NERVOUS SYPHILIS ;

With a Critical Digest.

BY W. JULIUS MICKLE, M.D., F.R.C.P.LOND.

THIS article is supplemental to a former one in BRAIN.¹ The present material will be dealt with under the headings of :—

Pathological Anatomy.

Anti-Luetic Remedies.

Pathology.

Para-syphilitic Affections generally.

Para-syphilitic Epilepsy.

The Pathogenesis and Relations of Functional Nervous Diseases in Syphilis.

Multiple Nervous Syphilis.

Hereditary Nervous Syphilis.

Ordinary Spinal Syphilis.

Relations between Syphilis and Tabes.

Insular Sclerosis and Syphilis.

I.—PATHOLOGICAL ANATOMY.

Macroscopically, some of the lesions produced by syphilis have more or less distinctive characteristic features, as, *e.g.*, gumma or gummatous infiltration. Other of the lesions are more or less suggestive of syphilis, especially if taken in relation to the seats of election, the patient's age and medical history, the general excretory, secretory, and blood and tissue conditions of the affected individual. Still other of the lesions in appearance are entirely common to syphilis and other morbid states.

Microscopically, much the same statement holds good, but with less assurance of definite and accurate character, and none of the appearances absolutely pathognomonic. Even gumma is merely one of the "granulation tumours"—a member of a class ;

¹ BRAIN, Spring Number, and Summer Number, 1895.

its cells—chiefly round cells—either close-packed or enmeshed in connective stroma, and undergoing regressive change.

Stress, indeed, has been laid upon "round-cell infiltrations" in or about blood-vessel walls, in meningeal tissues, invading nerve-roots, or cord, or brain, and consisting of cells which possess little protoplasm and single round regular nuclei. But the bare microscopic appearance seems to be insufficient for differential diagnosis of syphilis. The situation and tendencies of the infiltration add a degree of certitude, *e.g.*, the syphilitic infiltration tends very strongly to over-pass the meninges and invade nerve-roots and cord or brain.

Particularly in the pia of brain or cord, also in cord and brain substance, and in cranial and spinal nerve-roots, may occur small foci of round cells. Such accumulations represent potential gummata, and may end as ordinary syphiloma; or in them spindle-cells may come by transformation of the original round-cells, and thus a fibro-cellular structure appears.

Furthermore, syphilitic change of blood-vessel walls may ultimately lead to roughening of the inner lining, with vascular narrowing and tendency to occlusion; these in their turn may lead to thrombosis, and thrombosis to still graver disorder and defect of circulation, or even to ischæmic local softening or necrobiosis, especially in the brain; or the syphilitic blood-vessels may rupture and give vent to hæmorrhage, a condition more apt to affect the spinal cord and its coverings.

A strongly marked feature is the conjunction in some cases—the separate occurrence in others—of syphilitic change of outer, middle and inner coat of blood-vessels supplying meninges or nervous substance.

Thus the alliance of peri-, meso-, and endo-arteritis (or vasculitis), the invasion of nervous substance by meningitic processes, the existence of early gumma (or potential gumma) of meninges or nervous system, and the variety of form, association and succession of symptoms due to changes of nervous substance—all go to clinch the diagnosis of syphilis.

Moreover, an alteration of nerve-cells or fibres—of any part or the whole of individual neurons—may arise, variously, from widely different conditions brought about by syphilis; *e.g.*, the syphilæmia; the circulatory disorder due to vascular and other changes; the local mechanical effects of compression by cell-accumulation or tumour; these and the chemical results of invasion by syphilitic infiltration; the secondary systemic degenerations, whether of Wallerian type, or of the so-called

"retrograde" type sometimes observed, and presenting the aspect of a system degeneration.

Thus syphilis affects the nervous system either *directly*, affecting the parenchyma and degenerating the neurons—early or late in its course;—or it affects the nervous elements *indirectly*, affecting them only secondarily and by virtue of the effects of inflammation of vascular, connective, and lymphatic tissue-elements. For example, in the cord, syphilis usually leads to inflammation, &c., of vascular walls, especially of veins and small vessels, to diffuse general infiltration of connective tissue of meninges, to irritation of surfaces laved by cerebro-spinal fluid, and is characterised by miliary gummata of meninges vessels and cord; the nervous parenchyma and neuroglia being affected secondarily, and owing either to (a) imperfect nutrition, or (b) to mechanical effects of the lesion (Sottas), or (c) to both. Yet under the malign influence of syphilis the neurons may directly wither and decay. By some it is maintained that gumma follows irritation of particular regions in the early stage of syphilis, and the residuum of the original infective virus lying dormant in one or another part may be re-awakened into activity by functional hyperæmia, by the effects of injury, or by conditions weakening the protective and immunising forces of the organism.

