condition of one or more of the digestive organs, as in referring the greater number of cases of mania to a primary misaffection of the brain or the nerves. But in what that misaffection consists, is a question that has never been settled to the present hour, and from our total unacquaintance with the nature of the connection between the brain and the mind, never will be in any very satisfactory manner; "indeed, it seems only by the curtailment or suspension of certain functions, by the excess of others, and by the altered balance and connection of all, that a sort of analysis can be obtained of the nature of mind, which its waking and healthy acts cannot equally afford either to individual consciousness, or the observations of others."—*Dr. Holland.*

I therefore must conceive that he is the most competent to appreciate the nature and peculiarities of insanity, and the best qualified to attempt its dislodgment from the bodily organization, who, fully assured that more or less of physical disorder must necessarily have place in mental hallucination, is at the same time aware of the great difference between mere bodily disease, and the attack upon the nervous centre producing disease of the understanding,—that the distinction of the different kinds of insanity is a matter of much delicacy, for these varieties pass into each other frequently and imperceptibly—that there are grounds for supposing no sensations wholly new are introduced into the mind of a patient by the disease, or that the immediate operation of the senses are perverted, the illusions being principally false combinations of former ideas, with the additional persuasion of their actual existence,—and who has candour and intelligence enough not to form one particular or one exclusive treatment in his system of management.

THE LAW OF THE MORPHOLOGY OR METAMORPHOSIS OF THE TEXTURES OF THE HUMAN BODY.

(*Fourth Series of Experimental Researches.*)

By WILLIAM ADDISON, M.D., F.R.S., Malvern.

(*Continued from page 203.*)

XII. REGULAR, IRREGULAR, RETROGRADE, AND ASCENDING METAMORPHOSES IN THE TEXTURES OF PLANTS.

That part of botany which treats of the gradual transmutation of leaves into the various organs of a plant, which shews that bractæ are leaves affected by the vicinity of the fructification,—that the calyx and corolla are formed by the adhesion and verticillation of leaves,—that the filament is a form of the petiole, and the anther of the lamina,—and, finally, that the ovarium itself is a convolute leaf, is called morphology.

This doctrine seems to have originated with Linnæus, was deeply entered upon by the celebrated Goethe, has been universally adopted in Germany, and been since

received in France and England by most of the botanists of the present day.

The first idea of the subject appeared in the second volume of the tenth edition of the *Systema Naturæ* in 1759, and in 1760 the propositions were sustained by Linnæus, in a thesis prepared in the name of his pupil Ullmark, and called the *Prolepsis Plantarum*.

It would be out of place here to enlarge upon botanical facts, about which there is no question, or upon principles regarding the *regular metamorphosis* of plants, which have been firmly established.

"There is not only," says Dr. Lindley, "a continuous uninterrupted passage from leaves to the bractæ, from bractæ to calyx, from calyx to corolla, from corolla to stamens, and from stamens to pistillum, from which circumstance alone the origin of all these organs might have been referred to the leaves; but there is also a continued tendency on the part of every one of them to revert to the green parenchymatous texture, and even to the form of the leaf." Examples of *irregular metamorphosis* of some part or other of vegetable structures, are innumerable. Roots and tubers undergo a vast variety of changes, chiefly the effects of domestication. The celery, the root of which is fibrous when wild, produces under domestication a fleshy round root like that of a turnip, known in gardens by the name of celeriac. In short, stem, leaves, flowers, and fruit, exhibit a thousand irregular metamorphoses, for interesting examples of which, the reader is referred to Professor Lindley's "Introduction to Botany."

Examples of a *retrograde metamorphosis* are almost equally numerous. "In the monster *Muscari monstrosum*, a small cluster of branches, covered with minute imbricated coloured bractæ, is produced in lieu of each flower. Here all parts of the fructification, instead of remaining at rest to perform their functions, are attempting, but in vain, to become organs of vegetation; or in other words, to assume that state from which, for the purposes of perpetuating the species, they had been metamorphosed by nature." The general resemblance of the calyx to the ordinary leaves of vegetation is well-known; its green colour and tendency to revert into as many leaves as it consists of divisions, especially in double roses, is so notorious, that it need not be insisted on. In the cowslip and polyanthus, the calyx is frequently formed of five perfect leaves, in no respect different from the others, except in being a little smaller. Several instances have been observed in which petals have reverted to the state of leaves. In a *Campanula Rapunculus*, seen by Röper, the corolla had become fine green leaves like those of the calyx; the same was found in an individual, of *Verbascum pyramidatum*, described by Du Petit Thouars. Proliferous flowers of Geum and Rosa, in which the petals were converted into leaves, are adduced by Linnæus.

