the true mimetic effect which belongs to the contagious particles of the catarrhal disease.*

Whooping-cough, then, is the distinctive post-catarrhal cough of young children, the memory of

* Sturges ('Med. Times,' ii, 1885, p. 6) entertains the question whether a good deal of the whooping of children in an epidemic may not be due to subjective mimicry (a form of the *idée fixe*), and quotes Bouchut in support of that view.

expulsive reflex acts continuing for a considerable time out of all proportion to the local irritation, recurring at intervals and especially during the more exhausted hours of sleep, and in those periodical recurrences assuming a paroxysmal or convulsive character much more distressing than the cough which has the presence of a real irritant in the air-passages for its cause and the expulsion of the irritant for its object. A cough of that kind is "often kept up by custom," acting on a debilitated or irritable state of body, as Dr. Anthony Thomson admits; or, as Sir Thomas Watson says, "the cough would almost seem to be kept up by the mere influence of habit." But if we are to do full justice to the principle of unconscious memory inhering in nervous reflex mechanisms, we shall make the whole of the paroxysmal or whooping stage an affair of habit, or, in other words, ascribe all the coughing that goes on after the initial or acute catarrh has subsided to a memory of the catarrhal irritation.

This memory-doctrine of whooping-cough leaves us with several things still to explain. In the first place we have to account for the fact that paroxysmal or convulsive cough is a much more common sequel of catarrh in children than in adults; secondly, we have to explain why whooping-cough is so inveterate, and why it has in general so remarkable a conformity of type as to be counted among the specific diseases; and, thirdly, there is the stubborn fact that children seldom have it twice. All these difficulties in the way

of the memory-doctrine find a solution by keeping steadily in mind the physiological peculiarities of childhood in general, as well as the particular circumstances that favour the occurrence of whooping-cough in individual children.

As regards the frequency of paroxysmal or whooping-cough in children after a coryza or other catarrh of the respiratory organs, it may be said that the age of childhood has a tenacious memory for reflex effects in general. In the first year or two of life, nearly all the combinations or associations that a child holds in its body and mind are unconscious memories, of the instinctive, automatic, and reflex sort. A fortnight's bronchial, laryngeal or nasal irritation has an opportunity then of making an impression on the reflex nerve-mechanisms which it will never have again. As the intelligence and the will develop, the province of unconscious memories and of reflex, automatic, and instinctive actions becomes restricted. Mr. Herbert Spencer maintains that the memory (that is to say, conscious memory) and the will do in fact arise out of automatic actions, as these tend to "become complex, infrequent, and hesitating." Unconscious memories have the field almost entirely to themselves in infancy or early childhood. Is it surprising, then, that the coughing reflexes of a feverish cold should be so uniformly remembered at that time of life? Even in adults, as we have seen, a post-catarrhal cough, apt to come on in distressing paroxysms, is not altogether rare.

The second point concerns the so-called specific characters of whooping-cough, its conformity of type and its natural history characters in general, wherein the paroxysmal cough of children may seem to differ *toto cœlo* from that of adults. I have already spoken of the peculiar whooping indraught of the breath, which is really a minor point in the natural history, although it gives the disease its name. Much more distinctive features of the malady are its inveteracy, or almost prescribed course and duration, the somewhat regular intervals between the paroxysms, and their peculiar severity.

The opinion has already been quoted from Cohnheim that the intensity of the coughing paroxysms is out of all proportion to any local irritation at the time; in fact, there is probably no such local irritation at all, for the child (except where the violence of coughing has itself had serious after-effects in the lungs and brain) is remarkably well and comfortable in the intervals. Why, then, are the paroxysms so explosive in their periodical occurrence and so intense while they last? We shall find an explanation if we go to another principle or nervous action, which is a further development of the law of unconscious memory. I shall give it as stated by Rindfleisch.

There are two great distinguishing marks of nervous symptoms in disease: firstly, their periodicity or intermitting character; and secondly, the apparent disproportion between the intensity of the manifestations and the cause of them. The periodicity is based on

the general biological principle of labour and fatigue, of waking and sleeping, of force spent and force recovered. The apparent inadequacy of the cause to the effect arises out of a property of the central nervous system to absorb enormous quantities of incoming excitations as if they left no trace, while in reality it stores them up in the form of potential energy. Thus it is possible for some one impression which may hardly exceed the limits of physiological excitation, but is aided by circumstances, suddenly to let loose the whole store of accumulated forces and to give rise to an outbreak of the most intense feelings and most powerful movements.*

Applying this law to the paroxysms of whooping-cough (an application which Professor Rindfleisch finds no occasion to make, inasmuch as he refers the disease and all its phenomena to the specific action of an invading parasite), we shall take it that the irritations of the respiratory mucous membrane, in the acute catarrhal stage, are only in part answered at the time by the coughing reflex act; many of them are stored up as unconscious memories of which an account will one day be given. We may represent them to the mind crudely as so many suppressed coughs. Now, there are no doubt circumstances where this want of outlet, response, or expression at the time is especially apt to occur; and these are peculiarly the circumstances of whooping-cough.

The period of infancy is in itself an occasion;

* 'Elemente der Pathologie,' Leipzig, 1883, p. 121.

infancy has far more receptiveness than expressiveness, and this is what we all mean when we speak of the peculiarly impressionable nature of a child's nervous system. Further, there are special circumstances in connexion with whooping-cough; the catarrh which is its first stage is often the catarrh of measles, a catarrh of low vitality, of exhausted powers, of feeble reaction; where we cannot allege measles, we can often allege epidemic coryza, or a common cold along with rickets, teething, or some other of the manifold troubles of the growing period.

Those are just the circumstances which cause irritant impressions to be stored up in the nervous centres; the account is not promptly settled, the reckoning is put off to a future day.

The irritative state in question being a respiratory catarrhal one, the impressions are in the reflex mechanisms proper to it, that is to say, the coughing reflexes. A long account of these remains for settlement, and the settlement is in the form of periodical paroxysms of coughing, which otherwise seem to be causeless and purposeless. They are the deferred liabilities of the previous state of catarrhal irritation, deferred because infancy is prone to defer such reactions, and specially because the catarrh has come in the course of measles or of some other enfeebled state of the system. If these liabilities are to be fully liquidated, it will take a certain time to do it; and whooping-cough will inevitably run a definite course of six weeks or more, as Watson thought that it

always did. If they are finally liquidated the incident will be closed for good ; there will be a full settlement of all claims.

The objection may be taken to this view of the paroxysms of whooping-cough, that even if they are in a sense post-catarrhal memories, yet there is something specific in the catarrhal stage of invasion itself. To this it may be answered that whooping-cough often follows the catarrh of measles, and that it may follow a sporadic cold of the ordinary kind. Even in epidemics of it, there is probably nothing more specific in the initial catarrh than there is in an epidemic form of coryza (influenza) or bronchial catarrh. Infants and young children are equally liable with adults to be affected by the mysterious "influence," and in a certain proportion of them the acute febrile and catarrhal attack will be followed by the stage of paroxysmal coughing.

We find it stated, indeed, as one of the diagnostic marks between children's influenza and whooping-cough that "if the cough persists, it is without whoop ;"* but that is a very palpable *ignoratio elenchi*. It amounts merely to this that if the cough persisted with whoop, the practitioner would be wise after the event and diagnose the case as one of whooping-cough from the outset. That every child recovering from epidemic influenza has a memory-cough for some time longer, no one would assert, although a child will have such

* Squire, in 'Quain's Dictionary of Medicine,' Art. "Whooping-cough."

a cough more probably than an adult ; nor would one expect to find that such memory-coughs, when they did ensue, were all of the whooping kind. But it is open to us to say that when they are of the whooping kind, they may be explained as the dregs of the antecedent catarrh, just as the same kind of paroxysms may follow the catarrh of measles, or the catarrh of a sporadic cold in an impressionable child.

The last question before coming to alterative treatment is the immunity conferred by having had the disease once. In the first place it has to be said that an attack of whooping-cough does not preclude paroxysms of the same kind of cough when a fresh cold is caught. Thus, Watson says (ii, 64): "For some time after the disorder has apparently come to an end, if the child take cold and get a cough it is apt to assume a spasmodic character and to be attended with a whooping noise in inspiration." That is the utmost liability that a child has to paroxysmal cough and whooping in future ; it hardly ever has the full sequence of events again. But why should this be thought remarkable ?

The chances are that the child is never in quite the same circumstances again. In the first place it is fast outgrowing the probationary period of its nervous system, or getting rid of its peculiar impressionability to reflex effects ; every year it becomes less and less liable to convulsive cough, just as every year it becomes less and less liable to fits. In the second place, it is not likely to have soon again the debilitating kind of

feverish catarrh which is apt to turn to whooping-cough; thus, it is not likely to have measles again, and it is hardly probable that more than one attack of influenza would fall to its lot within the susceptible years of its life. As regards common colds, which it will have its due share of, we have Watson's statement that the child is in fact liable for some time after to whoop when it has a cold, although it is probable that only a very susceptible child will do so.

When the disease is arbitrarily set up in healthy children by contact with those suffering from it, there is the same kind of immunity from a second attack as in other maladies got by infection. I do not attempt to judge how much of the immunity from second attacks of whooping-cough is of that kind.

We come now to the experience of the profession in the treatment of whooping-cough. I have already quoted the opinion of one authority, that the cough which lingers as if from force of custom may be stopped by doses of oxide of zinc, and of another authority that the coughing habit may be broken by change of air "as if by magic." Both of these are alterative cures, taking the word to mean habit-breaking. Another remedy of the same kind is quinine, not as a so-called "febrifuge" or temperature reducer, but as an anti-periodic or habit-breaker; quinine is under no circumstances much of a temperature reducer, and in whooping-cough its benefits are most marked at a stage of the disease when all fever has long subsided. Among other alteratives suitable to the same stage one

has to mention the popular treatment of carrying the child to breathe the air of gasworks or limekilns ; there is nothing very remote in the supposition that a course of pungent vapours may exert an alterative or habit-breaking influence on the nervous mechanisms of the breathing by supplying the mucous membrane with a new sensation.

All these instances of alterative cure relate to that period of the disease when it is dragging on by mere force of habit in the admitted use of the term. But if my contention be sound, that the whole of the whooping paroxysmal stage is an affair of memory, ought not alterative remedies to be effective from the commencement of it ? In answering this question one has to bear in mind an important distinction in the antecedents of cases.

I have already expressed the opinion that the cases of " true " whooping-cough are those in which the paroxysmal seizures are the sequel of a feverish cold, such as an epidemic coryza or influenza, or of the catarrh of measles, or of a sporadic cold in a rickety child or in an infant cutting its teeth or in highly impressionable or nervously susceptible children generally. In such cases, as I have argued according to a principle quoted from Rindfleisch, the paroxysms of coughing, coming on as if irresistibly at periodical intervals, are the stored-up memories or the postponed liabilities of a past irritation. The nervous centre had assumed the liability for a time.

There is, it may be said, a law of give-and-take

between peripheral and central, between the executive and the presiding direction, a law which I have attempted to illustrate elsewhere.* In our present instance, if the stress were to have fallen on the executive organ or peripheral part, the result would have been some such condition as acute capillary bronchitis or broncho-pneumonia, a not uncommon sequel of feverish catarrh in children. But if the irritant impressions are carried to the nervous centre and there stored up, the local incidence is in a manner averted. The subsequent paroxysms of whooping-cough would be, in this view of the matter, the inevitable liquidation of debts incurred, and they would run a prescribed course.

As a matter of fact, drugs often fail to shorten the term of paroxysmal coughing, and their failure to do so may be regarded, in a certain class of cases, as inevitable if not even salutary. The convulsive cough will go on for six weeks, more or less, despite every remedy tried; unfortunately it will often shatter the child's life by its secondary effects on the texture of the lungs, brain, and other parts, or there may be fatal broncho-pneumonia and capillary bronchitis after all.

On the other hand, many practitioners are sanguine in using remedies to stop the paroxysms from the outset. In what class of cases is that treatment successful? Writers on the subject do not usually distinguish one class of cases from another; or, if they do, it is in

* Art. "Pathology," l. c., § 13, 'Errors in the Regulation of the Animal Heat.'

order to place in a "spurious" class all the cases which do not suit the dogma of continuous reproduction of the specific disease by contagion. In my view, it is just those cases of whooping-cough caught by healthy subjects, which are the spurious; while the real cases are those in which the paroxysmal cough is the sequel of a feverish catarrh, sporadic, epidemic, or belonging to measles.

For example, if a family of healthy children are taken to summer quarters at the seaside or in the country, and there catch whooping-cough from a child in the house, or in a neighbouring house, the malady is for them, and especially for the older of them, an arbitrary and factitious imposition. The paroxysms of coughing and whooping are in a sense mimetic; they do not stand for postponed liabilities of irritation in the real sense above defined; and there is probably no reason why remedies should not be plied vigorously to bring them to an end. To fold one's hands because the disease is a specific infection which will inevitably develop itself in its own time and run its prescribed course, is to make a mistaken prognosis on the basis of a too exclusive theory.

The cases where one must be content to watch the course of events, are just those where the disease had *not* been arbitrarily caused by contagion. In the contagiously acquired group, there will be cases, no doubt, where the course of the malady is as inevitable or prescribed as in the others. But in an epidemic, which is not primarily an influenza epidemic, the chances

are that the larger number of cases, especially those in older children, are suitable for the abortive treatment or for the vigorous administration of alteratives.

These, then, are the lines on which cases of whooping-cough would be discriminated into two classes: one class, mostly of older or stronger children who had caught the disease from others, suitable for vigorous alterative or habit-breaking treatment; the other class, mostly younger children, in whom the paroxysms of cough were a sort of postponed reaction, bound to come out sooner or later, and the sooner the better. While the whooping-cough of practice, especially in large towns, is likely to be a confused mixture of all kinds of cases, it may be occasionally possible to apply such a principle of discrimination, and such indications for treatment, as are here worked out on theoretical grounds.

CHAPTER VII.

AGUES AND NEURALGIAS AS MORBID HABITS.

THE powerful action of quinine or arsenic in checking the periodical paroxysms of fever in aguish attacks has been variously interpreted according to the pathological doctrine of fever uppermost at the time. Since the period of Hoffmann in Germany and Cullen in this country, a disorder of the nervous centres has been assigned more or less of prominence in the pathology, and the action of these powerful remedies was for a long time regarded as undoubtedly an antiperiodic action. It is only within the last few years, and under the influence of the parasitic or ferment-doctrines of fever now in vogue, that another theory of the curative action of these remedies has been attempted.

Whoever has read the history of medicine with a view to discovering the kind of tenure on which the profession in all ages has held its beliefs, dogmas, or principles of action, will hardly be surprised if we of the present day should prove to be as much as ever the victims of fashion in medical theory. Nor will anyone who candidly compares the large-minded and

sagacious writings of a generation or two ago with much that now passes under the pretentious name of research, be disposed to conclude that the modern addiction to measurements and other kinds of pharisaical precision promises more for the rule of practice than the philosophical temper of an earlier age. In our own literature it is always profitable to turn to Watson; and in Watson we shall find a presentation of the facts concerning ague and its cure which may well make us pause before we give over the pathology of that disease to hypothetical parasites, and the cure of it to equally hypothetical germicide properties in the quinine or arsenic.

"There seems," he says, "to be this general principle observable in respect to ague and to most other diseases which occur in paroxysms, viz. that after they have continued for some time their farther continuance depends more upon the effects of *habit* than anything else, and this habit may be broken by strong impressions made upon the nervous system, and the cure of one paroxysm is often the cure of the disease. We have seen examples of the existence of this morbid habit in hysteria and in some cases of epilepsy."* Let us set beside this sagacious conclusion a specimen of the modern academical or research logic taken from the therapeutic writings of Professor Binz, specially prepared for the profession in England: "Nowhere was the neurotic theory more clearly reflected than in the manner in which the action of quinine was for-

* 'Principles and Practice of Physic,' i, p. 772.

merly understood. Quinine was a tonic, nothing more or less; that is to say, it gave the nervous system strength to resist the fever, and for that reason the latter disappeared sometimes rapidly, sometimes slowly. Facts, however, all speak against this one-sided conception of the matter. Ague, for instance, is to be regarded as the fever in which quinine gives the most brilliant results. It arises from the absorption into the system of a specific poison, which develops itself from decaying vegetation. If this poison circulates too long within the body, decomposition of the blood is the result. . . . Besides that, experimental researches have failed to demonstrate the presence of any such influence of quinine upon the nervous system as it has been supposed to possess.”*

There is no warrant to introduce a virus or material poison of any kind into the pathology of malarial fever. It is always seasonal and climatic fever, and there are only two main factors in it—cosmical conditions, and the susceptibility of the organism to their effects. Primary and direct disorder of the heat-regulating mechanism, and that alone, will carry us through all the phenomena of malarial fevers if the principle be applied with full knowledge. The assumption of a virus or miasm, in order to account for the more difficult class of cases, or for the pestilential properties of the night air in certain localities, such as the Roman Campagna and Tuscan Maremma in the summer heats, or for whatever else in the incidence of the disease demands much patient

* “On Febrifuges,” ‘Practitioner,’ 1876, i, p. 433.

disentanglement, is a departure from those principles of reasoning which are the life and soul of science.

The first of Newton's *regulæ philosophandi* is that "no more causes are to be admitted than such as suffice to explain the phenomena;" Sir William Hamilton's Law of Parsimony is, that "a plurality of principles are not to be assumed when the phenomena can possibly be explained by one;" and even the old scholastic logic had a maxim, known as Occam's Razor, to the effect that "*entia non sunt multiplicanda præter necessitatem.*" Primary and direct upset of the wonderful self-adjusting mechanism which strives to keep the heat of the body always about 98° or 99° F. in every climate, in every season, and at every hour of the day and night, is the only principle adequate and worthy to account for all cases of malarial fever.

The factors in the problem are the grand cosmical phenomena of sunshine and shade, of heat and cold, of radiation, evaporation, rain, dew, and damp, the procession of the seasons, man's daily labour and rest, and his knowledge and forethought. This fever, although it never passes from one person to another, is the most universal malady on our globe; it is the standing dire discouragement of men in their struggle with nature. To refer it to a bacillus, or to any kind of poison at all, is not only a solecism of reasoning but a ludicrous error in the elementary sense of proportion. Malarial fever is a great and engrossing problem which requires some patience for its unravelling. Let us not delude ourselves into believing that we can come easily out

of it by assuming a specific virus. Nothing more plainly marks the parasitic hypothesis of disease as an *asylum ignorantiae* than the desire to extend the benefit of it to climatic fever.

It would take me too far out of my way to enter upon any analysis of a paroxysm of ague or of the causes of it, external and predisposing.* For the present purpose the interest of the fevers is in so far as they involve morbid habit; and I go back at once to Watson's statement, that "after they have continued for some time their farther continuance depends more upon the effect of habit than anything else, and the habit may be broken by strong impressions made upon the nervous system." The question that arose in connexion with the whooping-cough habit arises also here, At what point in the course of the disease does habit come in? As in the former case, I venture to introduce it at an earlier stage than our authority does.

Whoever has experienced or has closely watched the paroxysms of a typical quartan ague, including the repetition of the feverish onset punctually at a certain hour of the afternoon on the fourth day and the complete absence of fever and all other disturbance of health in the interval, will retain a strong impression that all the paroxysms after the first are an affair of habit. The regularity of intermittent ague is not quite

* See Art. "Pathology," § 13, l. c. Oldham's essay, 'What is Malaria, and why is it most common in Tropical Countries?' (Lond., 1871) is a remarkably able statement of the case.

so mathematical as one might infer from systematic accounts of it. The types of quotidian, tertian, or quartan, do not always remain pure throughout; the intervals are sometimes occupied by a considerable degree of malaise, and even by a temperature somewhat above the normal; and the paroxysms do not come back with undeviating regularity at the same hour of the day.

But, making all due deduction, the uniformity of *ague* as a habit is very remarkable. The heat-regulating nerve-centre has been upset by some concurrence of circumstances, predisposing in the individual and present in his external surroundings; and the impression lasts or is remembered for some time. Where the stroke has been of a moderately upsetting kind, or where the individual's power of resistance has been good, the fever returns at long intervals (as in quartans and tertians of temperate latitudes); where the climatic circumstances are more trying to the nervous mechanism that regulates the heat, the fever is a daily event (as in the quotidians of hot countries); and where the external circumstances are specially trying, or where the individual is especially fatigued or nervously exhausted, the fever does not intermit completely from first to last (or it intermits only in the convalescence), but becomes a "remittent" or approximately a continued fever.