Tuberculous lesions of central nervous system are often very similar to the gummatous ones of syphilis. But the history of the case, the absence of tubercular lesions elsewhere, and of tubercle-bacilli in the infiltrations or growths affecting meninges and nervous substance, often at least, mark the syphilitic nature of the lesion. When there is a tubercular mass, or when there are tubercles, assistance may be gained from the age of the patient, the site of tubercle, the presence of giant-cells, the marked tendency to caseation.

Sarcomatosis of meninges may be very similar to syphilitic infiltration of the same parts. But the sarcomatous infiltration of lepto-meninges of spinal cord shows extremely little tendency to invade the cord itself or the nerve roots outside the cord; therein it contrasts very strikingly with the great tendency of syphilitic meningeal infiltration to invade or compress cord and extra-medullary nerve-roots.

On the relation between *tabes dorsalis*, general paralysis and spinal cord syphilis, Nageotte has attempted to bring them all into line, to maintain that in all three are certain chronic inflammatory changes, which, according as they preponderate in this

or that particular part of the nervous system, are concerned in the production of tabes, or of general paralysis, or of syphilitic myelitis: there being in all these three a diffuse meningo-myelitis, first attacking vascular and connective tissues, and consisting of a round-cell infiltration; the nervous elements of the cord being affected secondarily. This process chiefly attacks the brain-cortex in general paralysis; the spinal nerve-roots in tabes; and in syphilitic myelitis the diffuse lesion is intense in foci of election. The infiltration is described as embryonic, and as beginning in mesodermal elements of the cord. Yet it does not follow that syphilis is always the effective agent in these diseases. He believes that the simple exaggeration of this diffuse morbid process in special points suffices to create the one or the other nosological species, and that the characteristic vasculo-connective lesions of each of these diseases—transverse neuritis for tabes; meningo-encephalitis for general paralysis; more or less circumscribed meningo-myelitis for the different kinds of spinal syphilis—probably form in relief on a common basis of diffuse inflammation, which is of the same nature in each of them and in some sort serves them as a bond of union. "The lesions of the cerebral cortex, as cause of general paralysis; those of nerve-roots, as cause of tabes; and the localised plaques of syphilitic myelitis, are only the exaggeration of that diffuse lesion in some points" of election.

Distinct as is the fundamental morbid process, and in the (perhaps great) majority of instances connected with syphilis, yet it cannot be exclusively attributed to that agency.

On the question of lesions of nervous system in the secondary and tertiary stages of syphilis, Brasch points out that neither the character of the nervous pathological changes, nor their site, distinguishes the one of these stages from the other; that there is no real, fundamental difference between the lesions of the central nervous system in "secondary" and "tertiary" syphilis.

Before summing up, let us refer for a moment to

THE PATHOLOGICAL ANATOMY OF SOME OF THE SO-CALLED PARA-SYPHILITIC OR META-SYPHILITIC AFFECTIONS OF THE NERVOUS SYSTEM.

Presently, we must speak of para-syphilitic diseases. If we now compare with the genuine and recognised nervous lesions of syphilis those (if any) found in so-called para-syphilitic affections it is seen that the latter are either:—

(a) Dynamic dispositions without marked, or at present clearly distinguishable, anatomical lesion of nervous apparatus, or:—

(b) Those with appreciable lesions: possessing, therefore, a distinct pathological anatomy.

The first do not come directly in question here, and therefore we pass on to the second, namely, to those of the para-syphilitic nervous affections which possess distinct anatomical lesions. These last are examples of nervous lesions apt to occur in infectious diseases of long slow course, and consist partly of forms of arteritis, phlebitis and sclerosis; usually, or often, more or less scattered in distribution; and partly, and even more strikingly, of various degenerations.

Conjunction or combination of the morbid dynamic and of the morbid anatomical conditions produced by syphilis, probably accounts for the destructive effect of the disease on foetal or infantile life; and the erection of this effect into a third department of para-syphilitic results is unnecessary.

Then again, some importance is conferred on the so-called "retrograde" secondary degenerations of nervous system (*e.g.*, of posterior columns of cord after cerebral lesions) in relation to the fact that cases taken to be examples of "primary" degeneration are sometimes in reality of the secondary retrograde form; and in relation to some so-called para-syphilitic diseases, such as tabes.

