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.

The most common causes of pericarditis besides rheumatism, are blows or excessive pressure on the præcordial region, inflammation propagated along the lungs or pleura, checked perspiration, cold, the abuse of spirituous liquors, and the exanthemata.

Morbid Anatomy.—After the inflammation has attacked the serous pericardium, the morbid alterations it produces may be described according to the four following heads:—Redness and vascularity of the membrane; effusion; formation of false membranes; and their conversion into cellular tissue, fibro-cartilage, bone, &c. But I must confess that I am at a loss how to describe what I consider to be the first stage of the disease—namely, that in which the fibrous pericardium alone is affected; for, as the fibrous tissue in the neighbourhood of joints does not present after rheumatism any pathological appearances, except in a few protracted and very severe cases, we cannot expect to find any morbid alterations in the pericardium when the disease has existed in its fibrous layer only. Thus it happens, as Laennec assures us, that in many instances he could find no trace whatever of the disease, although from the symptoms which had characterized it, he was persuaded that it had been the only cause of the patient's dissolution. In all such cases, I am convinced that the inflammation had existed only in the fibrous pericardium, and had produced its fatal effects by the impediment which it must have offered to the free action of the heart. The case already alluded to as described by Laennec, seems clearly to have been one of this description.

The redness over the pericardium is seldom uniform; sometimes it assumes an arborescent appearance, but most commonly shows itself in small patches, or in dots, alternating with the natural colour of the membrane. This alteration of colour is not invariably present after pericarditis, for Laennec found in some cases, that although the symptoms during life, and the thickness of the false membranes, indicated the inflammation to have been very severe, yet on the most attentive examination, he could discover no redness whatever. Although some have asserted that the redness may have disappeared after death, as it does from the surface of persons who have died of erysipelas, yet I think that the experiments of M. Scoutteten* go far to prove that inflammation of a serous membrane will invariably exhibit increased redness after death.

The effect of inflammation in almost all textures of the body, is the effusion or exudation of a particular morbid secretion. In pericarditis it generally consists of coagulable lymph, accompanied by more or less serum. When only lymph and serum are effused, the latter sometimes exceeds the former in quantity. The effused lymph forms a membranous covering, more or less perfect, on the surface of the pericardium, and according to Laennec, rarely presents the equable surface peculiar to the membranes formed during pleurisy, but on the contrary, it is pitted, mammillated, and rough. The pericardium, whatever changes may be going on within it, is very rarely thickened, the

false membranes having been sometimes, according to Dr. Hope and M. Bouillaud, confounded with thickening of the pericardium itself.

Diagnosis.—The diagnosis is not always easy. The disease has been mistaken by some of the best practitioners for affections of other organs, which, on dissection, have been found perfectly healthy. Laennec assures us that he often found on dissection all the evidences of the existence of pericarditis, when nothing had occurred during the life of the patient to excite the slightest suspicion that such a disease was present: and again, that frequently he could find no trace whatever of the disease, when he was sure that it had been the only cause of the patient's dissolution; and he observes that pericarditis is a disorder, the existence of which, during the life of the patient, the most able physicians rather guess at than recognize. Dr. Latham mentions two cases in which the disease was mistaken for disease of the brain, and treated accordingly, but dissection proved them to have been cases of pericarditis. Andral and Corvisart mention two similar cases; the latter was of opinion that the cases where diagnosis was most obscure, were always complicated with pleurisy, pneumonia, or some other disease of the thoracic viscera.

In opposition to this statement may be quoted Laennec, who says that the most complete latent affections he has met with, were in patients whose thoracic viscera were in other respects quite sound, and who had died of disease of the abdomen.

The pulse at the commencement, that is, when the fibrous membrane alone is affected, will generally be found to be that of acute rheumatism, but will vary in proportion as the serous membrane becomes affected; and it is owing to this that the pulse of pericarditis is so different in different subjects, and so variable throughout the course of any particular case. We cannot therefore form our diagnosis by the pulse alone, as it may derive its particular character in some cases not so much from the affection of the pericardium, as from rheumatism in other parts of the body on the one hand, or from inflammation of some other serous membrane on the other.

All authors seem to agree that the most unequivocal sign is the presence of pain over the region of the heart, particularly if aggravated by pressure, in whatever way excited,—whether by full inspirations, change of position, or artificially. This latter circumstance has been known to aggravate it so intensely as to have caused a fit of syncope. "The pain," says Dr. Hughes, "which, according to my experience, is a constant attendant upon rheumatic inflammation of the pericardium, is fairly explicable by the inflammatory rheumatic affection of the fibrous external covering to the serous membrane, the fibrous tissue being the natural seat of rheumatism, of which pain is the most common, if not the universal, symptom."