The memory of it is strong, according to the force with which the original impression had told on the nervous centre. In mild attacks, of tertian or quartan,

the patient gets up tolerably well after a somewhat feverish night, and he remains quite well; it looks as if there were to be no more of it. But on the third day, or on the fourth, he suddenly passes into as high fever as before; and if he does not resort to quinine or arsenic during his clear intervals, he may have the aguish paroxysms coming back at intervals for some time. There could hardly be a clearer instance of a paroxysmal onset repeating itself for no other reason than that the memory of it was retained. The power of memory is still more strikingly seen in those persons returned from the East and living in a non-malarious country, who have an aguish day every now and then when they are run down in health, or upset by festive eating and drinking, or suffering from such a degree of chill as would have ordinarily brought on a common cold.

A principle that was stated in connexion with the paroxysmal attacks of whooping-cough may seem to apply here also; the principle, namely, that the nervous centre has stored up a certain number of excitations, that it has deferred the reflex liabilities until a future time, that the account has sooner or later to be squared, and that each paroxysm is so far a contribution to the fair settlement. It is impossible to overlook the fact that, where there has been much antecedent exposure to heat and moisture, where the heat-regulating centre has been taxed over and over again, or habitually, the tone of the nervous centre is not always speedily recovered even under the influence of quinine or

arsenic; the paroxysms *will* last a certain time, and the fever *will* run a certain course, or will leave behind it the permanent marks of cachexia or diathesis.

But the salient fact remains that the paroxysms of ague are to a most remarkable degree under the control of quinine, or arsenic, or other remedies. What is the effect of those remedies? It is an alterative effect, it is to break the habit. If quinine is a "febrifuge," or hostile to the life of living organisms, arsenic certainly is not; and arsenic, as the "tasteless ague-drop," was of the greatest service in ague long before quinine began to be extracted from bark, and was a better remedy than bark itself. Not only so, but in the experience of Annesley, although bark is the grand remedy of fevers in India during the cold season, yet it fails in the rainy season, in which calomel and antimony are alone useful.*

Taking one remedy for ague with another, we shall conclude that the cure is not by way of killing any hypothetical ferment or organism, but that it is by way of breaking the morbid habit, as Watson says, "by strong impressions made upon the nervous system." As for Professor Binz's statement, "that experimental researches have failed to demonstrate the presence of any such influence of quinine upon the nervous system as it has been supposed to possess," all that one can say is, so much the worse for experimental researches. Everyone knows that a continued use of quinine in clinical practice makes noises in the

¹ A. T. Thomson's 'Materia Medica,' 452.

ears, or even deafness, or mental confusion ; and these, no doubt, are nervous symptoms. If the "influence upon the nervous system which it has been supposed to possess," refer to the much sought proof that quinine lowers the temperature, then the objection is merely irrelevant. It is not by lowering the temperature that quinine cures ague, but by breaking the heat-regulating centre of its periodical habit. As Watson says : "This habit of paroxysmal recurrence may be broken by strong impressions made upon the nervous system; and the cure of one paroxysm is often the cure of the disease."

The evidence that the action of quinine in ague is an anti-periodic or habit-breaking action is not only in the fact that its equivalent remedies or drugs in that respect (arsenic, calomel and antimony, change of air and the like) are the most conspicuous members of the old group of alteratives, but also in the fact that quinine itself will often break a habit which is not at all febrile or on any conceivable theory the result of an infective virus. In a case of Sir Benjamin Brodie's, a gentleman who had been long in the tropics became subject to stricture of the urethra of a spasmodic nature, which recurred every other midnight and continued until five or six in the morning. The recurrences were stopped, or the disease was cured, by large doses of quinine at short intervals.

But that kind of alterative action brings me to the second part of this chapter, namely, neuralgias as morbid habits curable by alterative remedies.

Neuralgia.

In neuralgias, as in all other persistent conditions, the first question is whether there be not some abiding cause for the pain, and, in particular, whether there be not some local source of irritation, such as a bad tooth. Such primary or initiating causes of neuralgia are notoriously difficult to discover. Many patients with face-ache are sent to the dentist to have the teeth "looked to," when the teeth are all quiet enough, and there is absolutely no reason to arraign them or to set a dentist to work at them. Face-ache, where it is referable to the teeth at all, is more likely to be a reminiscence of dental irritation long past, than of any morbid condition of teeth still in progress.

In saying this, there is no wish to deny that neuralgias have been cured by pulling out or stopping decayed teeth. But as a general rule, dental caries or periostitis of the fang, or whatever other morbid condition the dental tissues may be subject to, will produce toothache and not neuralgia. Toothache is local, neuralgia is more paroxysmal and pervading; toothache is primary, neuralgia is subsequent; toothache is the reality, neuralgia is the surviving memory. These considerations, it seems to me, are a necessary supplement to the familiar doctrine that the teeth are to blame for much of facial neuralgia, and that the patient requires the dentist's services more than the physician's. To illustrate this view of facial pains

remembered and recalled, I shall relate a case where there was no ambiguity from any supposed implication of the teeth.

The sufferer in this case was a Cambridge mathematician of repute, who may be trusted to have rightly inferred the sequences of cause and effect. Having accidentally struck his forehead just over the eyebrow, against the edge of the mantlepiece, he felt the pain of the blow as usual at the time, and just as naturally soon forgot it. Several weeks afterwards he had an acute attack of neuralgia all over that side of the face; and from some indications of a subtle nature best known to himself, he was led to connect the neuralgia with the contusion of the eyebrow, which had evidently been severe enough to make some impression on his memory. He had never had neuralgia before nor did any explanation of the paroxysmal attack seem so ready to hand as the antecedent supra-orbital injury. The supra-orbital twig of trigeminus had been touched by the blow; it had transmitted impressions to the centre which had not only been felt as painful at the time, but had been stored up in the chambers of unconscious memory. After an interval, but upon what provocation one knows not, the whole trigeminus of that side of the face becomes the seat of paroxysms of pain, shooting as if from the trunk of the nerve along the several branches, ophthalmic, infra-orbital, and inferior maxillary. It is difficult to regard that particular case of facial neuralgia otherwise than as one of memory. The memory, it is

true, ranges more widely than the reality ; also it is paroxysmal like the gusts of a storm. It is as if the original pain had multiplied a thousandfold by brooding upon itself.

There are doubtless many cases like that in the experience of practitioners. I shall mention briefly one other, giving the sequence of events as they were related by the patient, a highly observant man. He is now the victim of periodical sciatica, in which the pain shoots from the hip down every nerve of his thigh and leg. He traces it all to the time, many years before, when he used to sit on a high stool at a desk, not far from a door which was constantly opening and shutting, and admitting currents of cold air. The constantly recurring draughts struck the outer side of the foot, where it was exposed between the shoe and the drawn-up trouser.

Taking this to be the true sequence of events—and the narrative was not inspired by any theory—the external saphænous nerve must have transmitted many slight impressions, which were stored up, to discharge themselves afterwards with thousandfold intensity of pain along every branch of the great sciatic.

If such after-effects as these had been motor and not sensory, they might have been classed among those deferred reflex liabilities of which the paroxysms of whooping-cough have been taken to be one instance, and of which an attack of tetanus, following a wound or other local irritation of a nerve-twigg, would be another.

Although neuralgic paroxysms are not reflex effects in the strict sense of being reflex actions or responsive discharges of motor force, yet they are to the sensory side of the nervous system what reflex movements are to the motor. The pain seems to issue from the central side, as if it were an outgoing discharge. In the passage quoted from Rindfleisch with reference to the storing up of impressions, he speaks of the sudden letting loose of these as giving rise to an outbreak not only of powerful movements, but also of acute feelings. We may venture, then, to speak of reflex pains, just as there are reflex movements of the voluntary muscles, or of the involuntary muscles, or of the vaso-motor mechanisms, or of the glandular secretory mechanisms. In fact, true or motor-reflex effects in the form of muscular spasms of the face, and vaso-motor reflex effects in the form of redness and swelling of the corresponding region, and glandular reflex effects as in the flow of tears, are not unfrequently correlated parts of the neuralgic paroxysm.

How does this memory-doctrine suit the bulk of the cases of neuralgia? At first sight, by no means well; for it is seldom possible to go back to any definite nerve-injury from which the stored-up memories might have proceeded. But if we go through the groups of neuralgic cases, the application to them of the principle of unconscious memory and acquired habit will seem to be less far-fetched. Thus, among all the cases of facial neuralgia, there are probably few in which some antecedent irritation of dental

nerve-twigs can be excluded, even if it had fallen in former years. Or again, in the facial neuralgia of seafaring and fisher folks, there has been habitual exposure of the whole trigeminus region to cold winds, and salt spray, or to burning and tanning, an exposure so habitual that no acute effects were ever felt at the time. In such cases there would be the long antecedent storing of impressions, followed by the violent paroxysmal discharges.

In still other cases, which are remarkable for their aguish periodicity, there would have been no primary excitation of peripheral nerves of the face at all, but a direct shock or injury, or series of shocks, to some nerve-centre, such as those centres which preside over the uniform body-temperature and the reaction to chill. The paroxysms of facial pain are sometimes the equivalents or substitutes of true paroxysms of ague, one variety of them being actually called brow-ague. Even in this country, where we have hardly any ague, we have no lack of intermittent neuralgia or hemi-crania. Without seeking to exclude other explanations, I venture to offer the following suggestions as relevant to aguish and other intermittent neuralgias.

There is, as we know, a curious relationship between chorea and rheumatic fever, of which I have given elsewhere* an explanation as follows: In rheumatic fever "there is an upset of the heat-regulating centre by chill, owing to which an extravagant amount of heat-generating nerve-influence is sent out. This

* Art. "Pathology," l. c., § 13.

falls, for some reason of the body's habit (inherited or proper to the individual's occupation, or otherwise special), upon the muscular system, whose metabolism produces heat without work. The articular nerves, which are ordinarily employed to convey the sense of effect of work done, from the surfaces where the movement is applied, convey, under the changed circumstances of the muscles' activity, a sense of pain.

. . . Among other muscles the heart is affected; and just as in the voluntary muscles the structural effects are in the synovial membranes, ligaments, tendons, and aponeuroses, so in the heart they are in the pericardium and in the more fibrous parts of the endocardium. But they are sometimes in the cardiac muscular tissue itself, the muscular substance of the heart being peculiar." Now, on that basis, the relationship with chorea is represented as being that the nerve-centre either permits the generation of heat from the muscles without work (according to the suggestion of Foster), or that it sets the muscles on to an incoherent and gratuitous display of their proper work, those two results being more or less interchangeable or even mixed, while the latter is special to the earlier years of life.

Chorea, then, is intermitting paroxysmal discharges of motor force having the same relation to a true chill-disorder, namely, rheumatic fever, that the intermitting paroxysmal pains of neuralgia may be said to have, as a sensory effect, to other chill-disorders, and to ague in particular. Intermittent paroxysmal

neuralgia is not ague, but it is interchangeable with it or correlated with it, just as chorea is interchangeable with or correlated with rheumatic fever. In both cases the equivalent nervous effect (motor in the one case, sensory in the other) would appear to be produced when the injury to the centre is something short of a fever-causing chill, or where the individual's age or sex or other circumstances cause the reaction to turn in a different direction.

So far as concerns the memory-doctrine, neither chorea nor rheumatic fever illustrate it well in themselves, both being more or less acute and self-limited maladies. But intermittent neuralgia is a good instance of it, running parallel rather with the malarial cachexia or diathesis than with intermittent fever itself, and so raising the question of a kind of memory which falls to be considered in a later chapter.

In seeking for those primary injuries to which the store of facial neuralgic memories might be referred, (including injuries of dental branches, the effects of habitual exposure on the cutaneous branches, and injury to the nerve-centre by chill), it is not intended to lessen the importance of anæmia, or other predisposing causes, or even to deny the possibility of neuralgia having no more definite antecedent, either peripheral or central, than those constitutional states, and depending for its cure upon the cure of them. At the same time, I do not think that we get at all more forward in this matter by speaking of some persons as being peculiarly neurotic; it would be just as pro-

found to say that they were peculiarly neuralgic. But on the subject of neurotics and neuroses I shall have more to say in the chapter following.

If we come now to inquire what are the most celebrated remedies for neuralgia, we shall find among them some well-known alteratives or anti-periodics, such as arsenic and others of the metals, quinine, change of air, and the like. But everyone knows how intractable a disease neuralgia is apt to be; there is hardly another functional disorder so often the despair of the practitioner and the opprobrium of his art.

That being the case, our first duty is, not to seek for more and more remedies by empirical trial, but to be clear about the indications of cure. The most obvious indication of all is to remove the abiding local cause, if there be one, as, for example, a decaying tooth in facial neuralgia; and not less important, to remove as far as possible such a condition as anæmia, which is often much more than a mere predisposing cause of neuralgic attacks.

But when these primary indications are fulfilled, there will be much neuralgia still uncured; and I believe that the greater part of that intractable residue is an affair of memory on the nerves or in the centres. Some of it has doubtless become as inveterate as a diathesis, and the treatment of it will be palliative in the form of local application of counter-irritants, or of benumbing substances like aconite, or of anodynes, so long as the paroxysms are present.

The radical cure of a neuralgic liability, if I am right in my contention, must be an alterative cure, or such a mode of treatment as tends to efface an old train of memories or to break an ingrained habit. Quinine enjoys a repute for that purpose; but quinine fails as often as it succeeds. One powerful remedy after another, in the same group, would no doubt be better than plying a single drug for a length of time. Among other alteratives, arsenic in solution or in pills is not without its advocates. That the cure of neuralgia is in many cases really an alterative one is proved by the striking benefit often got by change of air, especially if the change be from a relaxing climate to a bracing, or from a moist atmosphere to a dry.

CHAPTER VIII.

UNCONSCIOUS MEMORY IN VISCERAL NEUROSES.

UNDER visceral neuroses are included those recurring or inveterate states of ill-health, with symptoms located in the lungs as in asthma, in the heart as in angina pectoris, in the stomach as in some forms of dyspepsia, in gastralgia and gastrodynia, and in other abdominal and pelvic organs. It is a familiar experience that valetudinarism of that kind too often refuses to yield to treatment directed to the physiology of the organ where the symptoms are located; on the other hand, it is becoming every day a more common experience that such forms of ill-health do frequently yield to a particular class of remedies. What are those remedies?

In looking through Dr. Clifford Allbutt's, 'Lectures on Visceral Neuroses,' we shall find that arsenic is credited with the most conspicuous benefits, that quinine comes next, that silver, iron, and phosphorus are among the other beneficial drugs, and that change of air, sea-voyages and the like are the best adjuvants of drugs. Dr. Allbutt argues ably and eloquently in favour of a class of neurotic persons, whose liabilities in the par-

ticular direction are largely a matter of inheritance or breeding, as indeed our various qualities and the defects of our qualities mostly are. Wishing to advance somewhat beyond the almost equivalent proposition or truism that patients with such liabilities are neurotics, I venture upon the definition that neurotics are those persons whose unconscious memory, or whose memory for unconscious reflex effects, is particularly strong. If the neurosis be an asthma, there must have been at one time some experiences of morbid action in the lungs, the memory of which remains. If the neurosis be an angina pectoris, there must have been some long-continued disorderly action of the heart, due, for instance, to excessive smoking, to afford a basis for the recurring distress. If the neurosis be habitually bad digestion, there must have been at one time or another a good many meals undigested, owing to mental preoccupation, hurry, bad cooking, ill-chosen dishes or other avoidable cause. If the cause be as habitual as the ill-health, there is, of course, no occasion to invoke the explanation of memory or habit on the nerves; nor is that explanation literally applicable if there be strong evidence of inherited disposition to the particular weakness.

It is one of the valuable results of Dr. Allbutt's pleading to show that the recurrence or inveteracy of such ill-health is often detached from an obvious and abiding cause, and that even inherited liability may not serve to explain it. It is only to such cases that I would apply the principle of unconscious memory, or of disor-

dered reflex effects remembered. The malady is largely on the nerves, to use the popular and not inaccurate phrase; but it is a memory of some local disorder that has really been, that has had an actual and intelligible origin in the life of the individual. I find a partial admission of this by Dr. Allbutt himself: "We know, for instance, that the touch of a bronchial attack, or of an acute pneumonia, may first reveal an asthma till that moment wholly latent—latent it may be, till middle or even later life—or latent it might have been, like the unwept tear, for ever. But the sleeping ill, once awakened, rarely recedes altogether, and by its recurrence tends to rivet upon the sufferer the chains of habit." The sleeping ill, we may take it, had no existence except as the memory of a real attack, unless we can positively allege strong evidence of heredity. The unwept tear is no tear; and although we may speak of the suppression in their due place of such emotional reflexes, yet the relation of a paroxysmal dyspnoea to a touch of bronchitis is not the same kind of latency.

Neurotic persons, we may admit, have keen memories for transient reflex effects; it is their unusual retentiveness in that unconscious and involuntary sphere that makes them neurotics. Of the neurotic person Dr. Allbutt says, *nascitur non fit*; and no doubt his retentiveness for the unconscious is part of his congenital endowment. Dr. Allbutt's graphic sketch and analysis of the neurotic type would suffer no loss of harmony by some such additional stroke as

would place a lively retentiveness for the unconscious in the background.

It matters little for the empirical treatment of such neuroses whether we resolve them into memories of bygone reflex disorders, or whether we call them simply neuroses. But it is interesting to observe that the drugs which have most power over visceral neuroses are precisely those which are beneficial in chronic skin diseases, in ague, in neuralgia, and in other persisting or recurrent disorders. However, there is some confusion as to the names of the therapeutic agents.

"Once persuade them," says Dr. Allbutt, "to throw all their alteratives, their pepsines, and their mineral waters to the dogs, and your battle is half won. I cannot read the lives of men like De Quincey or Carlyle without suspecting that a timely course of Fowler's solution" would have made a great difference to them. But what is Fowler's solution if it be not an alterative, a habit-breaking, a memory-effacing drug? In that enumeration of remedies which Dr. Allbutt would throw to the dogs (the alteratives, the pepsines, and the mineral waters), it seems to me that we have precisely the combination that the circumstances call for—alteratives to break the habit, and physiological aids to the enfeebled digestion meanwhile. At a mineral spa we have the two in combination—the alterative effect of holiday and change of air, and the adjuvant effect of the waters. Herein I do not differ from the experienced and philosophical physician whom I have

quoted, in the main principle that he lays down ; for we may cordially appropriate from him with no reserve his generalisation of "nervous reactions so imposing and distressing as to conceal the original seat of the disturbance and to establish a secondary malady out of all proportion to the mode of its initiation." My endeavour is simply to rescue the old and respectable term of "alterative" from vagueness, and to read into it a modern and rational meaning. Whether I have succeeded in doing so will be more apparent when I have finished.

Diabetes.

The question must often have occurred to practitioners, Why should glycosuria become chronic when there is no structural lesion at the back of it ? There are, of course, cases of diabetes where the disease seems to depend upon the abiding influence of a tumour or injury in or upon or near the medulla ; the cure in such cases would depend on the very improbable event of removing the anatomical cause, as Dr. Ross expresses it. There are other cases of diabetes, especially in the East, where the preponderance of carbohydrates in the diet turns the scale in favour of glycosuria, even if it do not altogether account for the existence of the malady. The cure in such cases would depend on removing the physiological cause ; and these are the cases, discouragingly few in number, where diabetes is not only kept within bounds but veritably cured by a purely nitrogenous diet.

But there are a great many other cases of diabetes, probably the larger proportion of the whole, where the malady seems to have begun in occasional or fitful periods of glycosuria, which gradually became habitual and confirmed. Speaking of the experimental production of glycosuria in animals I have elsewhere said : " These interferences produce a passing diabetes. It has been objected that the diabetes so produced is too transitory to be counted as analogous to the grave human malady ; but it is well known that the same transitory effects are not uncommonly met with in medical practice. The true and serious diabetes is merely the established and confirmed habit of turning everything to sugar."

Without wishing to bring every case of diabetes into the same category, we may take it that a very large number of them begin in emotional and intellectual strain, in intense mental preoccupation, in business worry, in shocks to the primary instincts and affections. The means by which artificial glycosuria is produced in animals are curiously analogous to these causes in the human subject. Curare causes glycosuria, its more characteristic effect being to cause that muscular limpness which is the bodily expression of fear. Another toxic agent which has glycosuria among its effects is nitrite of amyl, the more characteristic effect of it being to cause that dilatation of the superficial vessels which, in blushing, is the bodily expression of embarrassment or shame. Certainly, much of glycosuria, whether experimental or clinical,

is an affair of interference with the nervous control.