Also, in general paralysis, if viewed as a para-syphilitic affection, in most cases we find no particular admitted well-recognised specific luetic pathological change. Nor are syphilitic symptom-groups, clearly established as such, always to be found in general paralysis. Nor are the effects of classical "anti-syphilitic" treatment of very striking value in this disease.

As a rule, too, visceral syphilitic lesions and tabes do not co-exist.

We may summarise by briefly stating that it is necessary to widen the conception formerly held of lesions due to syphilis, so as to include many of non-specific kind, or not formerly considered to be specific. Here may rightly be placed:—

Meningeal inflammation of several kinds, and other than the frankly gummatous form; in fact, a series occupying a wide range between the gummy and the simply sclerosing form of meningitis, spinal or cerebral:—

Various forms of encephalitis and myelitis (non-gummatous) :—

Softenings in central nervous system, of various kinds : whether of vascular, of syphilomatous, or of inflammatory origin :—

Primary degeneration, or destruction, of nerve-fibres in brain, cord, or nerves :—

Primary atrophy of nerves, nerve-roots, or central nerve-nuclei.

II.—ANTI-LUETIC REMEDIES.

Formerly, one outcome of dominant doctrine was to give to mercurials the most important place in the drug treatment of "secondary" manifestations of syphilis, and to rely mainly upon the iodides in the "tertiary" stage of the disease. Syphilis of the nervous system being then considered as by far most frequently a tertiary affection, the iodides took chief place in its treatment. Consequently, in the ordinances of the treatment of cerebral and spinal syphilis, too much was made of iodides, too little of mercury ; the latter being possibly the more important of the two.

Most emphatic are the assertions of some on this subject. For example, Neisser declares that mercury is the only known remedy which attacks the virus of syphilis, although whether it does so directly or indirectly is still uncertain ; that any other remedies (K.I., &c.), are only ancillary, and by virtue of their property of removing cell-infiltrates ; and that mercurial treatment properly conducted and suited to the requirements of the case, is quite harmless. He thinks well of Fournier's intermittent method of treatment : prefers inunction and subcutaneous injection to other forms of administration ; and treats for four years, giving seven or eight mercurial courses in that space of time.

Relevant to the discussion of this subject, also, is the observation (Brasch) that in syphilis of the nervous system neither the character of the pathological lesions nor their localisation distinguishes the early and late stages of syphilis ; syphilitic lesions of the nervous system being essentially the same in the secondary and tertiary stages of the disease.

On the other hand, Stassano asserts that the affection of internal organs in tertiary syphilis results from an additional toxine possessing necrotic powers, thus differing from the toxine

of early syphilis. And Kuh lays stress on the usual presentation of superficial and diffuse lesions by *early* syphilis of the nervous system.

A fuller knowledge than we now possess of the pathogeny of "para-syphilitic" affections would shed light on the obscurities of this subject.

With regard to amount of the rival remedies to be used: some advocate free inunctions of mercurials; as, *e.g.*, of *ung. hydrarg.* a drachm daily; and the iodides of sodium or of potassium in doses of 300, 400, 600 or more, grains a day. As a rule the iodides are gradually raised to these large amounts. It has been maintained (Stieglitz) that these large doses are better borne than are the ordinary small doses of a few grains each, and several such in the day. Strained claims of benefit from over doses of mercury have been made; as, *e.g.*, a case by Krauss of brain syphilis treated by large doses of mercury, which were followed by salivation and by mercurial neuritis of all four limbs.

A prevalent view is considerably in harmony with the opinion expressed by Mills that "when the iodides fail, which is very rarely, if success can be attained at all, mercury may be used successfully even for the late manifestations."

Referring to the subject of the powerful syphilitic microbe Stassano points out that in some respects it resembles the bacillus of tubercle, in some the bacillus of diphtheria, and in still others the influenzal microbe. He thinks serums taken from syphilitics are not of any curative value, and advises empirical treatment, as well as certain serums to strengthen the natural defences of the organism effected by phagocytes.

EARLY ANTI-LUETIC TREATMENT, AND ITS RELATIONS TO OCCURRENCE, KIND, OR SEVERITY, OF NERVOUS SYPHILIS.

Early cerebro-spinal lues has often an acute commencement and a rapid course; in contrast with the chronic development and tardy process of nervous lesions of the late stages of syphilis. In relation to this is the question of *early* treatment.

Usually, it has been held that early, orthodox, anti-luetic treatment is of great value in the prevention, or mollifying, of syphilis of the nervous system; and that prompt, efficient treatment tells strongly in those directions; that the rapid and unfavourable course in some examples of nervous syphilis is attributable to the insufficiency or absence of early anti-syphilitic

(specific) treatment. Closely connected also with this question is that of defective early treatment (primary and secondary stages) as conducing to the occurrence of so-called "para-syphilitic" maladies.