That the anthers are alterations of the margins of petals there is no difficulty in demonstrating. In *Nymphaea* the passage from the one to the other may be distinctly traced. In double roses and camellia's the precise nature of a retrograde metamorphosis is shown in a very instructive way. If any double rose be examined, it will be seen that the filaments of those stamens which are next the petals are expanded and coloured like the petals; and sometimes the perfect lobe of an anther will be found on one side of an abnormal petal, and the imperfect remains of another on the opposite side, proving that the unnatural excess of petals has, in these cases, been produced by a retrograde morphology of the stamens. The conversion or retrogradation of stamens into green leaves is more uncommon, it was seen by Röper in the *Campanula Rapunculus* already referred to, and Du Petit Thouars found the stamens of *Brassica Napus* converted into branches, bearing leaves.

Nothing is more common than to find the pistil converted either into petals or into green leaves. Its change into petals is to be found in numerous double flowers, as for example,—double *Narcissi*, *Hibiscus Rosasinensis*, wall-flowers, ranunculuses, saxifrages, and others. Nothing again is more common among roses than to find the ovaria converted into perfect leaves, and the same fact is often met with in the double cherry.*

There are also many instances among plants in which organs advance beyond their natural stage of metamorphosis, attaining a higher, as well as falling back into a lower, type.

In the tulip a bractea is occasionally present upon the scape, a little below the flower, partaking of the nature both of the leaf and the petal. In *Aquilegia vulgaris* the petals consist of a long sessile purple horn, with spreading margin, while the stamens consist of a slender filament, bearing a small oblong yellow anther; in regularly formed flowers, nothing can be more unlike than the petals and stamens, but in some of the double flowers the horned petals are changed into stamens. Several instances are known of ovula being borne by the stamens; it occurs continually in *Sempervivum tectorum*, and Dr. Lindley has seen it in the double Barbadoes lily, and the wall-flower. There is, therefore, as he observes, "no doubt of the truth of the theory of morphology which is now universally adopted by all philosophical botanists."†

It is well known that gardeners, if they wish to have double flowers,—flowers whose pistils have changed to petals, or whose stamens have undergone the same retrograde change, save the seed, (the few at least that may chance be formed in the ovaria of the double flower,) or they select the seed of a more

perfect individual, growing nearest to the one whose retrograde changes they wish to perpetuate. Experience tells them in the latter case, that they will be more likely to succeed in their wish to obtain a double flower, than if they chose another plant, growing under the same external conditions of soil, light, heat, and moisture, a few yards off. Hence from this and many other similar facts, it appears that there is an *original inherent disposition* imparted from the parent plant to the seed, in virtue of which alone, independently of external conditions, the young structure will exhibit the same morphological aberrations as those which existed in the stock from which the embryo sprang.

"It is probable," says Dr. Lindley, "that all plants have a particular range, (in some cases more extended than in others,) to which they are best suited, in consequence of their constitutional peculiarities,‡ which become visible by the effect produced from a change of situation, although not otherwise appreciable. The two great external agents by which they are affected, that is to say, soil and atmosphere, will, in their natural situations, be nearly uniform; and so long as this uniformity of the conditions under which they exist continues, their structure will remain unchanged; but let an alteration take place,—their atmosphere, for instance, change from that of the valley to that of the mountain,—the soil from alluvial deposit to chalk or slate, and the mean temperature under which they are found fall several degrees; or remove a plant from its native spot, and cultivate it in the rich soil of a garden, thus submitting it to what may be called domestication. Under such circumstances, an alteration will be produced in the structure of the plant, which will become manifest by external characters. This is what is called irregular metamorphosis. We are ignorant of the specific causes by which the metamorphosis is effected, but we know that it is the leafy texture, and the secreted matter, or proper juices, of the plant, which chiefly manifest their sensibility of change."§

It is evident then, that there are two conditions operating in the irregular or retrograde metamorphoses of plants,—the one a constitutional peculiarity or inherent disposition, derived from parent to offspring; the other, unfavourable external conditions. The former or constitutional disposition may prevail over the most favourable external conditions, and the latter, the external conditions, may modify the morphology of the most perfect embryo, and cause a degradation of its textures. Either of these events would be productive of abnormal form and qualities—that is, of diseased structure.

Before proceeding to the farther consideration of

* The year 1845 was remarkable for a total absence of blackberries, there was hardly a fruited bush to be seen, and on examining the reason it was found that all the pistils were metamorphosed into bractea.

† See Lindley's "Introduction to Botany," Book vii. Ed. 1832.

‡ Inherent disposition.