Although the centres and paths of that control agree closely with the vaso-motor, it is highly improbable that glycosuria is simply vaso-motor paralysis. The effects are not vaso-motorial, even if the path of influence be the same. The effects are rather to take off the sort of check or inhibition which ordinarily restrains the liver-cells from turning their glycogen into sugar. The controlling nerve-force is upset in such a way that the glycogen which is always ready to become sugar (as its name implies), but is usually inhibited from so doing or turned off in another direction, does actually change to sugar. This interference with the healthy nerve-control of metabolism within the liver might be otherwise spoken of as if it were some shortcoming in the hypothetical "ferment" of the metabolic process, the due control of the function by the nerves and the due breaking up of the substance by the ferment being for practical purposes one and the same thing. The sugar so produced is not what the economy wants; it is useless for purposes of tissue nutrition, and there are all the signs and symptoms of malnutrition in proportion.

Regarding glycosuria as a result of the taking off or paralysing of a restraining or inhibiting force, whose more or less constant operation is somehow necessary to the functional adaptation in the liver, we shall find that this loss of control over the steady and balanced action of a gland, or loss of inhibitory influence, is the

same that goes more obviously with many kinds of emotion, particularly in women and the young. The lachrymal and salivary glands afford perhaps the most familiar examples. But the wave of emotional disturbance spreads widely over the viscera; it certainly does not exempt the liver, although the action of the feelings upon the liver is perhaps less familiar to us than the reaction of the liver upon the feelings and temper.

Now, in the class of diabetic cases here referred to, there will have been profound emotional, or other mental upsets, but there has, generally speaking, been no corresponding expression. The mental state is strictly comparable to the muscular state of dead strain; there has been no active *play* of the feelings. Some people habitually keep back the expression of their feelings, and remain what is called stoical under all circumstances. Whether these persons are more liable to glycosuria than others it is impossible to say; but we are warranted in saying that the unexpressed emotion of anxiety, worry, and paralysing misfortune, the grief unrelieved by tears, the load of care borne without help, the mind turned for ever inwards upon itself and checked in its active outgoings, even curtailed opportunities and soured ambitions—that all such repression, or want of expression by the usual channels, is apt to take a peculiar revenge or to find a peculiar outlet by discharging itself unconsciously upon the glandular system, and upon the liver in particular. The loss of inhibition or tone which ought to have caused the blushing of embarrassment or the limpness

of fear, the flowing eyes or the parched mouth, turns aside to deeper channels and produces an effect which looks as different as possible from an emotional effect—namely, a discharge of sugar from the liver-cells into the blood. The disease is a peculiarly profound kind of visceral accompaniment of emotional upset, and one that falls entirely in the sphere of the unconscious.

We may now come back to the question, from which we started to digress, Why should glycosuria become chronic? The answer seems to be that the unconscious visceral accompaniment, being an affair of nerves and nerve-centres, is unconsciously remembered. Either there has been a very profound impression produced at one overwhelming stroke, the memory of which does not readily fade; or, more probably, there are frequently recurring upsets, which turn more easily into their organic channel the oftener they recur, and so form a kind of tradition or habit of morbid action. In the former class, are those remarkable cases where confirmed diabetes has followed the harrowing suspense of shipwreck, or the shock of suddenly uprooted domestic ties. In the latter class, are the ordinary cases where for years long the glycosuria had kept coming at fitful intervals, until at length it is brought under the physician's notice as an established habit, not very easy to break.

That reading of the morbid process, as one of unconscious memory and acquired habit, is in accordance with some recent views of diabetic treatment. Thus

it is stated by an American physician,* who expresses an opinion not uncommon in the United States: "Diabetes has become to-day a disease easily and certainly curable provided that the treatment be not begun too late." Provided that the habit be not too deeply ingrained, it may be broken; so, at least, we may interpret the alleged power over incipient glycosuria of the recommended combination of arsenic and bromine, administered in small doses for a considerable period. Doubtless an antidiabetic diet is needed at the same time; but the indication of cure is not merely to reduce the quantity of sugar-forming food-stuffs, but also to break the habit of glandular action which will seize upon any kind of pabulum for the satisfaction of its acquired craving.

I reserve for later chapters some remarks on the more intimate nature of the alterative effects of the metals upon cell function.

Albuminuria.

Diabetes or fitful glycosuria does not appear to be purely an affair of vaso-motor disturbance, even if the nerve-control be very much the same as the vaso-motorial; the nerve-control touches the glycogenic metabolism more intimately. But in the sphere of purely vaso-motor disturbances, we may find evidence of the same power of unconscious memory and morbid habit, and of the same kind of alterative cure. I

* Dr. Austin Flint, junr.

shall take the instance of albuminuria following one or more attacks of congestion of the kidneys from chill. Why should an attack of renal congestion from chill, or a "cold of the kidneys," ever be followed by permanent albuminuria? With a view to this question, let us consider what is the derangement that favours a leakage of albumen.

I quote from the pathological article already referred to :* "The problem, as it may be called, of the renal excretion is how to discharge from the blood and from the body absolutely the washings of the tissues, or the waste matters of metabolism, without allowing other dissolved substances of the blood to be discharged at the same time. In adaptation hereto the kidney is in part a secreting organ and in part a mechanical filter. The greater part of the water of the urine is filtered from the blood as it passes through the remarkable coils or glomeruli of small vessels which are placed at the farther end of the tubular system. In these the structural adaptations all point to mechanical filtration and not to selective secretion. The circulation in the vascular coils of the kidney is unique as regards the balance of driving force and resisting force ; the lateral pressure in these spherical coils of small vessels is greater than in any other capillary region of the body. It is indeed great enough to cause a transudation of water ; but is it so nicely balanced as not to allow an escape of albumen ? There can be no question that albumen does often

* Art. "Pathology," l. c., § 11, 'Errors of Metabolism.'

find its way into the urine without amounting to a serious functional error or a clinical condition of disease, and it is equally certain that the leakage takes place at the glomeruli; the filtration of water from the blood is very apt to be attended with a slight leakage of albumen also. The adaptation that water should drain off, but not albumen, is a very nicely balanced one, and therefore very easily upset. The nicely adjusted balance of driving force and resisting force in the vascular tufts is constantly exposed to disturbing influences, so that one may reckon to find a certain small average of albuminous leakage. The great occasion of this leakage is sluggish circulation through the glomeruli. The faster the blood passes through these capillaries, the greater the quantity of water drained off, and the more minimal the quantity of albumen that escapes; but when the blood travels slower, there is absolutely less water filtered off in a given time, and the proportion of albumen that passes with it is increased from a minimal quantity to something considerable. Thus a *congested* state of the kidney is favorable to the leakage of albumen, and a large part of the albuminuria of medical practice is of that nature."

But why should one single attack of congestion (from chill or other cause) so often leave behind it habitual leakage of albumen, and the parenchymatous swelling or other structural changes consequent thereon? The continuance naturally expresses itself in the language of memory; the vaso-motor nervous mechan-

ism of the renal filters retains the impression made upon it. A corresponding impression on a mucous membrane, say from chill, would have had its catarrh for a definite period, and there the incident would have ended, or the effects of the blow been resolved or dissipated. But the vaso-motor nervous mechanism of the kidney is, as we have seen, a very finely adjusted or very sensitive one; and its memory or retentiveness may be said to be acute in the same degree.

It is difficult to explain this persisting congestion of the kidney on any other ground than that of habit. The effects of a severe blow, such as a chill under peculiar circumstances, were bound to last a certain time; but in the kidney, such is the sensitiveness of its vaso-motor mechanism and corresponding keenness of memory, that they are peculiarly prone to go on indefinitely. The temporarily disturbed balance of driving force and resisting force in the renal tufts usurps the field for good; it becomes a habit of the kidney, the leakage of albumen becomes chronic, and chronic leakage of albumen means structural changes, probably of the "large white" sort.

Hitherto, in applying the doctrine of unconscious memory to disease, we had in the first instance cases of embryonic memories where the nervous system did not come in at all; next we had cases, such as chronic skin diseases, where there was certainly a nervous basis for the process, determining the area of distribution, the figure or pattern, and the like; thirdly, we had the unconscious memory of the nervous system

very clearly implicated in the respiratory reflex act of coughing ; fourthly, we had the memories of the heat regulating nerve-centre exemplified in the periodicity of agues, with certain equivalent or closely related nervous memories in the paroxysms of neuralgia ; fifthly, we had the neuroses or remembered and ingrained functional irregularities of great organs within the sympathetic sphere, where the metabolic function is directly under nerve control.

Into all these the regulation of the blood-supply by the nervous control enters more or less ; but it is not until we come to the persistent congestion and albumen-leakage from the renal vessels that we meet with a vaso-motor memory pure and simple ; and along with that predominance of the vascular element in the morbid process we have a proportionate amount of structural effects. That is one reason why chronic albuminuria is not so likely an object for alterative or habit-breaking treatment as some of the morbid habits already considered. Wherever a certain tradition of vascular action gets established, the chronicity is of the worst sort, because structural changes gradually come in behind it and fix it with all the fixity that adaptation of structure gives. And in albuminuria there is the further disadvantage that the leakage causes the cortex of the organ to be bathed constantly in a fluid of high nutritive or stimulant value, so that an embarrassing over-feeding of all the cortical tissues ensues.

Under these circumstances it is perhaps not sur-

prising that there should be less evidence among the empirical experiences of medicine in favour of habit-breaking drugs in albuminuria than in the case of other memories of unconscious nervous action previously considered. There is, indeed, a strong prejudice, whether well- or ill-founded, against giving drugs of the alterative kind in chronic albuminuria. But there certainly seems to be an opening for some such course of treatment where the sluggish circulation through the glomeruli drags on from mere use and wont long after it should have returned to its healthy swiftness. The vaso-motor nervous mechanism is peculiarly amenable to influences; and if it has merely fallen into an evil habit, it does not seem unreasonable to expect that the habit may be broken before the structural changes have fixed the disease for good. There is at least an indication of treatment in this doctrine of unconscious memory as applied to albuminous leakage; and it is not clear why such an alterative as antimony, in the form of Plummer's pill, should not be tried in small doses for a considerable period, say three or five grains once a day. There are, I believe, some floating traditions in favour of that practice.

That the kidneys will become structurally damaged after a long continuance of albuminous leakage is certain; but it is equally well known that albuminuria is often intermittent or paroxysmal for months or perhaps years, just as glycosuria is. It is to these cases of periodical leakage of albumen from vaso-

motor disturbance, threatening to pass into a confirmed habit with fatal structural changes, that the alterative indication specially applies.

Whether cases of scarlatinal congestion come under the same law I shall not attempt to say. Wherever there is an abiding cause, such as amyloid disease, or any of the extrinsic conditions that make embarrassed venous reflux, it is obvious that the memory-doctrine of cure does not hold even within the modest limits assigned to it in renal pathology.

Before passing to other illustrations of unconscious memory in disease, which are of a more lasting kind, and (except in one instance) less curable by alterative treatment, I shall state in a few words wherein seems to consist the step forward in therapeutical theory that the memory-doctrine enables us to make.

Dr. James Ross, in his standard treatise on 'Diseases of the Nervous System,' tells us that the treatment divides itself into four branches: (1) to prevent disease, (2) to remove the exciting cause, (3) to remove the anatomical cause, and (4) to alleviate or remove serious symptoms. I venture to add that there is a beneficent kind of treatment, long practised empirically, which is not included in that enumeration. It is neither prophylaxis, nor removing the exciting or structural cause, nor palliating incidental symptoms; but it is literally and truly effacing, by means of an "oblivious antidote," the unconscious memory of what has been.

CHAPTER IX.

MORBID HABIT SUMMED UP IN DIATHESIS.

IF the visceral neuroses are the abiding effects of functional disorders induced from time to time by everyday causes, or the self-existent memories of visceral nerve-control impaired after a certain amount of intermittent provocation; we shall discover still more striking examples of the same cumulative or lasting effect of errors too often repeated, in the class of diseases which may be rightly called diathesis. It would lead me too far from my proper thesis to take up all the diatheses that are included in the wide and philosophical definition of them by Mr. Hutchinson.* Three of them, namely, syphilis, cancer, and tubercle I shall consider by themselves, from the more engrossing point of view of their infectiveness. One of the most important of them, gout, I shall pass over altogether, although it lends itself obviously to those views of ingrained memory or morbid habit which are here in discussion. There are three great instances of diathesis which stand out conspicuously by their peculiar limitation in time, place, and social circum-

* 'Pedigree of Disease,' Lond., 1884.

stances, namely, pellagra, leprosy, and beriberi; and although these are all foreign to our own country, they are not so unintelligible in their main features as to be unsuited for a general exposition of the principles of inveteracy in disease.

Common to all three conditions are certain initial errors in the staple diet of groups or classes of the people. Common to them, also, are permanent or at least very obstinate lesions of the nervous system, following a sufficiently prolonged exposure to the exciting cause. In the end, each of them is something of a neurosis, either of the sympathetic system or of the cerebro-spinal, or of both. Habitual errors of diet, along with miserable living or with some specific noxious thing in the food, seem to affect the nervous mechanisms of the body and to produce tropho-neuroses, hyperæsthesias succeeded by anæsthesias, impaired power of movement, and even loss of intelligence. Each of these diatheses has a well-marked type; it becomes a species of disease. The remarkable conformity of the symptoms is due to the remarkable uniformity of the causes, to the constancy of their operation, and to their integration. If there be anything harmful or insufficient in the staple food of the common people, it will affect many of them together, and in the same manner. Hence it is that these endemic diatheses are in many respects simpler than the sporadic forms of diathetic ill-health, because the latter depend largely upon family antecedents or idiosyncrasy or personal proclivity. In the endemic forms the exciting

cause is at work on a large scale, and beyond mere personal selection, because it touches those elementary needs of the body which are common to all. Pellagra and leprosy are each a clear instance of a *morbus miserix*; and although beriberi is different in that respect (especially in Brazil and Japan) it has sufficient points of resemblance to them to be taken in the same group.

Pellagra.

The facts of pellagra are peculiarly obvious, and capable of being stated in the plainest terms. A wretched and underpaid peasantry in Lombardy, Asturias, Gascony, and parts of Roumania are obliged to live upon damaged maize in the form of polenta or bread. The poorest of the corn falls to their share, and in their hand-to-mouth way of living they are unable to dry it or store it with the care that it requires. When it is made into loaves, these are large enough to last a week, only half baked, wet in the inside, and sure to turn mouldy before the week is out. The effects of that kind of diet are soon seen. When the field-labour begins in spring, erythematous patches appear on the exposed parts of the skin, attended by a burning heat and with lassitude and unfitness for work. The reddened or livid patches become dry and scaly as the summer wears on, and remain quiet through the winter; but next spring they come back worse than before. This goes on for two or three

seasons, with the addition of other characteristic symptoms of ill-health ; until the unhappy peasant finds himself obliged to give up work and seek relief in an hospital or asylum. He is reduced to a kind of mummy, troubled by diarrhoea and a burning state of the mouth, by pains in the head, paralysis or contractions of the limbs, double vision, ptosis, and many other forms of hopelessly disordered innervation. Sometimes he turns melancholy and commits suicide, or becomes wildly maniacal, or passes into drivelling imbecility. There are 100,000 such peasants in Italy, many of them in hospitals and asylums, and others dragging out a wretched existence in their native communes. Only a small proportion get cured, and these only when they have been taken in hand at the outset. After a certain limit of endurance is passed, outraged nature abandons the unfortunate victim to a slow death.

There is no question that this comparatively modern disease is the direct effect of living on damaged or decomposed Indian corn in certain parts of Europe where the Indian corn does not ripen well unless under good farming. A toxic principle has even been extracted by Lombroso. It is slow poisoning by a peculiar product of maize-decomposition ; but it is so very slow and insidious that it is more properly a chronic disorder of nutrition than a toxic disease. The significant thing is that, after a time, no amount of good food or careful tending will bring the pella-grous peasant back to health. The habitual use of

damaged maize has brought about a far-reaching tropho-neurosis, with many purely nervous and psychical symptoms; the memory of all his years of wretched food and miserable living is too fixed to be eradicated, and in the end gains a complete mastery over him, body and soul. It is highly probable, also, that the pellagra of the children is in great part an affair of inheritance.

Leprosy.

Leprosy has many close and unmistakeable affinities to pellagra. It has the erythematous patches of the skin coming and going for a time but always recurring with greater intensity, hyperæsthesias followed by permanent anæsthesias, and the profound constitutional malaise. It is more purely a tropho-neurosis than pellagra; it keeps on the lines of trophic disorder throughout, avoiding those paralytic and psychical diversions which are characteristic of pellagra. The spots on the skin remain either as blanched anæsthetic areas; or, on the sites of them and along the nerves, there develop nodules of granulomatous tissue, as in the tuberculated variety. The disease takes on the character of a local or peripheral structural disorder, or trophic disorder of tissue at particular spots; but even as a disease of tissue-nutrition it always follows the nerves. Heredity is even more marked in it than in pellagra.

Leprosy is a well-defined species of disease; all

over the world and through a period of many centuries it has had a uniform and unmistakeable type. To what is this remarkable conformity of type owing? All the evidence points to the staple diet of communities, and, at certain periods, even of whole nations and continents. The etiologist who is hard to satisfy finds no single defect of nutrition that will suit the circumstances everywhere; he finds discordant facts in abundance, and he is inclined to leave the cause of leprosy an open question. But the striking conformity of type in all ages and in various countries very clearly points to a definite and uniform cause, or integral of causes, operating on a great scale and over a wide area. The predominant indication in the etiology of leprosy is certainly towards a diet of decomposed or half-cured fish, just as in pellagra it is towards damaged maize. I shall not enter upon a detailed discussion of the question. Everyone appreciates the difficulty of explaining away all the apparent exceptions to the rule; but it is the merest timidity or want of faith not to follow the guiding light that is held out to us. Whoever makes a generalisation does so at his peril; he is either on the right track or on the wrong. But it is not in human nature, nor is it in the interests of scientific progress, to have no leading indication at all. The fish-diet hypothesis of leprosy, which is as old as Galen, proves every year to be more and more in accordance with the weight of evidence. We are all aware of the seeming exceptions to it; but it is only an over-

scrupulous person who will take credit to himself for withholding his assent so long as one iota of the evidence is outstanding.

The chief objection to the hypothesis that leprosy is a food-diathesis (the food being mostly decomposed fish), is that the disease occurs not only on the coast or on estuaries, but also hundreds of miles inland, as in Brazil and in the interior of India and China. I shall give one or two facts, ascertained by myself, to show how the plausible objections of that class may be made to disappear one by one before fuller knowledge. The hill-country of Assam is given as one of the regions of leprosy which do not suit the fish hypothesis. It is several hundred miles inland from the Bay of Bengal, and at the foot of the Eastern Himalaya. An old school-fellow of mine, who is a tea-planter there, tells me that there are a few cases of leprosy among the coolies; and in reply to questions, which were not of a leading kind, he gave the following interesting information: The country abounds in small brooks, which are dry for part of the year. Whenever the rain comes these are all alive with small fish, which would seem almost to have sprung out of the mud. The natives come long distances to gather the fish at the time when they can be most easily caught; they collect large quantities of them, and carry them in creels to their homes; and my informant added, without knowing the significance of his remark, that he could smell them a mile to windward as they were approaching his tea-garden.

Another tea-planter, on the eastern side of the Brahmapootra valley, gave me information to the same effect; he spoke in particular of the Kaghari tribe, among whom semi-putrid fish is eaten, and among whom also there are a good many lepers; and he mentioned the practice of making great periodical hauls of fish from certain pools of the river, the fish taken on these occasions being fetched by natives from far and near.*

The inland position of a leprosy-centre is nothing against the fish hypothesis. There is no doubt that the sort of evidence which I have obtained casually for Assam would be forthcoming also for other interior parts of India and China. For Brazil in particular, which is now the worst endemic seat of leprosy, the evidence is not far to seek; the whole country is covered with a maze of streams, and among the

* This practice of periodically catching enough fish to last for some time is common in other parts of the world; thus, in the Marquesas according to Herman Melville ('Typee,' Lond., 1847, p. 229), the great fishings, when the young men went down to the sea in a body and came back after two days with loads of fish for the whole population of the valley, took place about the time of the full moon. "During their absence the whole population of the place were in a ferment, and nothing was talked of but 'pehee, pehee' (fish, fish). .