Writer after writer has emphasised the great importance of this *early* treatment in modifying and mitigating the future phenomena of *late* syphilis. Thus, to mention one only, Neisser declares that in his opinion, "the most weighty ætiological factor in the appearance of tertiary syphilides is deficient mercurial treatment in the early stages of the disease."

But, on the contrary, Dr. Joseph Collins endeavours to prove that exudative and degenerative diseases of the nervous system due to syphilis, are not retarded in their appearance by thorough and prolonged administration of anti-syphilitic remedies during the activity of the virus; that this same treatment does not seem to prevent the occurrence of such diseases as tabes and general paralysis; and that cases confessedly syphilitic and receiving only most desultory and incomplete treatment, are not more liable to the earlier development, or to the severe manifestation of these two diseases than are those in which treatment has been thorough. Unfortunately, the statistical summaries given in support of these conclusions are self-contradictory on several points, which therefore remain unsettled by them, even provisionally.

In my previous articles¹ the subject of the *early* occurrence, in cases, of syphilitic affections of the nervous system, was dealt with.

Spinal symptoms and lesions are not infrequent in the secondary stage of syphilis. Brain syphilis may occur before the chancre is healed, as Kuh states; even syphilitic cerebral meningitis. And spinal cord and brain are attacked by syphilis, on the average, the earlier after infection, the later in life the syphilis is acquired.

Worthy of note in relation to this point as to the *time-relation* of syphilis of the nervous system, is the view of Stassano concerning the *severity* of the disease; namely, that this severity is inversely to the adenitis aroused, this last being directly as the strength of the phagocytes and reaction of the organism against the virus; in consequence of which relation syphilis (*cet. par.*) is more severe in adults than in young persons.

¹ BRAIN, Spring Number, 1895, *passim*. Summer Number, 1895, p. 352.

III.—THE PATHOLOGY OF NERVOUS SYPHILIS.

We have already referred to the facts that syphilis can act on the nervous system in two kinds of way (Sottas) (1) *directly*, attacking nervous elements, as in the vague nervous troubles of the secondary stage, and in the late systematic affections, as for example, tabes; (2) *indirectly*, by producing inflammation of vascular, lymphatic and connective tissue elements, to which the alteration of nervous parenchyma is secondary.

In the latter case, for example, in spinal syphilis, and as already mentioned, there are brought about inflammation of vascular walls, especially of veins and small vessels; diffuse general infiltration of the surfaces laved by cerebro-spinal fluid; formation of tiny or incipient gummata of meninges, vessels and cord. From these conditions comes affection of nervous substance and of neuroglia as result either of imperfect nutrition, or of invasion, or of mechanical pressure and other effects. Of these, the first may end in anæmic necrosis; the second, or infiltration, may invade nerve roots or cord substance from the meninges. The degenerative changes produced by the action of circulating toxine, or by the anæmia of nervous substance, may become more important than the vascular lesions. Yet acute cases may be dependent on vascular lesions. The vascular condition often rules the symptoms produced; and in spinal syphilis the veins may be more affected than the arteries.

In nervous syphilis, the primary or early vascular and meningeal changes are attended by general prodromic phenomena; the softening and degeneration which may ensue have the accompaniment of various trophic and paralytic symptoms; and the final sclerotic state usually goes with chronic spastic paralyses.

An explanation offered of the fact that the posterior part of the meninges and cord is usually the one more affected in syphilis, is to the effect that the luetic virus sinks by gravity to the back part of the cord and meninges, in consequence of the predominantly recumbent position of the body.

In an earlier section we have sufficiently discussed the statement that general paralysis, tabes and syphilitic myelitis, all have at their foundation the same chronic inflammatory process.

Bearing on points of interest is the recent contribution of Stassano. He refers to the gradual tendency of parts, especially skin, to become immune to syphilis. And one of his views is

that "primary chancre," so-called, is not a local result of the syphilitic virus but a secondary lesion. At the onset, swelling of the inguinal glands forms a first line of defence and a barrier diverting the virus into blood-vessels of the region, and shutting it out from the general lymphatic circulation. The virus takes action in superficial capillaries of the skin and mucous membrane, the formation of chancre resulting.

This view of the secondary nature of chancre is supported by (1) its vascular origin; (2) cases of absent chancre and absent secondary lesions of syphilis; (3) the fact that solution of continuity is not necessary for the formation of a chancre.