§ See "Introduction to Botany," &c.

the phenomena which exemplify, and appear to me satisfactorily to prove, the existence and operation of a morphological law in animal textures, let me recapitulate the points which are settled and established with regard to plants:—

1. *Regular metamorphosis* is the process by which the type, texture, and form, established by Nature for the species, are perfected, and handed down from parent to offspring without fault, deviation, or change. It is the ultimate fact of living structure. Why is it that there is one form, one colour, and one property in one part of a plant, and others in another, &c.? We do not know, all we have to do is to study the normal form and quality of every portion of the structure of the individual during the morphology, so that we may learn the order of Nature, and thereby estimate the kind and nature of observed changes.

2. *Irregular metamorphosis* occurs when parts are checked or stunted in their growth, or when they become unusually exuberant. The structural elements are unchanged, but there is some deficiency or excess. Leaves and fruit undergo manifold changes of this kind, the more observed because the gardener promotes and fosters the irregularity. By an irregular metamorphosis leaves become more succulent and roll inwards, forming what is called a heart, as in the cabbage and the lettuce. If the green parenchymatous texture be exuberant, and extend more rapidly than the veins and margins, they pucker; and if the parenchyma and margin are together in excess, then the leaf is copiously and curiously curled, as in cress, savory, endive, &c., &c.

3. *Retrograde metamorphosis* occurs when the texture and form of a part are completely changed, when later-formed organs assume the structural elements of lower or preceding ones, beyond which, in the natural course of things, they ought to go.

4. *Ascending metamorphosis* is the term applied to parts that do not observe the limits of, but pass above or beyond, the natural type,—as when the sepals of the calyx assume the colour and textures of a petal,—when petals assume the form and function of stamens,—or when stamens bear ovaries.

5. That the causes or conditions operating in these morphological phenomena are two-fold,—external conditions, and the inherent disposition.

(To be continued.)

EXTRACTS FROM AN ESSAY ON PERICARDITIS.

By M. M. de BARTOLOME, M.D.

(Read before the Sheffield Medical Society, February 18th, 1847.)

Pericarditis is generally defined by authors "An inflammation of the serous membrane lining the pericardium, and covering the external surface of the heart." This definition is, I think, insufficient; for the

frequency of this affection consequent upon, or concomitant with, rheumatism, sufficiently shows these diseases to be somewhat analogous, and that, very probably, pericarditis generally, if not always, first attacks the fibrous pericardium, although from the intimate connection existing between the two layers of which the pericardium is composed, the inflammation quickly extends to the serous membrane. Corvisart, whose description of the disease almost all succeeding authors seem to have followed, pertinently enough enquires, "Why the fibrous pericardium should not, like all other solids of a similar structure in the body, be the seat of inflammation?" Analogy, and I may venture to add, facts also, lead to the conclusion, that in very many instances, the inflammation does begin in the fibrous pericardium. Many of the causes of pericarditis are such as produce rheumatism, and still more frequently rheumatism itself is the only assignable cause. Pericarditis often occurs as a vicarious affection on the disappearance of rheumatism; at other times the two diseases co-exist.

As rheumatism undoubtedly is the most frequent source of pericarditis, as it is essentially a disease of the white fibrous tissue, and as the synovial membranes of the joints become affected by it secondarily only, it is very probable, I think, that the fibrous pericardium being a membrane of the white fibrous structure, is the primary seat of the inflammation, and that the serous pericardium becomes affected, in the majority of instances, secondarily only. Laennec relates an example, which I think incontestably proves this to be sometimes the case, in which he found the heart enclosed in a bony case, which sent processes into the substance of the heart, even to its very cavities; and he satisfied himself by dissection, that it was developed between the serous and the fibrous layers of the pericardium. Other strong proofs of the analogy of pericarditis and rheumatism may be found, in the pulse of incipient pericarditis being generally the loose throbbing pulse of acute rheumatism, rather than the hard and tense pulse of inflammation of the serous membranes; and in the two diseases requiring very nearly the same treatment.

In rheumatism, general blood-letting to any extent is deprecated by many authors, as tending to induce a chronic form of the disease, or even pericarditis itself, as is believed by Drs. Fordyce and Alison, whilst local abstraction of blood is freely used. The early symptoms of pericarditis must be promptly met by local bleeding and counter-irritation; but venesection, to any amount, is rarely admissible. Indeed, it was thought by Corvisart, that blood taken from the region of the heart was more efficacious than when drawn from the general system.

Acute rheumatism generally attacks the young and vigorous, so does pericarditis; though the latter disease sometimes attacks children under the age at which they would be liable to suffer from the former; and patients suffering from either, are liable to a recurrence of the disease, and are particularly exposed to suffer from pericarditis if previous attacks of rheumatism should have been treated by copious depletion.