. . . All the South Sea Islanders are passionately fond of fish." The fish were eaten raw and ungutted. There is certainly nothing said about leprosy among these islanders, although the statement has been made by a more recent writer (Brunet, 1876) that the disease occurs in all the islands of Polynesia. If leprosy has really become common among them, the cause would hardly be their original fish-eating habits, but some perversion of the same, or the same in combination with the misery of living which had come to them by contact with European civilisation.

indolent natives fishing is a chief means of subsistence.

In considering this question, it should never be forgotten that a diet of even putrid fish, or fish dried without salt, is not accused of producing the leprous diathesis on a large scale unless there be a concurrence of those other causes that go to the making of a *morbis miserix*. It is simply that the decomposed animal food gives the food-diathesis the special characters of leprosy, just as decomposed maize (*plus* miserable conditions of living) produces the nearly allied condition of pellagra.

It is not even necessary to insist that no other kind of decomposed animal food but fish will yield the specific element in leprosy production; in Mexico, where there are few rivers but a good deal of leprosy, the place of putrid fish appears to be taken by badly cured pork.

Again, although leprosy all over the world is a disease with a remarkable conformity of type, there are probably varieties or modifications of the type due to peculiarities of the diet. Pellagra itself, which is the diathesis of bad maize-food, is not so very far removed from the type of leprosy; and it is not unlikely that there are varieties of food diathesis which are neither pure pellagra nor pure leprosy, but something between the two. Thus the leprosy of the Maoris ("Ngrengere") was at one time not admitted by some authorities as true leprosy; and it is a significant thing that one of the favourite Maori articles of food is,

or used to be, a disgusting dish made with maize purposely allowed to go putrid. Even the maize-hypothesis of pellagra itself, for all its certainty, has to be supplemented by admitting some equivalent damaged grain, so as to account for the cases of sporadic pellagra where no maize is grown or used.

Leprosy then, like pellagra, is a tropho-neurosis brought on by the habitual use of an injurious kind of food, in the great majority of cases half-gone fish, eaten in that state either of choice or of necessity. It is an error of nutrition which becomes a diathesis, which goes to the nerves in a very peculiar and literal sense, and becomes hereditary to a quite remarkable extent. According to the long continuance and regularity of the dietetic habit is the memory of morbid action ingrained in the tissues. The steady pressure of a monotonous, unwholesome or even specifically noxious diet day after day and year after year takes the spring out of the system, so that there can be no recovery even if the pressure be removed. This is the peculiar Nemesis of habits of a certain kind,—of habits built upon our voluntary acts and conscious indulgences, or of unwholesome and monotonous habits of diet forced upon the people by the stress of living. The incidence of the disease, before heredity begins to tell, depends naturally upon various aiding circumstances; both in leprosy and in pellagra, the most wretched would seem to be the most liable.

Beriberi.

The other instance that I shall take of a disease in the same group of food diatheses, and with an instructive variety in its characters and contributory causes, is beriberi. It was once very common in China but is now rare; it is now very common in Japan; it has become very common in Brazil within the last half century; it has certain circumscribed spots of endemicity in the Madras Circars; it is common in many parts of the East Indies; and it breaks out in epidemics on board coolie ships and among the Malay crews of Dutch ships of war on the East Indian station. It attacks men of good physique for the most part, rarely women, and hardly ever children, except in occasional epidemics in schools or orphanages. It is usually chronic and in many cases incurable. It is, like pellagra and leprosy, a tropho-neurosis. There are hyperæsthesias of the skin and perverted sensation, followed by anæsthesias; but these are overshadowed by the motor disorders, paresis and paralysis of the limbs, which give the disease its character and probably its name. Vaso-motor nerve effects are often added, such as palpitation, dyspnœa, small pulse, dropsical effusions, and diminished secretion of urine.

Like pellagra and leprosy, beriberi is a disease of malnutrition which goes to the nerves, to the cerebro-spinal nerves (motor and sensory) and to the vaso-motor equally. It differs from pellagra in having no

psychical symptoms, and from leprosy in having no localised trophic tissue-changes. But it resembles those two diseases in the initial symptoms, and in the general nervous ground-work of the whole malady; and it resembles them also in being specifically due to some error in the staple diet. The etiological facts of beriberi are complex, but not hopelessly so. Rice diet is pointed to with tolerable clearness. Of course rice is the diet all over the East, and beriberi is endemic only here and there. The cause seems to be a monotonous diet of rice, and perhaps of bad rice (such as "paddy," with the husk on), under peculiar circumstances such as sedentary occupation, change from country life to town life, confinement in a ship's 'tween decks or in prisons, barracks, workhouses, and the like, with various aiding and abetting circumstances peculiar to the individual, or the locality (sea coast), or the season.* At all events rice is somehow implicated in the causation of beriberi, just as maize is in pellagra and decomposed fish in leprosy; and the remarkable conformity of type wherever the disease occurs must be owing to something equally steady in the causes at work, or to the production of the "integral" of all the aiding and abetting factors.

If the staple diet is not the only factor in each of those diseases, it is at least the chief and special one; and in all of them the implication of the nervous

* There are, no doubt, cases hard to bring under this hypothesis, such as the cases of beriberi among well-to-do Brazilians. I have no clue to these apparent exceptions.

system is the most fundamental. Corresponding to the element of habit in the causation, is the memory-element in the phenomena; and that has its seat, as in other strong memory-effects, on the nerves. The total effects in each case represent a diathesis, a chronic malady of a well-defined type, or a species of disease. In none of the instances is the disease-species communicable by means of infecting particles; but in two of them the offspring inherit the condition, or a special degree of liability to the condition, from the parents. This is a high degree of specificity or integration, on a basis of unconscious memories long stored up. The prolonged use of an innutritious or specially toxic diet produces a well-defined species of chronic disease, for the most part an incurable malady, and, in two out of the three instances, communicable by heredity. We shall see, in the next chapter, that the same kind of memory may be summed up in true infective particles, and by them transmitted as a specific disease.

CHAPTER X.

THE ALTERATIVE CURE OF SYPHILIS.

PERHAPS the most famous of alterative cures is the cure of syphilis by mercury. Assuming, as we have good reason to do, that the alterative action of a drug is a habit-breaking or memory-effacing action, we are met by the question, How can the process of syphilitic infection be represented as an affair of morbid habit in the tissues, and of what is it a memory? The answer to that question is not so forced or far-fetched as it may seem at first sight. The key to the problem is the irregular or protracted healing of sores in certain situations; or, in other words, syphilis is the tradition or idea of bad healing, or of granulations gone wrong.

There is first of all a doctrinal obstacle to be cleared away. It will be admitted by everyone who keeps his eye on the facts that the attempt to make an absolute separation between two kinds of venereal sores has been an ill-judged one. There are cases within the knowledge of many practitioners where a common sore, developed within a few days of exposure to infection, having an encroaching or spreading tendency, and no

obvious induration, has been followed by symptoms of constitutional infection.*

No surgeon now confidently acts upon the doctrine that sores indurated from the outset are the only "true" or "syphilitic" sores. The belief on that point which held sway for a number of years has silently been given up, and we are practically back at the old stand-point. The surgeon who is asked by his patient whether the sore will be followed by secondaries, prudently answers, if it be a common ulcer, that he cannot be sure. Meanwhile, to cover the failure of the dogmatism about "true" sores, a very characteristic kind of fallacy or poor logic has been resorted to. If the common or soft or spreading or suppurating ulcer should happen to be followed by constitutional infection, we become wise after the event; we allege that the "true" syphilitic virus had been communicated at the same time as the "spurious," that the one was implicitly present along with the other, although there was nothing to betray its presence; otherwise, how could the constitutional infection have arisen? This is so transparent a begging of the question that it is hardly necessary to argue it.

* I lately saw, in the tertiary stage, a case where a large sore of that kind had developed on the mucous surface of the foreskin five days after the exposure to which the patient confidently traced it. The entire prepuce had been at once cut away; but in due course there occurred the symptoms in the throat and on the skin, and, within a year or two, periosteal nodes followed by intra-cranial symptoms, which at one time seemed to warrant the very worst prognosis.

The absolute separation of indurated or syphilitic from non-indurated or simple sores should never have been made; if there were to be any useful contrast at all, it would have been much nearer the mark to set off a certain degree of circumscription and induration against a certain degree of phagedæna; and it will probably be found to hold good that local destructiveness diminishes, *pro tanto*, the chances of metastatic infection. But in these matters of venereal sores we are far removed from the rigidity of species; it is now abundantly evident that the specific tests of a "true" sore, which were discovered in one of the sanguine moments of medical progress, are constantly failing us and landing us in confusion and mistake. The best evidence of the uselessness of the test is that surgeons of high repute thought it safer to put the patient on a mild course of mercury even when the sore was a soft one.

If all sores on the sexual parts of men and women had followed the natural course of repair, we may be sure that they would never have been known by their distinctively venereal characters and consequences. Hunter makes the obvious remark that, unless the sores had been on the genitals, they would never have been communicated from person to person. We may go farther, and say that unless in the course of these transmissions and retransmissions, and amidst the general circumstances of lewdness and personal neglect, the natural healing of sores, or the normal process of repair, had been seriously interfered

with, venereal sores would never have acquired their distinctive and inbred character among the sores of the body, the same being, according to Hunter, "a small disposition to heal."

It is, indeed, conceivable that a particular type of granulation-tissue might have been bred by the mere contagious reproduction of sores in that particular region through a long succession from sex to sex, and without the factor of neglect or indifference to the healing process coming in. But there is no need to make allowance in real life for such a possibility of evolution as that. Neglect of healing, or indifference to the existence of sores, has not only been the grand cause of their spreading from person to person, but it has also been the cause of their distinctive syphilitic characters. The class of men and women with whom syphilis is mostly associated are characterised not merely by the absence of moral restraint; there is also a frequent want of care of the person, or an indifference to the cure of their ailments. All the virulent epidemics of syphilis in recent times in obscure parts of Europe have had that sort of physical neglect as their principal factor, although it has been more often due to the unsophisticated nature of the people than to their degradation; and those recent epidemics, as Professor Hirsch points out,* are a good analogy for the great fifteenth-century epidemic, which, although not by any means the beginning of syphilis among

* 'Geographical and Historical Pathology,' English translation, ii, 1885, 90, 97.

mankind, was the fountain-head of much of the syphilis now extant.

We have to put into the foreground then, two obvious and common-sense considerations: first, that (as Hunter says) the sores would never have passed from sex to sex unless they had been on the sexual parts; and second, that their other distinctive character of "small disposition to heal" is one that has been acquired, bred and intensified in various ways, and is constantly being acquired, bred and intensified afresh, under circumstances which are well known although not much discussed or written about.

Let us take, then, the case of a neglected sore in some recess or fold of the labia, from the irritation of acrid discharges, or from herpes, or from a contusion, laceration or other injury; or let us take Hunter's statement of fact that "the penis is liable to ulcers like other parts of the body, and from some circumstances, rather more so than other parts; for if attention be not paid to cleanliness, we have often excoriations or superficial ulcers from that cause. Since, then, this part is not exempted from the common diseases of the body, and as every disease in this part is suspected to be venereal, great attention is to be paid in forming our judgment of ulcers there." Let us take such a case in either sex, and make the further warrantable assumption that the presence of ulceration, recognised or unsuspected, had not been permitted to bar sexual intercourse; then we may infer that the ulcerous process would be inoculated on the sound party, just as an intense urethral

catarrh is frequently set up in the male from a catarrhal or other excited state of the mucous membrane of the female.

It may seem that we are assuming too much here, when it is kept in mind that, according to Ricord's experiments, no pus other than chancrous pus was able to induce a chancre on the skin. But it is at the same time clear that no experiment can possibly reproduce the natural circumstances of the case; and we have the clear analogy of gonorrhœa acquired where there is no gonorrhœa, but some much simpler exciting condition, in the woman. It would be hard to exclude the possibility that sores on the pudenda, which are no other than sores of common origin, may be transmitted by contact or contactual inoculation.

Now, in the inoculated person, such a sore might or might not reproduce the characters of the original sore; according to the temperament or constitution of the individual, it would reproduce them perchance in a more rapid sequence, and it might reproduce something more. In particular, the small beginnings of phagedæna, which may be found in every ulceration, would have a chance, at least, of extending. It is observed by Pearson, and after him by Brodie, that the degree of phagedæna as often depends on a bad state of constitution in the infected party as on anything specially phagedænic in the sore from which the infection came. It is amidst such differences between the man and woman, or again between the woman and

man, that ordinary ulcerations—always assuming that they are transmissible—may become ulcerations of a peculiar type. In some such way a slight phagedænic tendency, such as any ulceration has, may be cultivated from time to time into a fixed character of venereal ulceration, that character which, as Hunter says, distinguishes venereal sores above all other sores, namely, their small disposition to heal.

The circumstances under which a sore on the genitals, of common origin, may be cultivated into a sore of a special type and with a special inveteracy, are not confined to the general differences of sex always in operation, including occasional instances of marked personal idiosyncrasy. We find them on a much larger scale in differences of race and habits, and in changes of climate. The almost inexplicable outbreak of syphilis in Tahiti and New Zealand after the arrival of Cook's and De Bougainville's ships in the last century, probably depended for its small beginnings on *de novo* causes in concert with racial differences. A remarkable instance of the effect of change of climate on the type of venereal diseases is given by Larrey.* The French Army of the East (1801), of which he was surgeon-in-chief, contracted a very mild kind of venereal sore from the Alexandrian women, which healed in about three weeks and left no bad consequences. But Larrey remarked that in several persons who returned to France with sores unhealed, the type of the process became peculiarly inveterate. Larrey does

* 'Relation historique et Chirurgicale,' &c., Paris, 1803.

not say that the inveteracy amounted to constitutional infection; and in all probability it was simply an exaggerated indisposition of the primary sores to heal. But there are cases occurring in everyday practice where the same kind of inveterate soreness, from blundering attempts at self-treatment or the like, is followed by roseolar rash and sore throat.

It will be admitted that Hunter's definition of a venereal sore, as one that has little natural disposition to heal, suffices for the sort of ulcer that enlarges its borders, eats away the sound margin of tissue, starts the ulceration at new centres, or shows the phagedænic tendency in one degree or another. But it will occur to everyone that the kind of sore which is always most to be feared, namely, the indurated sore, cannot be accused of an indisposition to heal. The definition does not apply to such cases literally; but it applies to them with quite peculiar force if we have regard to the kind of healing. It is not ordinary healing by granulations; it is healing by a kind of "granulomatous" tissue, which approximates to tumour tissue. The phagedænic tendency is one kind of indisposition to heal, and the granulomatous or indurated tendency is a peculiar modification of the same indisposition. In both cases we miss the self-limitation of normal repair: in the one case, quite obviously in the more or less marked phagedæna; in the other case less obviously but not less really in the tumour-like characters of the new growth of repair.

Something has determined the ulcerous process along the one devious road or along the other; and it will probably be found that the decision has rested more with the infected individual's constitution, temperament, idiosyncrasy or diathesis than with anything fixed, inherent or certain to breed true, in the infecting matter. I have already quoted the opinion of Pearson and Brodie that the degree of phagedæna in venereal infection is apt to depend on the constitution of the person infected; and if communicated sores with a long history or tradition or memory of bad healing take the phagedænic direction in some persons, they take the granulomatous or callous direction in others.

It is not in venereal sores only that those differences in the healing process are observed. Some persons heal badly wherever the injury is; and although the bad healing of a wound or sore is often set down to a syphilitic taint in the constitution, the hypothesis is a very arbitrary one and often wrong. Thus, in a case where the whole circumstances were known to me intimately, the healing which followed the loss of a piece of skin in front of the forearm (down to the deep fascia) took so irregular a course, that a well-known surgeon was led to suspect syphilitic infection; and he would have doubtless been strengthened in his suspicions if he had seen the tumour-like thickening of the scar (of almond shape), which remained for weeks after. But there was not a particle of evidence of syphilis; it was simply one of those cases of bad healing, where the reparative process takes the

direction of granulomatous rather than of granulation-tissue; and there were some things to account for it (although I do not go into them) in the situation, manner of production, and subsequent exposure of the wound, and in the constitution of the individual. Surgeons with large experience of the healing of wounds and sores have probably seen many such cases.

The differences among individuals as regards healing will always have many opportunities of asserting themselves in the constant transmission and retransmission of sores on the sexual parts, all the more so that those parts are peculiar in their innervation and vascularity. Who can find his way through that labyrinth of pathology? Those who affect to believe that the types of venereal sore have existed *ab aeterno*, and that they always breed true, need never enter it. For others it remains to make the attempt, following what clues they may.

We have good reason to think that the degree of phagedæna does not by any means depend on the eating character of the sore from which the infection came; and conversely we may take it that induration and all its consequences may follow infection from a sore of a different kind. Even if we could always know the kind of venereal ulceration from which the sore was caught, it would be impossible to predict the result in the infected person, just as it is impossible to say whether a non-indurated sore may not be constitutional. What we do know is that a venereal ulcer is always

peculiar in its healing, and that the two main directions are, on the one hand, towards extension of its borders and the starting of fresh centres in the neighbourhood, or, on the other hand, towards callousness and induration, and the setting up of distant metastatic disease.

Those two kinds of healing are not separated by a hard-and-fast line. At the same time it appears to hold good that the more extensive the local destruction of tissue, or the greater the phagedæna, the less is the likelihood of constitutional infection. But even in cases which have begun as widely-spreading sores, induration at certain points may appear after a time; edges may here and there become thick, rounded, and callous; and these well-known threatenings of constitutional sequelæ will be the signal for giving mercury.* The benefit of the mercury is shown in bringing the course of ulceration back towards healthy repair.

We come at length to the real issue of these evolutionary or developmental views of syphilis. Many would be ready to admit that soft sores, phagedænic in one degree or another, may be said to stand for a kind of acquired inveteracy, or for a tradition of bad healing developed out of common inflammation, and out of such degree of local infectiveness as every common inflammation of those parts has. But they would object to call that syphilis, or the disease which mercury cures. And as my object is to deal with the alterative cure of syphilis, as an instance of habit-breaking or memory-

* See Pearson, 'Effects of various Articles of the Materia Medica in the Cure of Lues,' 2nd ed., Lond., 1807, p. 64.

effacing cure, I am concerned to show how the real syphilis, with its exanthems, sore throat, periosteal nodes, visceral gummata and all its phenomena whatsoever, is also the tradition or memory or communicable idea of bad healing or inveterate soreness in ulcerations of the sexual parts.

The clue to the metastatic infectiveness of syphilis is the granulomatous character of the tissue of repair in primary sores. That grand character of the syphilitic process has been clearly worked out by Virchow, whose comparison of the infective products of syphilis to the metastases of sarcomatous tumours may be read in the chapter on "Granulomata" in his '*Krankhaften Geschwülste*.* Granulomatous tissue is granulations gone wrong; it is the peculiar kind of bad healing which takes the direction of infiltrating and infective new growth. Without analysing the matter farther, I shall attempt to make it clear by an analogous case.

In a middle-aged man, the bed of the thumb-nail had become occupied by an unhealthy-looking sore, with infiltration under the adjacent margins of sound skin, the axillary lymphatic glands being enlarged. The thumb was amputated and the glands removed. The central part of the sore was somewhat sloughy on the surface, and occupied with highly vascular granulation-tissue (round cells) underneath. The margins of sound skin on each side were "infiltrated" with sarcomatous new growth of large spindle-cells; that is to say, the pre-existing tracts of connective tissue

* French transl., ii, 464 *seq.*

were everywhere changing into interlacing bundles of spindle-cells. One of the axillary glands contained pus in its centre ; but other parts of that gland, and all the rest, reproduced the type of spindle-celled sarcoma, as in the primary "infiltration." The patient died some time after of generalised sarcoma.*

In this case there was a mixture of inflammatory or granulation-characters, and the characters of an infective tumour. It may be said that it was merely a common spindle-celled sarcoma with inflammation and suppuration superinduced upon it. But it is well to get away from such entities or finalities of disease whenever we can ; and I prefer to regard the case as one of a sore (probably of traumatic origin) in a highly vascular and highly irritable place, which had gone wrong in its healing. The histological evidence points that way ; the "infiltration" under the sound margins of skin was an infection derived from the round-celled base of the sore, although more decidedly sarcomatous in type ; while the lymph-gland infection was for the most part sarcomatous but to some extent inflammatory or purulent.