Retardation of lymphatic circulation leads to extravasation of lymph and leucocytes, and these last carry the syphilitic microbes and propagate the disease.

Cet. par., severity of the disease is inversely to the adenitis; this last being directly as the phagocytal strength, and that of the general reaction of the organism against the virus.

These views have been called "new." True it is that chancre is often spoken and written of as the "primary" lesion of syphilis, or as marking "primary syphilis." Nevertheless, it is by no means a "new view" to designate chancre a "secondary" lesion, at least not a new view in the sense claimed. The implication that syphilitic chancre is a purely local affection, and that the "secondary" symptoms of syphilis denote the earliest systemic or general empoisoned condition, was contested many years ago, and some of the best teaching was that in (Hunterian) genuine chancre, the slight induration indicated that syphilis had become general (or systemic or constitutional); in a word, it was influentially held that syphilitic chancre was an evidence of "constitutional" syphilis.

Another of his so-called "new" views on the pathology of syphilis is that in tertiary syphilis there is an additional toxine, possessing necrotic powers and causing affections of internal organs; thus differing from the toxine of early syphilis.

The evidence for this is not convincing. The view is not in harmony with the seeming similarity in essential nature of the nervous lesions in the so-called secondary and tertiary stages of syphilis. It is against the conclusions of Neisser. This observer denies that bacterial virulence has been modified in tertiary syphilis, inasmuch as the peculiarity of tertiary syphilides and their slight infectiveness can be explained by the paucity in number of the microbes; and not by their less virulence. And he agrees with Mr. Hutchinson's hypothesis that the tissues in

tertiary syphilis are so profoundly altered by the syphilitic virus, that they no longer react to syphilitic bacilli as do healthy tissues, on the same tissue, in the first stage of syphilis.

Two points he keeps separate. One concerns the factors determining the *localisation* of tertiary syphilides; namely (a) residual virus, in former site of primary and secondary syphilides, becoming the starting point of tertiary eruptions; and (b) traumatic or pathological irritation of tissues, with resulting neoplastic tendency, &c. The other point concerns the general conditions favouring *preservation* of the virus; such, namely, (a) as interfere with the normal measure of destructive power on the virus by the healthy organism; or again, (b) such as absence, insufficiency, or delay, of anti-luetic treatment.

The question at issue is weighty in relation to so-called "para-syphilitic" affections. One of the hypotheses on the origin of these introduces variety in syphilitic toxins. According to Fournier's statement of it, condensed in the following lines, the specific microbe would produce morbid phenomena, the results of its specific toxine and direct activity; *i.e.*, ordinary syphilis. Then, later on, this same microbe would elaborate a special toxic substance, a toxine, which, infecting the organism in its turn, would produce another succession of very different symptoms from the first, especially in their resistance to specific treatment; "symptoms of which the prototypes would *par excellence*, be tabes dorsalis and general paralysis."

Therefore the present is a convenient place to consider the para-syphilitic affections.

IV.—PARA-SYPHILITIC AFFECTIONS, GENERALLY.

This term Prof. A. Fournier applied to morbid states which, although not of direct specific syphilitic character, nevertheless are in reality products and derivatives of syphilis. According to this, syphilis is not solely and exclusively limited to characteristic luetic lesions and symptoms: for its action on the organism may arouse disorder of the general health, lessen the vital resistance, affect the development of foetus and infant, and create organic defects or morbid tendencies. These para-syphilitic affections, although not syphilitic in nature, are syphilitic in origin "in the sense that they are the progeny of syphilis, that they are the result of its

occurrence, that according to all evidence they would not be produced without it" (Fournier); *i.e.*, in the given examples. Between them and genuine specific luetic manifestations, a well-defined line of demarcation is drawn by two leading para-syphilitic characteristics: namely, that they do not arise solely and exclusively from syphilis, as do the pure genuine specific syphilitic manifestations; and, secondly, that para-syphilitic affections do not show that amenability to anti-luetic treatment, that prompt and lively movement towards recovery, which so often marks the genuine direct syphilitic morbid states.

Following Fournier, his pupil Gastou deals with the para-syphilitic affections, classing them much as follows, although the loose lines are here a little "dressed."

In the first line come tabes dorsalis, pigmentary syphilide; and, less distinctly so, general paralysis, and the amyotrophy of Raymond.

Besides these, are a number of affections which are taken as being very frequently of syphilitic origin. These para-syphilitic affections are:—

In acquired syphilis; of neurasthenic, hysteric, epileptic, or mental type.