It is frequently difficult to form a correct diagnosis of this disease. Inflammation of some other thoracic viscus may be readily mistaken for it; and by pressure, should it be applied, we shall excite pain, whether the heart or some other organ within the cavity of

* "Arch. Gen. de Médecine."

the chest be affected. Should this be the case we must mainly trust to the symptoms elicited by auscultation and percussion, which in the generality of cases will be sufficient to guide us; but in some obscure cases of pericarditis, we have only negative symptoms to judge by, and then we must decide of the nature of the case by the absence of such symptoms as characterize disease of other thoracic viscera, as for example, pneumonia, pleurisy, &c.

The inflammation may be said to be on the decline when the fixed pain, if there should have been any, degenerates into diffused uneasiness, and the peculiar vehemence of the heart's action gradually becomes the beat of merely accelerated circulation; but not until all the symptoms have altogether disappeared can we say that the inflammation has terminated. Even when they have entirely ceased, the patient is not for a long time safe against their recurrence, as they very often return when the patient resumes his original avocations. When the motions and sounds of the heart do not entirely regain their healthy standard, we may reasonably suspect that adhesions and lymph still remain.

Physical Signs.—The impulse of the heart is greatly increased, sometimes to such a degree as to be perceptible to the bystanders; it is generally abrupt and irregular. Whenever there is a contraction of the heart stronger than common, the jerking is immediately felt along the arteries. It is this that distinguishes the pericarditic pulse from that produced by merely accelerated circulation. This jerking sometimes remains for months after the inflammation has ceased. Dr. Latham limits the existence of the *bruit de cuir* to rheumatic pericarditis, but I think with Dr. Hope, that it is present in every form of the disease, except when the action of the heart is feeble. The condition which I think necessary for the production of the *bruit de soufflet*, whether in the healthy or diseased heart, is that the valves shall bear a larger proportion than natural, to the orifices which they close; or, in other words, to some impediment to the flowing current of blood. Thus in endocarditis, affecting the valves ever so slightly, the bruit is produced, whether the valves be simply infiltrated or studded with vegetations.

The same explanation may be offered to account for the production of the *bruit de soufflet* after the loss of a large quantity of blood—viz., that the force of the circulation and the quantity of circulating fluid being diminished, the capacity of the arterial tube, and indeed of the circulating system at large, becomes diminished, to adopt itself to the distending force, and the orifices contracting also, cause the substance of the valves to fill up a larger proportion of the area than natural, and to produce the bruit, just in the same way as if they were diseased.

We can easily satisfy ourselves of the truth of this assertion, by projecting a column of fluid through a piece of intestine or a dead artery, and applying the stethoscope over any point of it. When we hold the instrument lightly no bruit is heard, but the moment that we indent the vessel it is produced, distinct in proportion to the pressure employed.

Dr. Alison* does not attach much importance to the *craquement de cuir*, for he says that in many instances the disease runs its whole course without this sign being present, and in a few cases, some of them well marked in every other respect, which have come under my notice, I have not been able to detect it, though I have attentively watched for it.

Treatment.—The list of remedies which can be employed for the cure of pericarditis with decided advantage is rather limited. The abstraction of blood is generally ranked foremost by almost all authors, and of the different modes of accomplishing it venesection seems to be preferred; yet I think that this mode of abstracting blood is far from being absolutely necessary, and that in the majority of cases topical bleeding is preferable,—first, because it answers the same purpose as general blood-letting; and secondly, because it does not produce that distressing debility which seldom fails to follow venesection to any amount, and because it does not excite that reaction, so prejudicial when the lining membranes of the cavities of the heart, and particularly the valves, are affected. Our primary object must be to allay undue excitement of the heart; and general blood-letting has a greater tendency than topical bleeding to excite nervous irritability, which in itself is a cause of hypertrophy of that organ.

That general bleeding is not absolutely necessary, and that provided blood be abstracted the effects are the same in whatever way accomplished, is beautifully proved by a case related by Corvisart. The patient, a woman of middle age, was attacked by very severe symptoms of pericarditis, which were completely arrested on the third day, ~~by~~ the appearance of the menstrual discharge, and although it was unusually scanty and lasted only three days, (instead of nine, the usual period with this woman,) yet it was sufficient to stop the progress of the disease and to keep it stationary.

That topical bleeding by itself is often sufficient, is clearly shown by Dr. Hope, who assures us that he has seen a single, prompt, and abundant application of leeches, or a cupping, at once subdue every formidable symptom. Dr. Alison says, that in rheumatic pericarditis general blood-letting is not advisable, but that the repeated use of local blood-letting is most beneficial. "My results of this practice," he says, "have been much more successful than those of any other." I do not mean to say that I would in no case employ general blood-letting, but merely that I would not do so on every occasion; for, unless the symptoms are very urgent, I consider topical bleeding preferable. In cases where they are pressing I would bleed, though not to a large extent at first, and then trust entirely in patients of strong and plethoric temperament, to cupping, and in those of weak and debilitated constitutions, to leeches. Cupping, where practicable, I consider preferable to leeches, because we can abstract a greater quantity of blood in a less space of time. If the pain and the heart's immoderate action are not subdued by the first topical bleeding, it should be

repeated; but sometimes, as already stated, such repetition is unnecessary. When there is pain at the epigastrium, and other signs of gastric irritation, I would recommend the application of leeches to the part, taking care to encourage the bleeding by warm fomentations and light poultices. Next to bleeding I would rank severe counter-irritation. Colchicum, digitalis, and antimonials, I have repeatedly employed with great advantage. The observation applies likewise to mercury.