Some such development of tumour-characters out of the tissues of repair would take place in an indurated chancre ; the infiltrated margins would be more purely granulomatous, and so would the indurated lymphatic glands ; the mucous, cutaneous, and visceral

* The case was first under the care of Professor Humphry, of Cambridge, who brought the parts to me after the operation, and was afterwards under Mr. Jonathan Hntchinson in London.

metastases would follow in due course. This kind of error in the healing process would arise under circumstances of irritation, and would have many opportunities of fixing itself as a type in the transmissions and retransmissions from sex to sex, even if it did not always breed true. There would thus be established the memory of granulations gone wrong, or a tradition of bad healing, the textural result being neither purely inflammatory nor purely tumour, but something between the two, and with an intermediate kind of infectiveness.

The intermediate kind of the infectiveness accounts for some of the sequelæ peculiar to syphilis—the roseola, and the throat-affection in particular.

But on that point, and with reference to the various changes of type in European syphilis since the great epidemic of 1488—1520, I must refer the reader to Häser's interesting collection of facts and opinions in the third volume of his '*Geschichte der Medicin und der epidemischen Krankheiten*.'*

The only other point which remains before we come to the theory of the alterative cure by mercury, is the syphilis of the offspring. It may come from the father, or from the mother, or from both parents; and I conclude that all those errors in the growth and development of bones, which so closely resemble the errors of rickets (and have even given rise to the very odd piece of confused reasoning that rickets is due to syphilis), are directly traceable, not to the mimetic

* See especially iii, p. 262, 323-4.

action of the syphilitic taint, but to the poor nutrient value of the placenta in a syphilised woman. The connexion between rickets and feeble placental power has been traced by me elsewhere.* That part of congenital syphilis which resembles rickets would be due to direct failure of intra-uterine nutrition through syphilitic atrophy of the placenta; but all the rest of congenital syphilis, including the overgrowth of interstitial tissue in various organs, comes from the male seed or the ovum, or the co-operation of the two. If the syphilis which passes from one adult to another is the memory, tradition, or communicable idea of bad healing or of granulations gone wrong; then the syphilis which passes directly from the parent to the offspring is memory summed up in its most implicit form, an integral part, namely, of the memory of generation as defined in the first chapter.

We have at length found a way to express the various forms of syphilitic disease in terms of the doctrine of unconscious memory or morbid habit; and we are now in a position to speak of the cure of the disease by the alterative action of mercury (and other drugs) as a habit-breaking or memory-effacing cure. If syphilis has always underlying it the idea of bad healing, or of granulation-tissue which has missed the safe path of repair; then the alterative action of drugs on the diseased process would be to break the morbid habit in the tissues, or to efface the evil memory in

* Art. "Pathology," 'Encycl. Britan.,' § 5.

them, or to banish the fixed idea from them. Such language may still seem to be allegorical; but it has none the less a close resemblance to some of the old explanations of alterative cure in syphilis.

I quote only two of them. Hunter says: "Mercury may act upon the principle of destroying the diseased action of the living parts, counteracting the venereal irritation by producing another of a different kind." More explicit is the view of Dr. Anthony Thomson:* "If, therefore, the action of mercury be sufficient to suspend the morbid action of syphilis—and it is a law of the system that morbid actions can be suspended, for a time at least, by the influence of new actions superinduced—it is probable that that of the syphilitic poison may be overcome by that of the mercury; and, as this can be withdrawn or subdued by the disuse of the remedy, *the system is left to the influence of its ordinary and healthy functions.*"

To make that explanation complete it is only necessary to fill in the details of "ordinary and healthy function" for the particular case. Dr. Thomson was aware of some such omission in his argument: "I am willing to admit that the theory which I have adopted does not altogether remove the difficulty of explaining the influence of mercury in curing syphilis; it may be said merely to express a fact, not to develop its cause; but in most circumstances we can proceed no further." It is precisely the memory- or habit-principle that

* 'Elements of Materia Medica and Therapeutics,' 2nd ed., Lond., 1835, p. 296.

enables us to take the next step. The tradition of bad healing or of granulations gone wrong "can be suspended for a time by a new action superinduced;" and as that "can be withdrawn or subdued by the disuse of the remedy, the system is left to the influence of its ordinary and healthy function," that is to say, the ordinary function of healing, or the healthy kind of repair comes in behind the displaced habit of bad healing or of granulations gone wrong. The sores heal naturally, the gummata cicatrize, the interstitial overgrowth passes into safe quiescence. The morbid habit has been broken by being suspended. The usurping action of the metal has lasted long enough to make the tissues forget the tradition or fixed idea of syphilis; and inasmuch as the ordinary powers of repair—of healthy granulating and of cicatrizing—are only waiting to come in, it is natural that they should assert themselves on the earliest opportunity. Syphilis being in the last resort an error of healing, it needs only the error to be suspended for repair to resume its natural course. The phenomena of syphilis are from first to last pervaded by the idea of bad healing, or granulations gone wrong,—the granulomatous nodules quite obviously so,—and the constitutional cure of syphilis is the expulsion or conquest of that all-pervading idea.

We may now inquire rather more closely, how the lessons of experience as to prescribing mercury and other drugs for the various forms and phases of syphilis suit this memory-doctrine of erroneous repair. We

may begin with a rule of Brodie's: "In the case of primary sores, where there is a great deal of inflammation in the neighbourhood, it is scarcely ever right to employ mercury in the first instance," for the reason that it will cause sloughing. Where there is a great deal of inflammation in the neighbourhood, the tissues are reacting more or less healthily, and there is no occasion to suspend their action so long as it continues on these lines. The ordinary practice to treat a common soft sore with nitric acid or caustic until it suppurates and granulates is an application of the same principle. If the action of the tissues should be from the first towards callousness or induration, or towards that kind of bad healing which is most characteristic of infecting venereal sores, it would be an indication for mercury.

Another rule of Brodie's is: "In cases of phagedænic and sloughing chancre, where its condition depends on a bad state of the patient's constitution, it is always wrong to give mercury at first, for it will aggravate the disease and make it spread more rapidly. But there are cases in which the phagedæna depends on the intense action of the venereal poison, and here, as I shall explain, mercury may be given." That is doubtless the teaching of experience, for we find it confirmed in the very large practice of Pearson at the Lock Hospital. In so far as the reaction depends on the patient's constitution and not on the induced habit of syphilis, a superinduced alterative action is for the time being out of place and, as would appear,

positively injurious. But in so far as the phagedæna is from the first the grafted tradition of syphilis, the indication is to suspend it, so that the natural forces of the patient may come in. It is clear that the rule is a difficult one to apply, for the reason that it is not always possible without much collateral evidence to say whether the phagedænic tendency is derived from without or ingrained within.

In those cases where the tendency to phagedæna or sloughing is personal to the patient, Pearson found that cinchona bark was a good remedy: "There are certain constitutions in which a chancre, on its first appearance, always becomes gangrenous; and I have more than once noticed this very unfavorable occurrence in the same patient every time he received the affection, although it did not always prevail in an equal degree. In cases of this kind, the Peruvian bark is indicated, as well by the state of the system in general as by the mortified condition of the affected part. Under a proper exhibition of this medicine, the sloughs will separate; the ulcer assumes a clean and favorable aspect; and sometimes the sore will even granulate and heal. More commonly, however, when all the parts are wearing a promising appearance the ulcer becomes painful, foul, unequal on its surface, spreads visibly every day, and has thick and indurated edges; and at this period the health begins to decline. The concurrence of these circumstances indicates that the venereal poison has resumed an active state; that nothing farther is to be expected from the Peruvian

bark ; and that the administration of mercury ought not to be delayed any longer."

What there is to be said in explanation of the value of iodoform is obvious enough. In so far as it speedily produces a crop of healthy granulations, it suspends the syphilitic tradition of bad healing to the extent in which it may have been present, and to that extent its action is alterative. There is probably always an alterative action wanted in one degree or another before a venereal sore heals naturally ; and as the reparative process can be put on the right track after an escharotic and by iodoform, one may claim the interposition of these agents as alterative. Iodoform may be claimed as a true alterative ; dusted over the surface of a sore it enters in a finely-divided state of its crystalline particles into the individual life of the cells of repair, and suspends their devious tendency, whether that be towards phagedæna, or towards irritability and scanty sanious discharge, or even towards callous infiltration of the edges and base.

The rare practice of cutting out the primary sore does not answer. The indication of cure is always to conduct the healing through the natural stages to a safe issue. Syphilis is the idea of bad healing, and the idea is not to be fought with a knife. "Nature is conquered by obeying her ;" it is impossible to "drive out nature with a pitchfork."

Lastly, as regards the cure of secondary and tertiary effects. In many cases the exanthem and sore throat disappear in due course and the infection is at an end.

Where the skin disease becomes inveterate or recurrent its cure would come under the law of breaking a morbid habit, as already stated in the chapter on Skin Diseases. All the various forms of mucous plaques (liable to ulcerate), of periosteal nodes, of perivascular and endovascular gummata, and of diffuse interstitial overgrowth in viscera, are so many forms of metastasis. In one way or another they are all pervaded by the idea of granulations gone wrong; and when they are cured by alterative treatment the curative process is one of retreat to the safe termination of scar-tissue in a more or less literal sense. In the cure of a considerable gummatous nodule or node it may seem necessary to ascribe something to "absorption;" but granulomatous new growth differs from other tumour-tissue in a certain instability of its protoplasm, and its bulk would be no barrier to obsolescence if once the granulomatous tradition were broken and the action of the tissues put upon the safe road to repair. Even intracranial syphilis, producing the most alarming symptoms, will suddenly begin to mend, and in two or three weeks all traces of it may be gone.

The dosage in such cases is always a matter of the first importance. According to the above indications from the pathology, the process of repair will not come in until the action of the drug (which has for a time usurped the place of the morbid habit) is itself withdrawn or, at least, subdued. The old mercurial treatment of syphilis seems to have erred by ignoring that indication. To ply the patient with mercury so

long as symptoms of the disease remain is to run great risk of inducing slow mercurial poisoning. To do its work effectively the mercury should merely occupy and possess the granulomatous tissues for a time; its function is to displace; when it has done that much it is itself to be withdrawn, in order that a third and greater power than either of the other two may come in, namely, the ancient and inbred reparative power of the tissues themselves.

It will thus always be a nice question how far the alterative should be pushed. Perhaps the safest kind of practice is to make experimental pauses in the treatment; but it will hardly surprise anyone if such experimentation lead him on to prescribing in one case two or three times more of mercury or iodide of potassium (or combination of the two) than in another.

CHAPTER XI.

CANCER AS AN ACQUIRED HABIT OF THE TISSUES.

IN no disease more than in cancer is a rational mode of treatment called for on the basis of a thorough pathological analysis. Even where the tumour is accessible to the knife the treatment is most disappointing. It may be that the profession will have to confess itself beaten by cancer; but there have not been wanting sanguine forecasts of what medicine may yet be able to do for this disease.

Thus, Sir James Paget says:* “If we can have any hope at all of curing cancer it must be in the study of it as a constitutional disease; for, so far as therapeutics yet have proceeded, nearly the whole power of therapeutics is that of constitutional remedies against constitutional diseases. If I look, and I do look for a hope of recovery from cancer, it is in such a fact as this, that we have a clear remedy for syphilis, a remedy as distant in all conceivable relations from the disease of syphilis as any one part of the world is from another.... Therefore, I repeat, if there be a hope, it is that by the earnest constant study of the constitutional

* ‘Pathological Transactions,’ 1874, p, 328.

character of cancers, there may some day come to us a remedy as little expected as mercury must have been before it was introduced for syphilis, but which not less surely than mercury may be the cure, even of inherited disease." I do not know what kind of study the author may have meant by "the earnest constant study of the constitutional character of cancers," or how mercury can be said to be distant in all conceivable relations from the syphilitic process which it cures. None the less, the opinion quoted is interesting as showing what kind of hopes are entertained.

There have been cancer cures from remote antiquity ; and it is significant that the drug which has always enjoyed the greatest empirical reputation as an antidote to cancer is the metal that is resorted to for so many other alterative or habit-breaking purposes, namely, arsenic. What I shall have to say of cancer in this connexion is by way of exhibiting the disease as an induced habit of the tissues, a habit that might be broken if we only knew how.

Before coming to these indications, and as preparing the way for them, it has to be said that the history of the cures of cancer by arsenic is not very encouraging. Its internal use has been pronounced beneficial, if not absolutely curative, by some respectable authorities of a former generation. Dupuytren used it in open cancerous (or probably lupous) sores as a powder, or lotion, or salve.* Justamond got the sores

* Dupuytren's arsenical powder consisted of 4 parts of white arsenic and 96 parts of calomel. The same ingredients were dissolved in

to heal after its escharotic action in one case; and in another case he professed to have cured a non-ulcerated scirrhus of the breast by getting it to detach itself and come away *en masse*.* There were doubtless some successes, even in sores correctly diagnosed as cancerous, among the irregular cancer curers such as Guy, Plunket and others. These indications of the success of arsenic, mostly in open cancerous sores, are interesting. They seem to show that the alterative power of the drug avails even for cancer; and it would avail still more were it not so intensely painful as a local application and so apt to produce its toxic action by absorption, that it cannot be used with any freedom.

The use of arsenic in cancer is one of those discoveries which we owe to the mild wisdom of the East.

water as a lotion, or mixed with gum arabic as a paste. The gum arabic paste has recently been revived by Esmarch as an application to the wound after cancerous amputation; he adds morphia, and increases the proportion of arsenic to calomel as follows:

℞ Acid. Arseniosi
Morph. Muriat. āā gr. iv.
Calomel. gr. xxx.
Gum arab. ℥iij.

Half a teaspoonful of this preparation to be spread on the wound daily.

* Justamond's arsenical powder (from a formula by Morris) was made as follows:—Equal parts of arsenic, copper, tin, and mercury distilled in spirit of wine and afterwards in oil of vitriol, and reduced to an impalpable powder. The treatment was begun by laying a small particle of the powder in the centre of one of the smallest sores; an eschar was so produced, and a few days after the eschar was thrown off, the sore cicatrised. ('Surgical Tracts,' by J. O. Justamond, F.R.S., Lond., 1789, p. 325).

The reference in the Sanscrit treatise of 'Susruta' is to an application of arsenic in cancers much more rational or much more scientifically probable than the usual applications of later times.* An arsenical salve was applied to the raw surfaces or flaps after the cancer had been removed by the knife, with the intention of preventing that great and lasting opprobrium of cancer-surgery, namely, a recurrence. Whether the ancient Indian practice was successful does not appear; but we may be sure that the salve was mixed in such proportions or with such ingredients as to prevent its toxic action on the body generally. In modern Indian medicine and surgery, it is doubtful whether the original practice continues. Ainslie says,† "I have noticed the use of the white oxide of arsenic in cancerous cases, sprinkled over the face of the sore" (p. 640); and he remarks elsewhere that he can say little of the external use of arsenic in cancer "as the disease is rarely seen in India" (p. 503). The old Indian practice has lately been adopted by Esmarch with doubtful benefit. However, the reference in 'Susruta' to the anointing of the raw surfaces after a cancerous amputation will serve as a basis for some remarks on the alterative effects therein implied, and on the element of habit or memory in cancer which gives us the indication for one kind of alterative treatment or another.

* I take the statement from Häser (i, 30), who quotes Hessler's Latin version of 'Susruta,' ii, 123. I have searched through Wise's English version of the Sanscrit treatise without finding any reference to the point.

† 'Materia Medica Indica,' Lond., 1826.

In cancers, as in some other instances of morbid habit or unconscious memory which have been already considered, we have to distinguish between an abiding cause of functional and structural disorder, and a habit or memory of that kind of action which has become virtually self-existent or independent of its exciting causes. The causes of functional and structural disorder leading to cancer in the stomach, uterus, female breast, intestine, rectum, tongue, lips, and skin, are bound to be of various kinds, and as a matter of fact they are difficult to trace. In some cases, as where cancer occurs in the stomach of a person habitually given to ardent spirits, the antecedent circumstances are doubtless those of chronic catarrh, a state of the mucous membrane and submucosa as habitual as the drinking habit itself; and if all other cases of cancer of the stomach could be analysed from their first beginnings, we should doubtless find evidence either of catarrh and its effects near the pylorus, or of some other lymphoid-like infiltration of the mucosa and submucosa antecedent to true cancerous infiltration and ulceration, or of a defect of substance developing a thickened scar, or of some other process falling within the limits of non-infective disorder of structure and function.

In like manner, among the antecedents of uterine cancer, we should have very commonly a recurring or long-continued catarrhal state, or frequent congested states, leading to induration of the cervix, and ultimately to cancer. In the breast it is the normal

obsolescence of the organ that creates the peculiar liability to cancer. In the tongue, lips and skin, there will have been antecedent irritation of one kind or another, often of such a kind as to produce a wart or fissure in the first instance. In all these cases, hereditary predisposition doubtless counts for much ; but if the element of heredity be analysed it will be found to resolve itself into congenital dispositions in the epithelial surfaces and supporting tissues, which are favorable rather to the antecedents of cancer than to cancer as an abstract or self-existent disease.

Summing up, then, the antecedents of cancer, we shall find that there has been usually some long-continued provocation, such as chronic catarrh, or habitual irritation, or erroneous sexual involution, or other indwelling misdirection of the natural forces of the body. These antecedents amount to habit, either because the irritation is steadily at work, or because it has been applied often enough to create a self-existent memory or tradition in the cells and tissues.

But admitting all this, we are still a long way from cancer. Catarrh may be so habitual that the mucosa becomes thick from infiltration with small round cells or from increase of its supporting tissue ; or there may be induration of the cervix uteri from repeated congestions ; or there may be warts on the skin or cracks on the lips and tongue from frequent application of irritants to the same spots ; or there may be some persisting activity or over-excitement among the epithelial cells of the breast at a time of life when

they ought to be obsolete or passing into a safe quiescence. These things are not cancer.

But it is out of all such habitual irregularities that the cancerous element grows—in a very peculiar manner. The cancerousness or structural infectiveness of the localised condition is a summation or integration of the morbid habit, a placing of it upon an independent or self-existent footing whereon it may survive and increase as a kind of living thing within the general life of the body. The grand histogenetic character of cancer is that the primary disorder of the epithelium communicates itself to the neighbouring tissues, and particularly to the connective tissue. The epithelial pattern is impressed upon cells that have all their life been something else than epithelium. Groups of epithelial cells, or pieces of glandular structure start up beneath the mucous membrane, or at more distant spots, as if from the touch of some magic wand.

If the development of these be closely watched, it will be seen that the connective-tissue cells first of all emerge from the quiescent or obscure state of flattened plates among the fibrous bundles; they become plump and granular, and pass by rapid transitions into the form and semblance of the epithelium in the primarily disordered mucosa; and in certain regions they even assume the grouping of glandular epithelium with closest fidelity to the original pattern. The morbid habit has reached a point where it no longer continues on the old lines of disordered structure and function; it confers its memory-power upon any or all of the

cells or particles, just as the organism itself confers its memory-power on the sperm-particles and ova; it breeds an infection which is confided to its own constituent elements, particles, and even juices; and it is that infective or spermatic power which causes the pattern of disordered structure and function to arise out of the connective tissues of the neighbourhood in the first instance, and out of the tissues of lymphatic glands, internal organs, and other remote parts in the second instance.

This is a form of generation, a form of it peculiar to diseased states. As in the generation of living things, memory touches the highest point of implicitness in being summed up in an infecting cell or particle. As I have said elsewhere :* “The primary disturbance of the glandular epithelium has practically ceased to be the disease; it is the infection of the other tissue that now determines the extent and the rate of progress of the malady.” The long-continued excitation or irritation has passed the bounds of ordinary habit or persistence, and has deputed the memory-power to representative cells and particles of the disordered tissue. This is what I have elsewhere spoken of as a morbid state of the body acquiring “autonomy” or semi-independence. The cancerous infectiveness which a chronic disorder of some secreting or other epithelial organ or part may acquire is, in

* ‘Journal of Anatomy and Physiology,’ “On the Infection of the Connective Tissue in Scirrhus Cancers of the Breast,” October, 1879. See also my paper in ‘Med.-Chir. Trans.,’ 1882, p. 53.

fact, a striking instance of that relation between Memory and Generation which formed the subject of the first chapter. After the disorder of structure and function has lasted a certain time, its traditions or memories are embodied, summed up, or made implicit in the cells, particles, or even juices proper to it ; the new growth becomes parental, reproducing its like by an agency that is literally spermatic or seminal. It remains to consider whether a morbid habit which has reached that remarkable degree of inveteracy may still be broken by alterative remedies.