Taking these in order, first comes *the neurasthenic group*: acute neurasthenia of the secondary or tertiary stage of syphilis, and its different forms; secondary neurasthenia; hysteroneurasthenia; ordinary neurasthenia (frequent in the tertiary stage of syphilis); neurasthenic headache; neurasthenic pseudotabes; neurasthenic encephalopathies (*e.g.*, simulating general paralysis); local neurasthenias, of peripheral, sympathetic or visceral form (dyspeptic, cardiac, genital); monosymptomatic, as local pain; and, finally syphilophobia, perhaps conjoined with morbid fear of the effects of anti-luetic mercurial treatment.

Also classed as para-syphilitic are certain cases of *hysteria*, which may be slight in degree or of medium or of extreme severity, and quite comparable to forms of common hysteria. Other para-syphilitic hysterias are of "partial" form, *e.g.*, paraplegic.

It must be specially noted, however, that Fournier¹ has also described cases of hysteria in the secondary eruptive stage of syphilis as being of purely syphilitic character, easily curable by mercury, and at least in one case cured by iodide.

Para-syphilitic *epilepsy* usually makes onset in late syphilis; is an isolated epilepsy, *i.e.*, not associated with other morbid

¹ *Gazette des Hôpitaux*, No. 96, 1888, and *Médecine Moderne*, 1891.

phenomena of nervous syphilis; is lasting, and does not yield to anti-luetic treatment, although often ameliorated by potassic bromide.

Finally, Fournier places here a variety of lypemania as a para-syphilitic mental change.

Forming a second large group, are the *para-syphilitic affections due to hereditary syphilis*.

These have obtained the classification following, which I take to be faulty, and several of its elements wrongly placed.

(a) Foetal cachexy, namely, greater or less inaptitude for life, leading to death *in utero*; or to the birth of wretched miserable infants with little hold on life.

(b) Congenital malformations of limbs or fingers, club-foot, spina bifida, cleft palate, hare-lip, abnormal cranial asymmetry, microcephaly.

(c) General or partial dystrophies, namely, arrests or retardation of general or local development; or atrophies. Thus there may be slowness of general growth, or of acquirement of motor function, dental defects and developmental anomalies, also atrophic dystrophy of reproductive organs, or of bone, or of brain (backward children, imbeciles); or even an arrest of development in a permanently infantile, or in an almost mindless state.

(d) Morbid predispositions to disease of the nervous system (*e.g.*, to convulsion, meningitis); or to osseous scrufulo-tuberculous affection (Pott's disease: *morbus coxae*); perhaps even to tubercular lupus.

Besides these organic states also are para-syphilitic changes of anatomical, or of dynamic order; alleged examples of the former being rickets, hydrocephaly, meningitis, congenital spasmodic tabes (Little's disease), the juvenile form of tabes dorsalis and of general paralysis; and examples of the latter, or *dynamic* changes, being neurasthenia, hysteria and epilepsy; these last being somewhat doubtfully offered for acceptance.

Several forms of *familial* disease have also been considered parasymphilitic. For example, recently were published four examples, *in a family*, of infantile spastic cerebral diplegia, attributed to parental syphilis.

We need not again describe, having already considered, the morbid anatomy (when any) of para-syphilitic diseases: how they are without syphilitic gumma or gummy infiltration: how lesions, if present, are those common to many slow long-lasting infectious maladies, and consist of forms of vasculitis, of sclerosis, and of degeneration, usually more or less disseminated, and how,

when grave palpable lesions are absent, the dynamic or functional defects and disorders (neurasthenia, hysteria, epilepsy, &c.), are engendered by what I have termed *syphilaemia* (with its structural, toxic, anæmic, chlorotic elements), and by the perturbing mental effects incidental to knowledge of the acquirement of syphilis, and the tragic drama, present and portending, of syphilised life. And, in cases, these factors may be reinforced by ill-effects on nervous nutrition wrought by syphilitic alteration of blood-vessels; or by the mercurialism of over-dosage.

V. — PARA-SYPHILITIC EPILEPSY.

The fifth part of my previous communication was on "Syphilitic Epilepsy," so-called. Here may be mentioned the form described by Fournier, as "Para-syphilitic Epilepsy."

Para-syphilitic epilepsy is sudden, unexpected, spontaneous in invasion, comes on usually in an advanced stage of syphilis; takes the form of the great or little epilepsy—the convulsive or vertiginous—is, or may be, isolated; does not yield to specific anti-luetic treatment, yet may be abated by bromide of potassium.