When the disease recurs it generally has not the same intensity, and is, I think, more under the power of medicine; we should now abstain from employing the same active treatment as during the first attack, and should content ourselves with combating the inflammation by the moderate use of topical bleeding and counter-irritation.

ON SIMPLE ACUTE INFLAMMATION OF THE MEMBRANES OF THE BRAIN IN INFANTS.

By Dr. RILLIET, of Geneva.

(Translated for the Provincial Medical and Surgical Journal.)

(Continued from page 181.)

IV. GENERAL DESCRIPTION OF THE DISEASE.

Form, Duration, Termination.—Acute meningitis declares itself under two forms, to one of which we give the name of "convulsive," the other "phrenitic." We do not, however, wish it to be understood either that convulsions are never present excepting in the "convulsive" form, or that the "phrenitic" is the form exclusively characterized by perversions of the intelligence; we merely wish to notify by these terms the predominance of certain symptoms.

The *convulsive form* is most commonly seen in very young infants. It commences suddenly by an attack of convulsions, general or partial, with more or less febrile disturbance. There is neither vomiting nor constipation. When the convulsions, which are repeated at brief intervals, subside, the infant is left either in a state of agitation, or profoundly comatose, with squinting, and sometimes perfect hemiplegia. In certain cases there is an approach to sensibility between the fits, but the amendment is but momentary, and death rapidly approaches either by coma or during a subsequent paroxysm. The convulsive form of meningitis sometimes sets in more slowly, and the convulsions are not so closely approximated. The duration of this latter variety is longer, being from a week to a fortnight.

Phrenitic meningitis is commonly observed in early childhood, and in many respects resembles the acute meningitis of the adult. It commences with fever preceded by a rigor; violent headache ensues, with photophobia, vomiting, and sometimes constipation. The intellect suffers by the end of the first or second day, and the face assumes the peculiar wild look of the disease. Agitation and stupor alternate, and delirium is generally present. Subsequently there is grinding of the teeth, partial convulsions, rigidity of the limbs, a drawing of the head backwards, strabismus, and contraction followed by dilatation of the pupils.

About the seventh or eighth day some of these symptoms subside; the vomiting ceases; but the fever still continues; the pulse and respiration are irregular; the belly is retracted, and finally partial convulsions ensue, followed by coma and death.

Diagnosis.—The diseases which are apt to be confounded with acute meningitis, are, as may be imagined, numerous. Before we mention these diseases, we shall enumerate those symptoms of the convulsive and phrenitic forms which are most worthy of confidence in a diagnostic point of view.

In the convulsive form, we should attach great importance:—1. To the constant repetition of convulsions at short intervals. 2. To the acceleration of the respiration, which cannot be accounted for by any pulmonary lesion. 3. To the absence of all visceral inflammation, and of any indication of an exanthematic eruption. In the phrenitic form, the cardinal symptoms are,—intense headache, accompanied by frequent bilious vomiting and constipation, followed by delirium and agitation, alternating with stupor.

Differential Diagnosis of the Convulsive form.—Convulsions in early infancy are very frequently symptomatic; but in this case they are seldom violent or so frequently repeated. Moreover, in the interval, the little patient recovers his sensibility, the respiration is not permanently accelerated, and the pulse quickly regains its normal standard. It must, however, be admitted that in many cases the diagnosis can only be established by the progress of the disease.

The distinction between convulsive meningitis, and other cerebral affections is still more obscure, and indeed it is often impossible. The error is not, however, one of importance, as the treatment, and too often the termination of all is the same.

The first disease which we shall endeavour to distinguish is *hydrocephalus*, with infiltration of the *pia mater*, the *Wasserschlag* of Gölis.

In certain cases this condition complicates inflammatory meningitis, and the main features of each are then undistinguishable. In other cases the "hydro-meningitis" is the principal lesion, and we find only slight traces of purulent effusion. This disease, like the one from which we wish to distinguish it, also attacks very young infants; it sets in with fever, and a violent attack of convulsions, or with agitation and stupor, with transient and fallacious signs of amelioration. The analogy between the disease and the convulsive form of meningitis is therefore perfect.

In *hemorrhage into the arachnoid*, we observe repeated convulsions as the earliest symptoms, but they are in general less violent than in meningitis, and the coma does not ensue so rapidly. According to M. Legendre, children attacked with meningeal apoplexy, exhibit contraction of the fingers and toes,—a symptom which is not observed in meningitis; while, on the other hand, the excitement of the pulse and circulation which are witnessed in the latter disease, are not seen in meningeal apoplexy. *Hæmorrhage into the pia mater* also in some respects resembles convulsive meningitis, but it is a lesion of such rare occurrence that it need scarcely enter into our consideration.