It may be conceded at once, that so long as a primary tumour with infective power is allowed to remain undestroyed, infectiveness will issue from it. The first indication, therefore, is to remove the parent new growth ; and that indication is usually fulfilled by the rule of practice to extirpate the tumour with the knife, if it be accessible. But the results are by no means satisfactory. In cancers of the breast, the infection of the surrounding tissues or of more distant parts is sure to continue, and the disease will sooner or later reappear. Even in cancers of the lip, where the infectiveness is much slower or less active, recurrence is not unfrequent.

The questions therefore arise : firstly, whether the knife is in all cases the best extirpating agent ; and, secondly, if the knife be used, whether some local or constitutional medication may not succeed in breaking the power of the infection.

The cases where some other extirpating agent is to

be preferred to the knife are probably a minority of the whole. They are those cases where a line of separation can be made between the nodule and the neighbouring tissues gradually, in the manner of a slough, but without the phenomena of inflammatory sloughing. One of Justamond's cases of a scirrhus nodule in the breast with the skin unbroken, was of that kind; the skin was first touched with lunar caustic, and after twenty-four hours arsenic was applied. In course of time the hard mass was disengaged more or less entire, and the defect of substance skinned over. The subsequent history is confused; but there was almost certainly recurrence.*

If recurrence take place, we say that some traces or "seeds" of the disease had been left; but such traces are certainly invisible to ordinary search in the tissues removed along with the nodule. What is left is the heritage of infection, a disposition communicated

* I lately saw a case where a cancer of the lip had been completely extirpated seven years before by means of an Indian remedy which was probably a preparation of arsenic. A plaster was applied over the broken surface of the nodule and kept on continuously for four weeks under a good deal of pain described as of the "drawing" kind; at the end of that time the new growth had separated all round and came away, as the patient described it to me, with a number of slender whitish fibres hanging from its base, "like the rootlets of a leek." There was a very obvious depressed scar about the middle of the lower lip, quite free from induration, and in all respects healthy after seven years. That sequel is of course common enough after removal by the knife; but it is none the less probable that the natural separation or exfoliation of a piece of new growth promises more for non-recurrence than the removal of it by an incised wound, even if the incision go wide of the tumour.

to the tissues of the neighbourhood, in virtue of which they all assume the embryonic type, and ultimately the epithelial form and grouping of the primary new growth. A clean cut with the knife does not remove that disposition, although, if it go wide enough, it may remove the connective tissues where it is at the moment strongest. The desideratum is to remove the infective disposition along with the original source of it; but are there any cases where that result is attainable?

The action of the drug (let us say arsenic) is not altogether escharotic. It can be escharotic, no doubt, if it be applied strong enough; but the indication clearly is to bring on a slow or gradual detachment of the part *en masse*, and, coincidently therewith, an alterative effect upon the neighbouring tissues in which the infective disposition resides. The toxic action which slowly kills the life of the new growth, or its connexions, will serve at the same time to suspend the infective habit or acquired disposition of the tissues immediately adjoining it.

Let us consider, on the other hand, what happens along the track of an incised wound. The embryonic activity is at once revived in the direction of repair; and, if the union be primary, there will not have been the very smallest interval of inflammatory loss and re-making. The revival of embryonic activity in the quiescent cells of the connective tissue and around the vessels will have been purely formative; and that is the one thing which will most favour the acquired

disposition of the surrounding tissues towards cancerous infection. The embryonic phase of repair is a phase that they would have gone through in any case so as to become cancerous ; the passage of the knife through them serves only to hasten it.

There is a wide-spread tradition that a certain slowness of healing and a certain amount of suppuration after removal of a cancer is so far a guarantee against recurrence. It is difficult to get at the statistical grounds of that belief. If there is anything in it, the explanation would be that the full degree of inflammatory action in the neighbouring tissues superseded for the time, if it did not effectually banish, their disposition towards cancerous infection. It is certainly a significant fact that amputations of the cancerous breast have a quite peculiar tendency to heal by primary adhesion, as if the formative power in the severed tissues were strong enough to dispense with the round-about process of inflammatory reaction, suppuration, and reparative granulation. Surgeons, in the present dexterous age, sometimes take credit to themselves for the quick recovery of their "breast cases ;" but the credit belongs as much to the tissues as to the mode of operating or dressing, and it is somewhat doubtful if the neatness of the cure be an advantage to the patient.

The indication which we get from a close study of the pathology of cancer, to suspend and banish the infective habit in the connective-tissue cells of the neighbourhood, may or may not have found a practical

fulfilment in the ancient Indian practice of anointing the flaps or exposed surfaces with an arsenical salve. There are naturally no records to show whether the practice really served to prevent recurrences, although we know from the explicit statement in 'Susruta' that such was its intention. In modern surgery that practice has been revived by Esmarch at his clinique in Kiel, but no great success is claimed for it.* The obvious objections to it are the danger of acute arsenical poisoning from absorption, and the pain which such an application would be apt to cause. At the same time it is to be kept in mind that the indication for the local use of arsenic in cancer is to obtain a slow and non-irritant effect, or an alterative action; and to that end the arsenic should be triturated with some inert substance to the highest degree of subdivision, so that a very minute quantity may permeate a large amount of the salve and be able to influence the cellular life of the part without poisoning it or the body at large.

The expectations of Sir James Paget that a constitutional remedy will one day be found for cancer, like mercury for syphilis, can hardly be said to be based upon anything better than a vague hopefulness. There is, of course, some slight analogy between syphilis and cancer in respect to their metastases; but the pathology is widely different in the two cases. Cancerous infection is always generated from some

* See note on p. 154. Esmarch has also treated cancers beyond the reach of operation by doses of Fowler's solution increased gradually up to the point of tolerance ('*Deutsche med. Zeitung*,' i, 1885).

local disorder of a secreting or epitheliated surface or organ ; the acquired local disorder is the fountain whence the infection issues, first to the immediate tissues around and afterwards to discontinuous centres, in ever-increasing strength and quantity. So long as the local growth remains undestroyed, there is always a source of infection ; and there is no reason to expect, from the circumstances of the case, that constitutional treatment will be of any avail to eradicate the primary disease.

The salient point of difference between syphilis and cancer is that the former is always the tradition of bad healing, or of repair gone wrong ; a tradition, therefore, which has a great element of hopefulness in it, inasmuch as the disease has still the reparative force behind it. Unfortunately there is no such reassuring fact to be found in the circumstances amidst which cancer arises. The difference will be at once apparent on comparing a lupus with a true cancerous sore or nodule : lupus has just enough of the granulomatous type in its structure to be capable of sound healing under an alterative action ; but in cancer the safe issue of cicatrization or repair has no tendency to come in. The evil repute of a cancer is on the whole well founded ; the disease has been hitherto mostly of the incurable sort, and there is only a glimmer of hope to be got from the pathological analysis.

The disease is the peculiar Nemesis of secretion or other epithelial action gone wrong—of long standing catarrhs, repeated congestions, or habitual irritations

of epitheliated surfaces, or of the peculiar liabilities of women in respect to the early obsolescence of their primary and secondary sexual structures and functions. The reason why cancers arise from such functional irregularities in some persons and not in others would appear to consist in the peculiar facility of the supporting connective tissues to be acted upon by the waste products of the epithelium, the induced action in the supporting tissue being in the first instance a return to embryonic characters. The great binding-tissue of the body, the chief residue of the original mesoblast, is therefore the peculiar seat of cancerous predisposition. It has a proclivity in some persons more than in others to fall into that disastrous infection, although never without repeated provocation.

Whatever precaution of living diminishes the number of fluxions, catarrhs, mechanical excitements, or reflex emotional excitements in the organs and epitheliated parts of known liability, diminishes naturally the risk of cancer. But such prevention is much too remote from the after-effects to be seriously thought of. Functional disorder is hardly ever viewed as a possible antecedent of cancer, even if the family history be disquieting. The treatment begins for the most part at a time when epithelial infection of the supporting connective tissue is already an accomplished fact; and there is hardly a hint, among the various alterative actions of the metals or other toxic substances, of any "oblivious antidote" for such a rooted memory as that.

CHAPTER XII.

*THE DIATHETIC ANTECEDENTS OF TUBERCLE, AND
THEIR SIGNIFICANCE FOR TREATING THE IN-
FECTIVE DISEASE.*

SYPHILIS we have considered to be the memory of bad healing communicable from sex to sex, or of granulation-tissue gone wrong. Cancer, on the other hand, is an infection arising always within the individual body, a persisting disorder of certain epithelial regions, driven at length to overstep the bounds of mere quantitative error, and to sum itself up in structural infectiveness. The examples of chronic ill-health in the chapter on Diatheses are summations on still another line; they implicate the nervous system pre-eminently, being as universal or constitutional in their extent as that system; but not even leprosy, for all its nodular formations, is an infection in the same sense as syphilis on the one hand or as cancer on the other. Chronicity, repeated provocation, habit, store of memories, come into account equally in the communicable infection (syphilis), the auto-infection (cancer) and the diatheses (leprosy, pellagra, beriberi). We have now to consider still another instance of chronic ill-health, where the

provocation and acquired morbid habit produce a result that amounts to a communicable infection on one side, an auto-infection on another, and a diathesis on a third. This kind of combination of effects is best exemplified in certain of the domesticated animals, and the particular instance in view is bovine tubercle.

For the sake of brevity, I must presume upon the evidence, and upon a view of it that I have stated elsewhere.* Bovine tubercle is, in the last analysis, a multiple tumour-disease of the serous membranes, with the property of auto-infection as shown in the secondary invasion of the lymph-glands, lungs, abdominal and pelvic viscera, bones, joints and the like, and with the property of infectiveness beyond the individual organism, as shown in the communicability of bovine tubercle, both experimentally and accidentally, by the ingestion of the morbid products and of the milk, by inoculation, and probably also by air-borne contagion. It is a summation of morbid memories of a very complete kind, in every possible direction, including that of heredity. What is there in the primary type of chronic ill-health to bring consequences so comprehensive in their range?

The multiple nodules or tumours of the serous membranes in cows and oxen are a peculiar kind of tissue, not altogether like anything else in the body. The tissue is partly sarcomatous, partly coarse fibrous,

* "The Autonomous Life of the Specific Infections," 'Brit. Med. Journ.,' Aug. 4th, 1883.

with great tendency towards caseous, cretaceous, or other dry molecular degeneration. It has no resemblance of fat ; but it grows to a very significant extent in the proper seats of fat in the stalled bovines, and it assumes the peculiar shapes of the subserous masses of that tissue. It certainly looks as if these multiple tumours, nodules, and deposits on the serous membranes, owed their existence to some errors of nutrition, which had caused the fat in its favourite internal seats to lose the property of a metabolic tissue and to assume an activity more decidedly structural and formative.

The distinctive mark of the serous-membrane nodules in the pearl disease is redundant growth of tissue without adequate provision of blood. Fat is the physiological type of it, and fat is a tissue in which the blood is naturally abundant. Under certain circumstances, where the blood-supply is for some reason restricted, one may observe the adaptation of the fat to a smaller amount of blood ; it becomes sclerosed or semicartilaginous, or calcified ; and its lobules so transformed may lead a safe existence for a considerable time, either *in situ* or as loose bodies of the abdominal cavity or of the joints. I have seen a typical pearly hardness in an isolated lobule of the abdominal fat in the carcass of a perfectly healthy ox ; and one may see the same kind of sclerosis sometimes in deposits of fat in the human subject.

The common pearly diathesis of the bovines has affinities to such occasional changes in the fat ; but it conforms to a well-marked type of its own, the con-

formity being due to the steady pressure of the same causes everywhere. Instead of fat there is at best only the embryonic tissue which would have developed into fat under favorable circumstances. On the outer layers of the pendulous nodules or lumpy masses, the cells retain the embryonic form for a long time, and the nodules increase in size by the formative activity of those layers. Sooner or later the outer layers acquire the pearly character; while in the interior, changes overtake the tissue, either a comparatively safe coarse fibroid change along certain lines, or a calcareous change, or a caseous change, or all three changes mixed. Such are the pearl-nodules of the serous membranes as we find them.

The breakdown appears to have been in the blood-supply of this redundant tissue upon the serous surfaces. Always a somewhat forced or superfluous product of feeding, fat on the serous membranes has peculiar liabilities. The habit of making it is strong in the bovine ruminants, not only in confinement but also in their undomesticated state. It is partly on the basis of that habit that these animals are adapted for the purposes of man. In the domesticated breeds, the habit not only remains but becomes stronger. To make redundant tissue on its serous membranes is what the domesticated bovine can hardly help doing under any circumstances.

Let us now consider what are the circumstances of cows in dairies, particularly in town dairies. Some of them may not see the sun from year's end to year's end;

they breathe a close atmosphere ; they get no exercise for half the year and many of them none for the whole year ; they are fed with stimulating foods ; they are turned into milk-producing machines by every kind of artificial device, the natural circumstances of the mammary function, namely pregnancy and suckling, being mostly ignored. This colossal contempt for the order of nature is practised more or less by mankind in their treatment of the domesticated bovines all over the world ; and all over the world* there is a disease of those animals, with a remarkable conformity of type, which is the Nemesis of that masterful practice, and of nothing else. The wretched animals cannot fail to make tissue in the seats of fat ; but the tissue is not fat. It is fat impoverished of its blood, a tissue that falls short of fat for the reason that it wants its due development of blood-vessels. And that is the character of tubercle wherever we find it, whether in man or in the other species—redundant tissue ill-provided with blood-vessels and doomed to decay.

The production of such nodules on serous membranes usually devoid of fat (such as the pleura), the production of them in the lymph-glands, in the lungs and elsewhere, together with all other incidents of tuberculosis, are merely the natural developments of diathesis and infection, intelligible to us according to many analogies.

* The exceptions are said to be Iceland and the Asiatic Steppes ; and these, oddly enough, are said also to be the countries most free from human tubercle.

If we now take the therapeutics derived from this view of the malady, we shall find that in veterinary practice they hardly exist. The interest in the treatment of tubercular disease belongs to the medicine of the human species; and, as regards tubercle in man, the difficulty at once arises whether the indications which we are well entitled to gather from the facts of bovine tubercle, can be transferred as a whole to human tubercle. That a certain number of cases of tubercle in man come directly by infection from bovine products, I have no doubt; and I have elsewhere given the reasons for my opinion at length.* But direct transmission of a virus from the one species to the other would account for only a small part of the sum total of human tubercle; just as direct acquisition of the multiple-tumour diathesis in the bovines themselves is not the only explanation of all the tubercle among them. In both cases direct hereditary transmission, or the transmission of a high degree of liability, is by far the most potent cause of the wide prevalence of tubercle.

But I cannot escape from the conviction that the peculiar errors of nutrition in the domesticated bovine species all over the world are the real fountain and source of human tubercle. The diathesis is constantly being acquired anew by cows upon the old terms; the supply at the fountain head is never permitted to fail; new transmissions to man are taking place from

* 'Bovine Tuberculosis in Man: an Account of the Pathology of Suspected Cases,' Lond., 1881.

time to time; and, notwithstanding the considerable tendency of consumptive families to die out, the disease is as common as ever.

If pathology and the common-sense study of causes (such causes as disorders of nutrition of a uniform kind and on a large scale) had given us any such indication of a rational or intelligible origin for tubercle in man as in the cow, it would not be necessary to risk so much upon the assumption of transmission from the latter species to the former. But, as the case stands, it is only for the bovines that we have those striking indications of primary disorder in a metabolic tissue (on the fat-forming serous surfaces), with subsequent diathesis, auto-infection, and transmissibility; and if these indications of mal-nutrition in a particular tissue are to be made available for human medicine at all, we must be content to take them from the animal disease. At the lowest estimate, the animal disease is an analogous affection. We may expect some therapeutic indications for tubercle, on the supposition that it consists at the fountain head, and in its fundamental type, in a certain definite disorder of tissue nutrition; and these indications we shall come to after disposing of difficulties that lie in the way.

It will be advantageous to place the facts of tubercle side by side with or in contrast to those of syphilis. Syphilis, as we have contended, is an induced tradition of bad healing, or a memory of granulations gone wrong. Fortunately there is always in the back ground of that infective disease, the natural

reparative force ready to come in if only the erroneous habit be long enough suspended. Hence the decided value of alterative treatment in syphilis; and hence the fact that scarring, contraction, puckering, obliteration of vessels, and other reparative effects, are the common issues of the syphilitic process. If the tradition of bad healing, or of tumour-like granulo-matous tissue instead of transient granulation tissue, can only be suspended for a time, there is, in the very nature of the case, a reparative force in store, which will conduct the process to the safe issue of cicatrization.

The difference between that process and the tubercular will be seen on comparing the ulcerations of the two diseases (in the larynx, or on the tongue, or in the bronchi), or the nodules and infiltrations of each in the lungs. In the destructive tuberculous process there is no reparative force ready to come in, for the reason that the tradition or fundamental type of tubercle is not that of bad healing or of granulations gone wrong, but of bad nutrition or of adipose tissue gone wrong. The morbid habit is incidental to nutrition as localised in a metabolic tissue peculiarly sensitive to vicissitudes and peculiarly apt to take a formative direction; whereas in syphilis the morbid habit is incidental to the process of repair in common sores of a particular region. Syphilis is exceptionally well placed for healing, because the disease is essentially an error of the reparative forces themselves, and has always the safe issue of cicatriza-

tion not very far off. Tubercle is a disease on a quite different physiological basis. The action of mercury is as injurious to tubercular products as it is beneficial to syphilitic. If syphilis had not fortunately the natural forces of repair underlying it, mercury would presumably be of no use; its use is to suspend the habit of bad healing, so that the reparative action is resumed on the proper lines. Tubercle has not certainly that particular force ready to come to its rescue; but has it not something appropriate to its own antecedents to expect from the readiness of the bodily actions to return to the beaten track, if the opportunity be given them?

It will hardly be possible to place these indications of cure on a serious basis, unless some attempt be first made to meet the obvious objections to this transcendental view of tubercle which will have presented themselves to the practical reason.

By far the most important of the collateral considerations in the question of tubercle, is that the lungs are the organs most affected. It may well seem hopelessly paradoxical and wrong-headed to assert that the affection of the lungs in tubercle is after all a secondary or derived one, or that pulmonary consumption is not essentially a disease of the respiratory apparatus. Yet, to get the true therapeutic indications, we must go as far below the surface as that.

There are cases, it is true, where bronchial irritation is directly, if not remotely, answerable for the pulmonary consumption; such cases as the consumption of

miners, stone-masons, and other classes of workmen habitually inhaling dusty particles. But even in these cases consumption would hardly be the sequel of the irritation where there not some specific diathetic cause at work in the body. The commonness of consumption under such circumstances only shows how widely spread the specific diathesis or constitutional taint is; it does not by any means show that the dust of minerals or metals can produce consumption of the lungs as the proper effect of its irritation.

Besides these cases there are many more where a common pulmonary catarrh may have had a considerable share in determining the incidence of the disease, or its character as "infiltrated" tubercle. But it is difficult to believe that so specific an issue would ever arise unaided from a common kind of irritation, whose effects are otherwise so often self-limited and non-specific. There is always the memory of erroneous tissue-nutrition when consumption ensues, upon what incitement soever.

The original circumstances, or at least the analogous circumstances, are revealed in the bovine species; and the significant fact meets us there, that the disease in the lungs is secondary to the disease of the serous membranes. The lungs are the seats of metastasis, just as they usually are in sarcomatous tumours. In the bovine lung the metastasis may be either in the form of nodular masses, or of diffuse chalky or gritty infiltration; but it is in all cases a metastasis in idea, even if it should overshadow the serous-membrane

disease itself, as it usually does in inherited cases. The divided interest, if not the subordination, of the lung affection in the bovine disease (or prototype of all tubercle) is farther made evident by the fact that various groups of lymphatic glands, many of them in no way connected with respiration, are subject to the same kind of textural overgrowth and degeneration. Wherever bovine tubercle occurs, whether in the lungs or elsewhere, and within that species or beyond it, we may take it that it stands for memories, more or less remote, of seriously disordered tissue-nutrition, and more particularly that it means fat-tissue gone wrong.

I make no reference to the minute organisms found here and there in the unstable tubercular products (as well as in other granulomatous new growths): firstly, because a sufficiently close scrutiny of the experimental evidence set forth to prove the disease-producing property of the bacillus will satisfy anyone that there is a fatal flaw in it;* and secondly, because all the world knows that the therapeutic indications of the parasitic doctrine are worthless. I address myself to a kind of tubercle-pathology which has lessons for us of the most practical kind. Such of them as relate to what I think the true *fons et origo mali*, namely, the short-sighted maxims and unconsciously cruel practices of cow-keeping, are matter of national concern; and I have nothing farther to say on that subject at present.