Let us expand this summary a little, partly in Fournier's own words, and entirely on his lines:—

Occasionally, in syphilis is an epilepsy which is very different from "syphilitic epilepsy" or more correctly, from "the epileptic form of cerebral syphilis." It is especially distinguished by the following features:—

It is produced, begins and continues throughout like epilepsy, pure and simple, as an isolated symptom, that is to say, without the accompaniment of other phenomena, and particularly without cerebral phenomena.

It is persistent and tedious in its duration.

It does not yield to anti-syphilitic or other remedies, yet may be controlled, though not cured, by bromides.

The invasion of para-syphilitic epilepsy is no less sudden than unexpected, and apparently spontaneous. It begins as a severe attack of convulsions (*grand mal*), or as a succession of attacks of *pétit mal*.

The attacks of *grand mal* are relatively few and far between; those of *pétit mal*, on the contrary, are relatively very frequent.

The seizures of *grand mal* reproduce all the features of a classical epileptic fit, so also as regards the *pétit mal*, and that of ordinary epilepsy, "apart from differences of detail."

This epilepsy is pronouncedly persistent and of long duration.

It belongs to the tertiary stage of syphilis, of which it is a late manifestation. It begins, as a rule, between the ages of 37 and 48.

The derivation of this epilepsy from syphilis is proved: (1) by indubitable syphilitic antecedents; (2) by the age at which the comitial symptoms first manifest themselves; (3) by the absence of any assignable cause, other than the syphilis; (4) by the occasional birth, to such parent, of an emaciated, degenerate, badly developed child, such as we so constantly associate with hereditary syphilis.

The convulsive form of para-syphilitic epilepsy never assumes the circumscribed and partially convulsive epileptiform type, it is invariably generalised. Para-syphilitic epilepsy continues pure and simple without admixture of other cerebral phenomena, *e.g.*, congestive, intellectual or motor, such as occurs in "syphilitic epilepsy." It persists in its original form for years. It is not amenable to treatment by Hg. and I.

A syphilitic lesion of the encephalon is unlikely as its origin. It comes from syphilitic source, has no features which pertain really to syphilis, or which are solely and exclusively syphilitic; is not amenable to anti-luetic treatment, and by conjunction of all these tokens it is a *para-syphilitic affection*.

VI.—FUNCTIONAL NERVOUS DISEASES AND SYPHILIS. FUNCTIONAL NERVOUS DISEASE OF SYPHILITIC ORIGIN.

In the preceding section on para-syphilitic or meta-syphilitic nervous diseases we have partially dealt with the present subject; and under the functional division of these affections paid especial attention to neurasthenia, hysteria and epilepsy.

Paul Kowalewsky arranges the chemical changes of nervous tissue elements as being conditioned by syphilis in five ways:—

I.—By blood changes.

II.—By heroic anti-luetic treatment.

III.—By pathological change of blood-vessels in syphilis.

IV.—By mental shock due to the fact of infection by syphilis.

V.—By the chronic action of the syphilitic virus or toxine.

Taking these in order, the following brief summary of his statements will suffice here:—

(1) Alterations of the blood in syphilis.

Hyper-albuminosis and oligocythaemia were among the earliest-described of the blood-changes. The blood-changes in

syphilis are sometimes mainly of anæmic, sometimes of chlorotic type, and, whether primarily due to syphilis or to its treatment, there may be red cells over-big or undersized, or pale and wan; or aberrant in shape, or even strangely deformed. The white corpuscles with single nuclei have been found over-abundant; those of the multi-nuclear variety decimated.

In early syphilis, eosinophile cells have been reported much augmented in number. Hematoblasts and Bizzozero's platelets have been observed to lessen in number during the eruptive and chlorotic periods; and, subsequently, to rise again. The red corpuscles and multi-nuclear white have been stated, by Anz, to follow parallel lines of change; but rising and falling in number inversely as the uninuclear elements, and transition forms, especially eosinophiles.

Roughly speaking, these blood-changes are proportionate to the intensity of the syphilitic phenomena; return with luetic relapses; are influenced by anti-syphilitic treatment; and in a happy issue of the fundamental malady disappear for good, effaced by a gradual return to the normal standard of blood-composition and structure.

These hæmic changes reaching their height, as a rule, coincidentally with the *acmé* of the secondary stage and its syphilitic toxæmia, the tendency is to reappearance of the normal standard; although the hæmoglobin remains somewhat low.

Naturally, these morbid hæmic states lead to defective nutrition of nervous system, to easily produced functional nervous disorder, especially in those otherwise predisposed; and this holds good both in acquired and in hereditary syphilis.

Taking now, and very briefly, the other several points mentioned by Kowalewsky:—

(2) The production of functional nervous disorder through heroic anti-luetic treatment (Hg., I.), is a result of inanition, or of poisoning, not syphilitic, but by an inorganic chemical substance; and we pass it by as being somewhat out of place.

(3) Altered vessel-walls occasion many symptoms in leading towards some of the worst forms of brain syphilis. But irrespective of this, the irregularities, defects and inequalities of nutrient supply, and of molecular excretion, obviously act so as to foster defective nutrition of nervous elements, and hence promote nervous disorder.

(4) Knowledge, on the patient's part, that syphilis has been incurred, may strike home, producing mental shock; which is obviously in line with like mental factors which do, notoriously,

produce or aggravate various nervous and mental functional disorders.

Applying these views to syphilitic *neurasthenia*, Kowalewsky divides into several forms of it:—

One is the congenital form of syphilitic *neurasthenia*.

Another is that acquired during the dyscrasia of syphilis.

A third is the inanition-*neurasthenia* due to mercurial overdosing for syphilis.

The fourth is that occasioned by mental shock in consequence of the patient becoming aware of his luetic infection and of its consequences.

Also as regards *hysteria* in syphilitics, are several varieties; namely:—

(a) The form due to intoxication of nervous elements by syphilitic poison.

(b) That originating in altered nutrition of nervous elements under influence of syphilitic dyscrasia.

(c) That springing from the mental perturbations aroused by the fact of the acquisition of syphilis, and its effects.

(d) That brought about by the mercurialism of antiluetic treatment.

Moreover, syphilis in the ancestry may conduce to *hysteria* in the descendants; an inherited state disposing to *hysteria* may have its rootlets in ancestral syphilis, and the hereditary degeneration springing therefrom.

Other forms of functional disorder are, in cases, due to syphilis, such as chorea, and angina pectoris.

The examples of *chorea* in acquired syphilis are but few; it is mainly *hereditary* syphilis which is potent in making for the chorea of Sydenham. And the probability is that those seemingly occasioned by acquired syphilis are in reality *hysteria*—are exemplars of hysterical mimicry of chorea originating in conditions the outcome of syphilis.

In the production of *angina pectoris*, Kowalewsky ascribes several methods to the rôle of syphilis:—

One is by the production of morbid changes in the heart-walls:—

Another by making pathological disorder of the vessels:—

And a third by change affecting the cardiac nervous apparatus.

Where the *angina pectoris* is from syphilitic alteration of the cardiac nerves we find nearly pure *angina pectoris*; of secondary grade is it in the cases of syphilitic change of cardio-muscular

and connective tissue; and still more insignificant is the purely anginal character with syphilitic change of the vessels.

Anti-luetic treatment has been reported very successful in several cases. The happy issue of that treatment would tend to indicate a form of angina pectoris directly the outcome of active syphilis, and not of para-syphilitic nature.

It has often been noticed that, at the outset, organic syphilitic and other diseases of the nervous system are apt to be confounded with functional disorder. Also recently it has been pointed out by Stieglitz that, in the early stage, syphilis of the brain is most frequently confounded with the functional neuroses; neurasthenia, hysteria, epilepsy. This is owing to the transitory character of many of the focal symptoms, and the frequent presence of such neurasthenic symptoms as insomnia, general irritability and headache. One of the cases lately published by C. K. Mills was an example of the kind; at first supposed to be one of hysteria or neurasthenia, but turning out to be brain syphilis in reality. And not a few resemble his third case—with mental weakness, convulsions, polyuria. Deutsch also is alive to the frequency with which nervous symptoms are among the first indicating syphilis to have become a constitutional disease—in other words, the infection to have become general. Such symptoms are pains in head or kidneys; mental symptoms; pallor and nausea (from meningeal irritation). Occasionally, the symptoms of encephalic origin are sluggishness or inequality of pupils, neuralgia, greediness, excessive thirst, severe sweats; and, as for the spinal cord, increased reflex excitability of skin and tendons, followed by rapid lessening or loss of the same for several weeks, even after the rashes have disappeared.

Somewhat contrary to the preceding views, are those of Orchansky, who contends for the existence of a sort of antagonism between syphilis of the nervous system and neuropathic heredity. He declares that nervous affections are more rife in those syphilitic persons who are without, than in those of them with, morbid neurotic inheritance. Moreover, that this inheritance ameliorates the effect of syphilis by tending to replace organic (gross) nervous disease by functional. And furthermore, that in the production of morbid conditions of the nervous system, syphilis acts almost solely as a factor of organic disease and not of functional.

(To be continued.)