* Pointed out by me in a fly-sheet on 'Dr. Koch's Method of Cultivating the Micro-Organisms in Tubercle,' 1884.

But for the more immediate indications of cure in the individual there is something to be gleaned on a nearer look at the erroneous habit of tissue-nutrition.

If that erroneous habit arises in the first instance, as I believe it does, in the fat of serous membranes, it becomes in the end a sort of idea* pervading the tissue-nutrition elsewhere; just as the erroneous healing of venereal sores becomes a pervading idea in the constitutional infection of syphilis. The archetypal error of tubercle is derived, in the last resort, from the fortunes of the adipose tissue in certain localities; and although human tubercle retains no trace of an adipose origin, the pervading idea of the disease may be said to be always and everywhere that of fat gone wrong. Are there any therapeutical indications from that pathology?

Whatever therapeutical indications there may be will come to us in the first instance from watching the natural behaviour of fat-tissue under various circumstances of malnutrition. Such behaviour is always conservative, or by way of safe retreat from a threatened position. When it falls short of its full structure and function, owing to failure of the blood-supply, it adapts itself to the circumstances; it becomes sclerosed, or semi-cartilaginous, or calcified; it becomes a kind of tissue which can subsist with little or no blood. This is seen in loose bodies of the synovial or serous surfaces, which appear to live by the imbibition of

* Idea may be read in the Aristotelian sense of "forma, vel anima, vel idea," as applied to the transmission of parental characters (see p. 14).

juices only. Next in order of safe retreat, the redundant tissue becomes coarsely fibrous, a condition in which it can maintain itself when the blood-supply is reduced in amount or present on the periphery only. This is the best of the conservative adaptations in tubercle itself. Still keeping on the line of safe retreat, it may undergo dry necrosis with or without calcareous deposition; and if the outer zones succeed in keeping up their vascularity the result may be harmless obsolescence. This is the common issue in those innumerable cases where the lungs or lymphatic glands are found after death to contain what are rightly called obsolete tubercles, usually with a cretaceous centre. Safe retreat from a dangerous position is the process of cure spontaneously instituted in very many cases of tubercle.

The administration of remedies has to be directed towards securing obsolescence; just as in syphilis it is directed to securing sound repair. But experience shows that the worst cases of tubercle are not nearly so amenable to treatment as the worst cases of syphilis. The idea of syphilis, it is contended, is an error of healing; correct the error, and the healing will proceed. On the other hand, the idea of tubercle is faulty nutrition affecting a peculiarly susceptible metabolic tissue, namely fat-tissue. If we were near enough to the fountain-head of the disease, the cure would be to make the perverted fat-tissue return to its proper metabolism. But that is, of course, a chimerical idea, for the reason that tubercle, as we

find it in man, has come a long way from any primary errors of nutrition.

If, however, we analyse the process of error in tissue-nutrition, we shall find that it consists essentially in inadequate provision of blood and blood-vessels.* If the primary idea of tubercle is fat gone wrong, the secondary idea is inadequate blood-supply to a redundant tissue. Whatever helps its blood-supply will help it on the road to safe obsolescence. In particular, if the natural recovery proceed as far as the fibroid condition of tubercle, the reinforcement of the blood-supply will be clear gain, with no risk of countervailing loss. The indication is not only to make more blood, but also to make more blood-vessels; and it is not inconceivable that both of these indications are fulfilled in scrofula by a drug of proved value—the iodide of iron. The same dual indication is doubtless fulfilled by much of the hygienic treatment of consumption—living much in the sunshine, breathing a dry and bracing air, exercise on horseback (Sydenham's cure), and whatever else gives the patient an appetite for and the power to digest abundant strong meats and wine.

It is in counteracting what I have called the secondary idea of tubercle, namely, the insufficient supply of blood to a redundant tissue, that the empirical treatment may be represented as most rational. But there is one kind of treatment special

* See a paper by the author on the "Physiological Type of the Giant-cells of Tubercles and Granulations," 'Journ. of Anat. and Physiol,' Jan., 1879. (Reprinted in Appendix to 'Bovine Tuberculosis in Man.')

to tuberculosis, namely, feeding with easily assimilated fats such as cod-liver oil, which may seem to meet the primary idea of the disease, or the idea of fat-tissue gone wrong. The best theory of the benefit of cod-liver oil is that it "improves the faulty nutrition which originates and keeps up the disease."* But the faulty nutrition is of a special kind, probably (in the remote causation) a diathesis-error of tissue-nutrition affecting the internal fat. Again, the beneficial action of cod-liver oil is more special in tubercle than in the cachexia of tertiary syphilis, or in non-specific wasting diseases. Is it not an artificial help to tissue-nutrition in that very direction in which the nutrition of the organism had remotely failed? If one could believe that an infective disease carried always with it to its remotest developments the idea of the primary error out of which it arose, then it would not be altogether fanciful to ascribe some such appropriate action as that to cod-liver oil in tubercle. But I would admit as soon as anyone that the assumed cause is too distant from the known effects, and that the intermediate links of the chain are too invisible (except to the eye of faith), to make it prudent to rest the known benefits of cod-liver oil at all exclusively on that pathological indication. The other or secondary hint for treatment, to improve the vascularity by every available means, comes with much more force and directness from an analysis of the morbid process.

* J. Hughes Bennett, 'Principles and Practice of Medicine,' 5th ed., 1868, p. 744.

CHAPTER XIII.

*VICARIOUS INFECTION AS THE EQUIVALENT OF
CHRONIC HARDSHIP IN OTHERS.*

THE illustrations of Unconscious Memory in Disease which have occupied us after the chapter on Visceral Neuroses may have seemed to some readers to be no illustrations of the doctrine at all. Diathesis, even where it is mostly an affair of innervation, may seem to have an explanation without invoking the power of memory. Or again, whatever the antecedents of infection may be in the way of diathesis or other chronic and recurrent ill-health, is it not overstepping the plain meaning of words to speak of infection as summing up and propagating by means of certain representative particles a long train of vicissitudes registered in the unconscious memory?

The reason for bringing infection under the doctrine of unconscious memory is its close analogy with generation, which is itself held to be connected with unconscious memory in the manner stated in the opening chapter. With every desire to keep within the legitimate use of words I fail to see that there is anything strained or fanciful in my later applications of unconscious memory; if they are less obvious than

some of the others they are not less real. I have still to touch briefly on another kind of infection as a singular illustration of unconscious memory in disease; and therein also I venture to say that the legitimate use of words has not been overstepped.

This kind of infection is vicarious infection, a term first introduced into pathology, so far as I know, by Sir Gilbert Blane. The peculiarity of it is that it proceeds from those who are not themselves suffering from a specific form of disease. They have been inured to hardships of various kinds; but, for their own bodies, those miseries have not come to the issue of an infection, and have hardly been protracted long enough to make a diathesis. On the other hand, the individuals quickly recover their ordinary health when the steady pressure of hard and unwholesome conditions is taken off. The remarkable thing is that an infection has been breeding all the while—an infection for others but not for themselves. The infection is actually a summation of certain kinds of hardship and unnatural conditions of living; but it is in those who are well, who are as far as possible removed from the same unwholesome conditions, and most of all in those who are separated by a great gulf of racial differences, that the infection unfolds itself. It is a short and sharp equivalent in the latter class for the slow grinding of misery in the former; and therefore it is called a vicarious infection. But, it will be asked, are there actually instances in real life of that rather romantic doctrine of disease?

The instances of it mostly belong to the class of fevers marked by the peculiar prostration of typhus. They include certain historical outbreaks of typhus at the trials of prisoners (in the old days before Howard), some instances of typhus on the arrival of filthy ships, the whole of yellow fever from first to last, and, in veterinary pathology, at least one great and destructive typhus-like disease of cattle, namely, Texas fever. There is so much unwillingness to believe in this kind of vicarious fever, so much prejudice in certain influential quarters against anything that does not suit the so-called "germ-theory," and so much impatience on the part of many when they are told of principles at work too impalpable for plain men to discover, that I shall make the Texas fever of cattle my chief illustration, finding therein a body of facts that are free from all ambiguity and have been candidly accepted by practical men in the United States.

The phenomena characteristic of Texas fever had been observed from time to time early in the century in connexion with the transit of cattle from distant pasture-lands to such long-settled States as Virginia. But it is only within the last twenty years that Texas fever has become an annual visitant of the Western States, along the "track" over which the cattle of Spanish breed are driven or carried in enormous herds from the pasture-lands of Texas through Arkansas and Missouri as far up as the Canadian Lakes. The fact is known in every farm homestead along that route that it is dangerous for the home-bred cattle to graze in the

track of the strangers. So much annual loss has resulted to the indigenous cattle of Missouri, Illinois, and other States from the transit of the Spanish herds, that an attempt was made at a great Convention at Chicago a year ago to lay down limits for the "track" of Texan cattle, so that the stock belonging to homesteads on the route should not come in the way of the foreign breed. The need for some such vigorous and concerted action has arisen out of the following circumstances :

Home-bred animals (say of Missouri) grazing on pastures over which Spanish cattle have passed and have left their excrements, are apt to be seized after an interval with symptoms of a typhus kind, that is to say : listlessness, no appetite, restlessness, loss of strength, the head lowered, the back arched, the ears drooping, the horns hot, the eyes dull and fixed, the flanks trembling, the fæces voided at frequent intervals along with bloody mucus, the urine bloody, the breathing quick, and death ensuing in a state of stupor or convulsions. Ninety per cent. die after three or four days, or it may be after one or two days' illness. On opening the animal, sloughs, erosions, and deep excavated ulcerations are found towards the pyloric end of the rennet or fourth stomach. The disease is never communicated from one victim to another. It is caught only by grazing or otherwise following in the track of the Spanish cattle.*

* 'Report on Texas Fever,' Parliamentary Paper, 1880 (compilation by Professor Brown, from U.S. sources).

Now, it was clear from the first that the droves from Texas did not suffer from that disease. Occasional animals among them died, no doubt, at the same time as the home-bred cattle were dying; but no amount of careful search could prove that they ever died of that fever. What they died of was something like the following: "The animal was quite emaciated, breathed hard and was evidently near death. It was killed and most critically examined throughout, without presenting appearances of any disease at all analogous to that afflicting the native cattle; in fact, there seemed to be no disease, but a wasting away of the animal, and a dying of poverty. The fatty tissues had all been absorbed in sustaining life, and the system did not seem to have vitality enough to rally from the fatigues the animal had undergone on the journey."* Indeed, illness of any definite kind besides lameness was rare among the Spanish cattle; they rapidly improved in condition after a few days' grazing, although it was admitted that sometimes a considerable percentage of the herd had dropped by the way. A Commission sent out from Chicago in 1868 came to a locality where the home-bred cattle had become infected, and they set to work to find traces of disease among the Spanish cattle: "We travelled over twenty miles back on the trail, never out of sight of these cattle, which were estimated to number from 25,000 to 30,000 head. Much time was spent in riding through and examining the cattle, and quite a number

* L. c., p. 16.

were caught with the lasso and their temperature and pulse taken and their feet examined. Two days were thus spent without finding any animal that could be called sick" (p. 18). There is in fact complete practical agreement among all sensible people along the "track" that the Spanish cattle do not suffer from Texas fever, although that fever is caught from them by the home-bred cattle, and is never caught in any other way.

The factors in the production of this remarkable vicarious infection are twofold: first, the hardships of the journey; and, second, the wide differences in breed. It is not likely that the infection would be so uniform in its incidence but for the existence of both of those factors. Its conformity of type is due to the steady operation of the same two factors, season after season; the infecting animals have been always of a widely different race, and they have undergone a trying journey from a totally different sort of climate and country.

It is noteworthy that Texas cattle "removed to localities characterised by the same climatic conditions (as from one portion of the Gulf Coast to another, or upon the same parallel of latitude) do not communicate disease to local stock;" and again, that "in portions of Arkansas in which the climatic conditions are similar to those of the region from which the migrating cattle come, no infection occurs." There are many other subsidiary facts of a like kind, upon which I cannot enter; but there are no facts conflicting with

the doctrine that the fever is a vicarious infection, a short and sharp illness caught from animals of a widely different breed, after they had come thousands of miles by road, rail, and river-boat, and had become inured to the well-known hardships of that kind of cattle-transit. I do not say that Texas fever is the infective equivalent of the hardships alone; it is the infective equivalent of hardships borne by cattle of a widely different breed. The infection is contingent, as infection so often is; but the home-bred cattle are so uniformly different in condition, acclimatisation and racial characters, that the contingency is almost a certainty.

Whether mere contact alone, amidst these racial and climatic differences, would induce a fever is a curious question, but hardly a practical one; for the reason that the new arrivals will always bear the effects of a journey or voyage in one degree or another. Thus, in the instances from the South Seas, or in the well-known case of strangers arriving at St. Kilda, there is always the fact of confinement on board ship; or, as Darwin says, the set of men whose effluvium would appear to be poisonous when inhaled by others ("and possibly more so if the men be of different races") had been "shut up some time together."*

I have endeavoured on various occasions to recommend this doctrine of vicarious infection as suitable to those mysterious and annoying outbreaks of foot-

* 'Naturalist's Voyage round the World,' p. 436.

and-mouth disease which now and then appear in the midst of the country, when every way of ingress is closed. New purchases, especially of Irish stock which had been driven for weeks from market to market, may give foot-and-mouth disease to home-bred stock with which they come into contact, although they do not themselves suffer from the acute specific malady. The practical bearing of such a doctrine is that all new purchases should be carefully keep apart from the home-bred stock, until such time as the former are acclimatised or the newness of their position worn off. Where breeds of cattle are broadly distinguished, or racial characters strictly cultivated, such precautions are all the more necessary, and most of all necessary where the strangers are just off a journey. This will prove a better working rule than the threadbare dogmatism about there always being pre-existing cases somewhere, preferably in a foreign country.*

The great instance of a vicarious infection in human pathology is yellow fever. It would take too long to go into the complex facts fully, and I must content myself with a brief summary of views that I have developed at length elsewhere.†

The element of racial difference in this case of vicarious infection is supplied by the wide gulf which separates the white man from the African negro, who, for his part, can hardly take yellow fever although he

* See 'Fortnightly Review,' Aug., 1883; and 'Field,' May 24th, 1884.

† See 'North American Review,' Oct., 1884; and 'Brit. Med. Journ.,' August 4th, 1883.

lives in the midst of it. The element of protracted hardships is supplied by the old African slave trade, by the "horrors of the Middle Passage." The peculiarity of yellow fever among human infective diseases is that its poison emanates from the soil or mud of certain harbours or foreshores, all of which have either been at one time or another themselves ports of debarkation of slaves from Africa, or have been frequented by vessels whose bilges had been fouled while lying in a slave-port.* The scourings of slave-ships had got into the harbour and shore mud, and had fermented there; and the specifically poisonous filth has been carried hither and thither in the bottoms of trading ships. The fever has been most persistent where there has been least cleansing of the harbour and beach by the natural action of tides. Wherever there has been a strong tidal ebb and flow, free drainage and the like, the poison in the harbour and in the soil nearest to the shore has not survived the slave trade itself by very many years; but where there has been a good deal of stagnation, as in some West Indian harbours, it continues still to be active under conditions favouring emanation, although no slave-ship may have discharged the filth of her voyage there for eighty or a hundred years.

As in the case of Texas fever, the poison of yellow fever is in the dejecta of the other race; and from the

* See the evidence as to the peculiar local limits of yellow fever given in Hirsch's 'Geographical and Historical Pathology,' English transl., i, 328, 360.

peculiar circumstances of the case, namely, the long transit by sea, the dejecta (largely of a dysenteric kind) had been brought in considerable quantities in the ship's bilges to the port of arrival, and had there been discharged into the harbour mud. They have thus had the opportunity of becoming an exogenous or soil poison, resembling in that respect the poison of Asiatic cholera; and the soil or mud where they have accumulated was for a time, or continues to be, an endemic focus of the disease.

The exogenous element in the infection of yellow fever makes it more difficult to trace its vicariousness. But all the facts of its history and geography connect it, either directly or indirectly, with the over-sea traffic in African negroes; and there is the other remarkable fact that the negro of pure blood can hardly take the fever, however much he may be exposed to the miasmata. Those who take it readily are new arrivals in the yellow-fever ports, most readily of all strangers from the higher latitudes. Whereas in Texas fever the Spanish breed of cattle carry an infection (in their excreta) to the cattle of more northern pastures; in yellow fever, on the other hand, those who get it most are persons of the white race who come from northern latitudes to certain localities where the poisonous excreta have been accumulated and have acquired virulence in the soil by fermentation. There are such differences; but the two main factors of vicarious infection, the wide differences in race and the peculiar subjection to antecedent hardships and misery,

are the same in both. It is by no means a romantic fancy, but a sober deduction from the most salient of the facts, that yellow fever, in its last analysis, is for the white race a short and sharp summation and reminiscence of the Middle Passage, made possible by those very racial differences on which the slave trade itself was based.

CHAPTER XIV.

*GENERAL SURVEY OF MORBID HABIT AND
ALTERATIVE CURE.*

WE have now gone over a wide range of the field of disease, finding illustrations of the doctrine of unconscious memory in regions of it that may seem at first sight to be too unlikely and remote. More particularly, those cases of disease which are purely an affair of infection or accidental contamination would hardly group themselves among effects remembered, summed up, integrated, and transmitted, unless we were to accept that old analogy which Harvey drew between infection and generation (*Op. ed. Willis*, p. 610), and interpret generation itself to be memory touching the highest point of implicitness. But if we accept these philosophical positions, there is nothing forced in the view of infection as organic memory. We are conducted to that conclusion by the way of diathesis. Except for their infectiveness or capability of being transmitted from organ to organ or from person to person, the infections which I have dwelt upon most might almost be considered diatheses; and the key to diathesis is summation and integration of habitual errors, the nervous system being the basis and common bond.

While the doctrine of morbid habit has thus been extended in unlikely directions, I have, on the other hand, omitted to say anything of those diseased states where its application is obvious and universally acknowledged. Such are the evil habits that grow out of our conscious voluntary actions—the drinking habit, the opium or chloral habit, and some other habits. For these also it would not be difficult to show that the treatment, however hopeless in many cases it may be, is based on the same alterative theory as that which applies to the unconscious memories of diseased action in the cells, tissues, organs, and mechanisms of the body. The lines of it have been nowhere better indicated than in the famous sermon of Chalmers on “The Expulsive Power of a New Affection.” The danger from an old habit, broken for a time but with the void unfilled, is known to us all from the Oriental figure which personifies the expelled habit as wandering about in search of rest, coming back to the empty house to find it as it were swept and garnished for the old tenant, and bringing with it seven other spirits worse than itself.

The power of drugs over habits of conscious voluntary origin is exceedingly limited. It is only where the habit is from the first involuntary, or the memory unconscious, that drugs have a fair chance. The hapless origin of such memories, as I have said, is medicine’s opportunity. But there has always been a widespread desire to get from drugs benefits that drugs can never give. The habit of lying long in bed

of a morning is one that seems as far as possible beyond the reach of physic ; but even for that typical example of a conscious voluntary habit, the aid of drugs has been invoked, as the following will show.

Among other eminent literary characters who have felt what Dr. Bain calls "the volitional solicitations of a strong massive indulgence" to be too much for them, was James Boswell, the author of Dr. Johnson's 'Life.' In that biography he has the following remarks with reference to his difficulty in getting up of a morning after he had been wakened :* "I said [to Johnson] *that* was my difficulty, and wished there could be some medicine invented which would make one rise without pain, which I never did, unless after lying in bed a very long time. Perhaps there may be something in the stores of nature which could do this. I have thought of a pulley to raise me gradually, but that would give pain, as it would counteract my internal inclination. I would have something that can dissipate the *vis inertix*, and give elasticity to the muscles. As I imagine that the human body may be put, by the operation of other substances, into any state in which it has ever been, and as I have experienced a state in which rising from bed was not disagreeable, but easy, nay, sometimes agreeable ; I suppose that this state may be produced, if we knew by what."

Johnson's reply on this occasion is wanting in its usual bluntness and force, for the excellent reason

* 'Life of Johnson,' chap. xli.

that he himself, like Swift and many more of the literary class, was a late riser, and could hardly help joining in Boswell's wish for "some medicine which would make one rise without pain."

Besides the habits that are based upon conscious and voluntary actions, I have purposely omitted a very obvious class of morbid habits which fall more properly within the sphere of unconscious memory, namely, epilepsy, chorea, and hysteria. Among these diseases we find a good many sufficiently familiar instances not only of habit becoming ingrained in the individual, and transmissible to the offspring, but also of the still more remarkable property of mimetic contagiousness for others. An interesting chapter might be compiled of a variety of cures of these complaints, and of hysteria in particular, exhibiting them as habit-breaking cures.* Having given much space to the more remote or dubious instances of unconscious memory or habit in disease, it will not be necessary for

* Dr. Weir Mitchell ('Lectures on Diseases of the Nervous System,' 2nd ed., 1885, p. 161) records the following cure in a case of "habit-chorea":—"He took at first a good deal of valerianate of zinc, and had cold douches to the spine, and also arsenic internally. Meanwhile he was taken from school and set free in Virginia on the sea coast to ride, swim, shoot, and fish. Notwithstanding these wholesome aids, we got no further in the way of relief until we began to use hypodermic injections of arsenic. For this Fowler's solution without the lavender was used thrice a week, in doses rising from two drops to twelve; and, as this heroic medication was followed by rapid subsidence of the symptoms, it was continued for nearly three months. A sea voyage and residence at an English school completed his cure, and then we had also the favouring influence of approaching puberty."

me to enlarge upon these more admitted and obvious instances.

The doctrine of habit, and the rule of alterative treatment apply, also, to a large and miscellaneous class of cases, many of which do not fall readily under the heads of a nosological classification. Such are the conditions when people are "out of sorts," or "run down," or overworked and needing a change, or merely bored by ennui and want of occupation, or suffering from the *tedium vitæ* in one form or another. To do the same things, in the same way, in the same succession day after day, and with the same degree of zest, or rather want of zest, is the commonest of all sources of morbid habit. The art of living, like the art of dining, or the pursuit of pleasure at large, is based upon the principle of change or variety. Most people require from time to time some fillip or stimulus, or something to take them out of themselves. The due administration of such alteratives calls for some exercise of the imagination. George Eliot somewhere says that a good many persons have no other ecstasy—or standing-ground outside themselves—than that which is provided by gin. Not always more intelligent or more permeated by a free play of imagination is the routine of society's so-called pleasures, although they are primarily designed to counteract the monotony of living. Even Watson's "good dinner with extra glass or two of wine" would fail of its end, unless it were resorted to in the spirit of that famous repast of Milton's:

Of Attic taste, with wine ; whence we may rise
To hear the lute well touched, or artful voice
Warble immortal notes and Tuscan air.
*He who of those delights can judge, and spare
To interpose them oft, is not unwise.*

There is one alterative remedy, not in the drug class, which requires a more special reference—I mean a trip to sea. The change from *terra firma* to the mobility of water, from the land atmosphere to that of the ocean, from the life ashore to that on board ship, is a very radical kind of change ; and where benefit results from a sea-voyage, the good effects may be claimed as largely alterative. But a sea-voyage is something of a two-edged weapon ; and there is no doubt that it has been prescribed too indiscriminately. I shall content myself with giving a single case, where the undoubted benefit got from a trip to sea may be reasonably set down as an alterative effect in the sense of habit-breaking or memory-effacing.

The particulars were told to me by the patient, who is a resident Fellow of a college at Cambridge ; and he was afterwards good enough to write them down for me (6th January, 1882). I may premise that the illness was directly and solely due to a concussion of the head, or neck, or back, from a fall in the hunting-field.

“ Your general view of my case is correct. The injury, I believe, was a slight concussion of the brain. The immediate symptoms passed away (after a week or two), and then showed themselves again some three months later in the manner described in your letter, *e.g.* loss of power in the legs (a sort of *numbness in the heel*) and general debility. I ate and slept very well, but could not exert myself. I have no

doubt the symptoms were aggravated by unconscious neglect (I went through all the work and excitement of the May term.) Then, in June, I was violently sick, after a journey, and by degrees became seriously ill. [He then consulted a London physician, "who prescribed lying down as much as possible."] In July I went to the seaside for two or three weeks. In August I was up in Yorkshire two or three weeks, but could not shoot on the moors. Then came the chance of a cruise. I think I was on board the yacht something more than a fortnight in September cruising about in the Channel, and derived the greatest possible benefit in every way. I should no doubt have regained my strength much sooner could I have prolonged the voyage, but I had to return to Cambridge for the Michaelmas quarter-day; and then came the October term with our audit and other engagements, which I got through as well as I could, improving slowly, but feeling all the time that the cruise had given me a real start which I never lost. I have always been fond of the sea.

"I take it, the benefit in such cases as mine is due to the buoyancy of motion and the fresh air giving keen appetite without the fatigue of exercise and the entire absence of care or worry—the *dolce far niente* sort of life—combined with a pleasing sense of change and novelty in watching, or taking part in, the management of the vessel."

This case of shock to the spinal cord and (or) brain, like other cases of the same, illustrates the memory-doctrine in one or two points. The long and serious train of symptoms were the effect of a single commotion, which was probably molecular only. Secondly, the serious symptoms showed themselves first after an interval of some three months—an illustration of that postponement of liability which would appear to be a special form of unconscious retentiveness. Thirdly, the serious symptoms threatened not only to continue but to go from bad to worse, as they often do in such injuries. The improvement which followed the trip to sea was too marked, in the judgment of the patient,

not to be ascribed to the proper effects of the cruise ; and I have introduced the case here, partly because it illustrates my notion of alterative action, and also because I find no reference to any such prescription for spinal shock in the monographs or articles on the subject. The indication of cure is, as I have elsewhere summarised it, "a paradoxical combination of rest and exercise ;" and that indication would appear to have been well fulfilled, in the instance given, by the fortnight's yachting which a chance invitation threw in the patient's way.

Having touched thus briefly upon the alterative effects of change or variety in the general manner of life, it now remains to put together shortly the considerations on the nature of alterative drugging which have arisen in the course of the foregoing chapters.

The class of alterative drugs has somehow retained its place even in text-books which are nothing if not scientific. Professor H. C. Wood says : "They may perhaps neither stimulate nor depress, so far as can be perceived, any function of the body ; their action may be silent and imperceptible, their mode of influence may be unknown ; but their therapeutic effects are among the most assured of clinical facts. . . . To deny, as has been done, the existence or value of medicines of this class because we cannot tell why mercury relieves syphilis, or why iodide of potassium cures rheumatism, is as absurd as to deny the existence of the syphilitic or rheumatic

dyscrasia because we do not know their ultimate nature.”*

Dr. Brunton is equally clear about retaining them as a class, approximately defined: “Custom has now excluded from this class all medicines which give external signs of vigorous action by purgation, sweating or diuresis, and has restricted the term to such remedies as do their work slowly and secretly, but none the less effectually. In short, we use the word ‘alteratives’ very much as a cloak for our ignorance.”† And, to go back to a writer of the last century,‡ we find alterative action defined in the same negative terms, or by exclusion: “Mercury in this way [small doses], although it produces no visible effect on a healthy person, often procures the removal of a diseased state. Its action, therefore, in such circumstances, is termed *alterative*.”

Now, when we come to examine more closely the list of drugs that are included by tradition or common consent in the alterative class, we shall find that the more conspicuous of them, if not the whole of them, have something positive in common. Antimony, arsenic, free phosphorus, iodine, mercury, zinc, copper and silver, are closely allied metalloids and metals.

Bromine is by some regarded as an alterative, and by others as a neurotic. Again, iron, sulphur, and

* H. C. Wood, ‘Treatise on Therapeutics,’ 5th ed., Philad., 1883, p. 383.

† T. Lauder Brunton, “On the Action of Alteratives,” ‘Practitioner,’ 1876, ii, 190.

‡ Andrew Duncan, sen., ‘Obs. on the Operation of Mercury in the Venereal Disease,’ Edin., 1772, p. 19.

chlorine are among the natural constituents of the body, and are not usually admitted among the alteratives. On the other hand, gold, tin, platinum, manganese, and other metals might be included in that class if their therapeutic usefulness were more obvious in general.

Thus far the definition of alterative would seem to point to metals or metalloids, foreign to the body, which enter into combination with the body's protoplasm more or less loosely, as in the case of the mercury albuminate. It may be noticed, in passing, that lead, which is not included among the alteratives, enters into a peculiarly fixed combination with the tissues. Another point in the definition is that the substances grouped together are "silent in their action" (Brunton), or "may neither stimulate nor depress" (Wood), or "produce no visible effect on a healthy person" (Duncan)—in single medicinal doses. On the other hand, as compared with most other substances of the *materia medica*, they are slow to leave the body, cumulative in their action, and apt to be followed after a time by constitutional symptoms (lead being excluded from the class because it has these properties in excess).

Now, if there are any other, particularly non-metallic, drugs that have these properties, they would also have a *primâ facie* claim to be considered alterative, or they would be more or less alterative in proportion as they possessed these properties. We may at once exempt the large class of drugs, which, as Dr.

Brunton says, "give external signs of vigorous action by purgation, sweating, or diuresis." We may leave out of account, also, those neurotic medicines which induce tolerance by long use, rather than surfeit, and may require to be given in increasing doses to get the effect. Most of these are vegetable, with an alkaloidal principle; but bromine compounds in some respects go with them, while in other respects they are alterative.

The question that we at length come to is whether quinine has anything in common with the alterative group. Apart from its obvious merits as one of the best of bitters, quinine is usually reckoned a febrifuge. But, despite the many attempts to prove that quinine lowers a high temperature, the evidence is far from convincing. It is chiefly where there is more or less obvious periodicity in the rises of the temperature that quinine is useful, and there is no general assent to its usefulness except in malarial fevers. On the other hand, it is useful against periodical paroxysms of various kinds, be they febrile or non-febrile. It follows that quinine is an anti-periodic rather than a febrifuge; and anti-periodic is the same as alterative, if by alterative we understand habit-breaking.

Does quinine exhibit any of the *primâ facie* characters of the general group of alteratives? Does it keep its atomic composition, is it slow to leave the body, does it pass out by various doors, is there a "quinism?" The answer is on the whole an affirmative one,* always setting apart the other or simpler action of quinine in

* "Weder rasch verschwindet, noch besonders giftig ist."—BINZ.

small doses as a bitter. "Quinia passes through the tissues without decomposition, quickly making its appearance in them, but not being completely excreted for several days." By the same tests, strychnia is included.

It is, then, not only metals and metalloids but some vegetable substances also that fulfil the *primâ facie* conditions of being alterative. Metallic substances are most likely to fulfil those conditions; but whatever else in the materia medica, being foreign to the body, is readily diffused through the tissues, loosely held in combination with them, excreted slowly and by many outlets, and in some degree cumulative, should also obtain admission to the alterative group; and quinine ought not to be excluded because it has marked bitter properties as well. The vegetable substances most usually placed in the alterative class, such as guaiacum, sarsaparilla, mezereon, and colchicum, are in the second rank of importance, and I shall not stop to inquire why they are placed there.

The alteratives may thus be taken to be substances foreign to the body which keep their elementary constitution on the whole unimpaired in passing through it, which pass through it slowly or accumulate in it, and which enter into combination loosely with the protoplasm of one region or another, and usually of many regions. In considering their mode of action, it is unnecessary to take into account their toxic properties or the effects of large doses, except in so far as these serve to reveal in a marked manner the elec-

tive affinities of the several drugs for particular tissues; and it is therefore unnecessary to open up the difficult question of a primary and a secondary action, or of a stimulant effect followed by arrest of metabolism.

The nature of alterative action is best considered with reference to such a case as the mercurial cure of syphilis, and I have entered fully into the question in the chapter on that subject. I shall quote again the view of Dr. Anthony Thomson as being a very likely one: "If, therefore, the action of mercury be sufficient to suspend the morbid action of syphilis—and it is a law of the system that morbid actions can be suspended, for a time at least, by the influence of new actions superinduced—it is probable that that of the syphilitic poison may be overcome by that of the mercury, and as this can be withdrawn or subdued by the disuse of the remedy, the system is left to the influence of its ordinary and healthy function."

An interesting supplement to that view of alterative action has been put forward by Dr. Mitchell Bruce :* "There can be no question that mercury is freely absorbed and excreted; that it is taken up and thrown out by cells; that it is incorporated with their protoplasm, and may be so firmly combined with them that iodide of potassium may be required to hasten its separation. . . . Without assuming that any virus or occult destructive influence resides in mercury, must it not be granted that, in thus *exercising* cells,

* 'Trans. Internat. Med. Cong., 1881,' i, 500; 'Materia Medica and Therapeutics,' Lond., 1885, pp. 458, 462.

it hastens their life and their death? It may be by simple 'wear and tear' that mercury acts upon protoplasm; and thus mercury and several other 'alteratives' might belong to the large group of therapeutic measures which affect nutrition and lead to structural changes by stimulating the vital activity of parts." Or, again, in his later handling of the subject: "When mercury and iodine have entered into combination with living protoplasm, and been again disengaged or thrown out of combination with it in the metabolic products, they have *made it do a certain amount of work*; and to a corresponding extent they have effected a change and renewal of its proper molecules; they have hastened its nutrition; their action may be said to be *alterative*. . . . In order to get the tissues to work normally, we must get them to work *somehow*, knowing that such work means chemical change, or even active nutritive renovation of the elements. The natural disposition which all tissues inherently possess to return to the normal is thus afforded an opportunity of coming into play; and the result is not a mere increase of activity, but also an *alteration in kind* of the activity."

A few changes in or additions to the words used by Thomson and those used by Bruce would enable me to appropriate them for my theory of alterative action as habit-breaking or memory-effacing action. "The morbid action can be suspended by a new action superinduced," needs only to be supplemented by some rational interpretation of the chronicity of morbid

action. Again, "as the superinduced action can be withdrawn or subdued by the disuse of the remedy, the system is left to the influence of its ordinary and healthy function"—this is an assertion of the indwelling power of all tissues and mechanisms to return to the established routine.

Dr. Bruce's suggestions are directed rather to explain the nature of the action superinduced by the alterative drug. It exercises the protoplasm, it gives it something to do, it hastens the metabolic changes, it stimulates the vital activity of parts; meanwhile the activity alters in kind. My emendation here would be, that the metal or other tough morsel, passing slowly and more or less unchanged through the body, simply engages the protoplasm, thereby diverting it by a kind of make-believe activity from its confirmed habit; it occupies the cells, tissues, or mechanisms with work for mere occupation's sake, so that they forget the manner of morbid action into which they had fallen. The drug having created its diversion can be withdrawn; and "the system is left," as Dr. A. T. Thomson says, "to the influence of its ordinary and healthy function."

Some such doctrine of neutrality or passivity or of merely make-believe activity would seem to be required for alterative action, strictly so-called; for it enters by general consent into the definition of alteratives that their action is quiet, or imperceptible, or secret, or that they have no visible effect (in their medicinal doses) on a healthy person.

It may thus seem that we had conceded too much in a former chapter, in recognising that an alterative "effaces the memory of morbid action by substituting an action like it." The action like it is rather an inference from doses larger than the medicinal dose, and is important mainly as revealing the special aptitude or elective affinity of the drug. It is obvious, however, that these aptitudes are of a very general kind in the case of the alterative group, when we consider how various are the maladies in which arsenic, mercury, and quinine are employed with advantage.

One other view of alterative action remains for notice, the opinion propounded by Dr. James Ross that it is essentially stimulant action.* "Alterative," he says, "cannot be applied so much to any class of agents as to the actions and mode of administration of those agents. . . . The slight stimulant action of an agent which has a special affinity for the diseased tissue or organ constitutes the alterative action of the drug." The only exception that need be taken to this is that it is made somewhat too absolute. That a slight stimulant action may be alterative, in the sense that I would give to the word as habit-breaking, is beyond question. Nothing helps so much to develop a bad habit, or to give fixity to it, as feebleness of body. Whatever increases the spontaneity of the organism will to that extent break the thralldom of habit. Hence much of stimulant or so-called tonic treatment may be claimed as alterative in a general

* "Action of Alteratives," 'Practitioner,' 1876, ii, 337.

way ; while such an action as that of belladonna in whooping-cough (stimulant of the respiratory centre) may be said to be alterative more particularly. But the theory of stimulation will not suit all the cases of alterative cure, nor, indeed, the most conspicuous of them.

APPENDIX.

BEYOND quoting occasionally from Watson and others on the subject of morbid habits, I have not thought it necessary to introduce into the text any reference to what contemporary writers may have said on Unconscious Memory in Disease. I shall here give the two or three more important statements on the subject which are known to me.

Hartmann, in his 'Philosophy of the Unconscious' (English translation by Mr. W. C. Coupland), has an interesting chapter on "The Unconscious in the Healing Power of Nature" (i, 123—144), wherein he applies the principles of his philosophy to the restoration of lost parts, inflammation and repair of soft parts and of bone, adaptations of structure in disease, vicarious functions, and a variety of other pathological phenomena, including those of fever, diathesis and infection. The healing power he regards as "a purposeful expression of unconscious Will and Idea." I have already (in the first chapter) remarked on the fact that the Philosophy of the Unconscious is built upon unconscious Will, and that it takes no account of unconscious Memory. Hartmann's pathological chapter, accordingly, is hardly at any point in contact with my essay, and I shall not enter upon a criticism of it.

The only reference to medicine in Hering's essay on 'Memory as a General Function of Organised Matter,' is as follows (p. 13):—"For the memory or reproductive power of the so-called sympathetic nervous system is no less ample than that of the brain and spinal cord, and a large part of the skill of the physician depends upon making a wise use of its help." Referring to Hartmann, he says:—"From the physical point of view, unconscious and material are the same; and the

Physiology of the Unconscious is no Philosophy of the Unconscious."

Although the 'Lectures on General and Experimental Pathology,' by Stricker (Wien, 1878—83), contain, in the metaphysical chapters, certain references to the unconscious and to memory, there is no attempt to treat of organic memory, or of its illustrations among the morbid phenomena of the body. Speaking of Hartmann's 'Philosophy of the Unconscious,' he says:—"For the investigation of nature such considerations are unfruitful" (p. 464).

The most direct, and, in fact, the only important statement of the part played by unconscious memory in some diseases is to be found in Rindfleisch's recent book, 'Die Elemente der Pathologie' (Leipzig, 1883), a work of remarkable originality and spirit, as well as of excellent style, which may now be read in English. I have already quoted in the text (p. 73) one passage from it relating to the storing up of unconscious nervous impressions or excitations. In a later part of his exposition he returns to the subject as follows (l. c., p. 226):—"There is another peculiarity of all 'nervous' symptoms which may be set beside the two that we had occasion to speak of before, namely, the periodicity and the disproportion between cause and effect. This is the tendency of a state of excitation to repeat itself after it has been experienced several times, the *practice* or *habit* of it, and, closely associated therewith, the 'dissociation' of a group of symptoms from their exciting cause, their elevation to independence as a disease in their own right, and, lastly, the heredity of that disease.

"If we were to add to assimilation and irritability another fundamental property of all living matter, it would have to be the property of memory, of retentiveness (*Gedächtniss*, *Erinnerung*). Every movement that the protoplasm makes for a second time is more easily made the second time than the first. . . . I cannot purpose to myself here to discuss this principle in all its bearings, a principle which plays so prominent a part in the Darwinian theory. It must suffice to say that for my present purpose, and as concerns the individual, it is only the memory-power of the central nervous system that comes into account. The fine network of fibres in the grey

substance is to be regarded as the anatomical basis which adapts itself, in its more delicate formations, to the increasing rapidity of movements until at length it repeats them of itself upon the slightest impetus. The smoother the road the easier rolls the carriage. At last it comes to this, that the movement which has been especially well practised may seem to occur of itself, because the minimal incitement which sets it off escapes our notice. . . . When this degree of detachment of the phenomenon from the cause comes about, it constitutes a 'habit' of the nervous system, a habit which we rightly designate an 'evil habit' if it involve a morbid process of sensation or of movement. It has become a persisting function of the central nervous system, settling the more firmly the oftener it returns. Thus recurring in one outbreak after another, it constitutes an independent disease; we have to do with a *neurosis*."

This definition of a neurosis ("self-existent memory of a disordered reflex," as I have named it, Art. "Pathology," 'Encycl. Brit.,' § 12) agrees on the whole with that which Dr. Allbutt has introduced into the preface of his 'Lectures on Visceral Neuroses' (Lond., 1884): "Nervous reactions so imposing and distressing as to conceal the original seat of the disturbance and to establish a secondary malady out of all proportion to the mode of its initiation."

Several interesting illustrations of "pathological habit" are given by Mr. Hutchinson in his 'Pedigree of Disease,' Lond., 1884 (see especially with reference to diathesis, p. 101).

M. Ribot's essay on the 'Diseases of Memory' ('International Scientific Series') deals with memory as ordinarily understood in psychology.









