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PART 1.—ORIGINAL ARTICLES.

On Syphilitic Epilepsy. By M. G. ECHEVERRIA, M.D., late Physician in Chief to the Hospital for Epileptics and Paralytics, and to the City Asylum for the Insane, New York, &c.

Syphilis has always been regarded as one of the accidental causes of Epilepsy, and ranks, indeed, among those which exert the most decided influence on its development. The epileptic malady, when so originated, throws almost into the shade the other constitutional accidents, or sequels of the syphilitic infection, if they are not—as it often happens—in suspension or latency. The first point, therefore, to be considered before we proceed to the description of its characters, is—at what stage of syphilis does the neurosis commonly occur, or rather, is there a secondary and a tertiary epilepsy, distinct from each other, as is held by Fournier,* who judges it difficult to connect the former, principally exhibited by females, like a transient specific neurosis, with any lesion of the nervous centres; whereas the latter should be, on the contrary, manifestly consecutive to encephalic lesions, thus constituting one of the manifold expressions of that complex organic state known as cerebral syphilis.

That insanity, epilepsy, or paralysis, may suddenly occur simultaneously with the early phenomena of constitutional syphilis is a well acknowledged fact, of great therapeutical value, since its recognition affords us a safe guide for the application of proper specific remedies, and a right management of such nervous disorders. But, the local paralysis, the hemiplegia, the neuralgias, or any derangement of the

* "Epilepsie Secondaire," "Ann. de Dermatologie et de Syphiligraphie." Paris, 1880. Tome I., 2me. Série, pp. 16 and 199.

mental functions, which might break out in the course of secondary syphilis, do not present, when taken singly, any distinguishable characters from those which may explode during the tertiary stage, beyond the peculiar features of the concurrent constitutional accidents in each case. Does epilepsy offer in this particular respect any exception to the other syphilic nervous maladies?

The investigation of the subject in patients under my immediate observation yields the following results. The irruption of the first epileptic attack in 118 cases—65 males and 53 females—took place, after the acquisition of syphilis, at dates which are thus noted:—

9 males and 15 females, from 4 months to 1 year.
16 males and 20 females, from 1 year to 2 years.
13 males and 8 females, from 2 years to 5 years.
15 males and 5 females, from 5 years to 8 years.
9 males and 3 females, from 8 years to 12 years.
3 males and 2 females, from 12 years to 20 years.

Now, 4 males and 12 females, of the first series, presented at the outbreak of the epileptic fits such unmistakable signs of secondary syphilis—as roseola, erythematous syphilid, superficial ulcers of the tonsils, iritis, inguinal adenitis, epididymitis, alopæcia, febrile paroxysms, sleeplessness, with gastric and other nervous troubles. The majority of these patients were females, as already observed by Fournier in similar instances; two males were the offspring of insane parents, and one of them had an insane sister. Another male became epileptic during convalescence from yellow fever, six months after having had a venereal sore of the prepuce, followed by glandular enlargement in the groin, and a cutaneous syphilid, already manifest at the time he was attacked with the fever. The remaining male exhibited a feeble constitution, with a marked nervous temperament, and had been subject, since boyhood, to periodical migraine of the most violent nature. The age of the males ranged from 19 to 31 years, that of the females from 21 to 28. One of the latter, aged 24, died with double pneumonia, three weeks after she had been seized with nocturnal fits. I shall refer presently to the lesions exhibited by her brain, and by that of one of the males, aged 19, who committed suicide by drowning.

It is evident that in the foregoing cases the neurotic temperament and enfeebled conditions of the males hastened the

development of epilepsy during the secondary stage of syphilis. Furthermore, it seems no less obvious that the greater nervous susceptibility of females accounts for their preponderance over the males in the first and second groups of cases, showing the early explosion of epilepsy at a period varying from four months to two years after syphilis had been acquired. To the same susceptibility I ascribe the state called by Fournier *nervosisme secondaire*, commonly exhibited by females in the course of secondary syphilis, and which I have chiefly noticed among prostitutes and women enfeebled by venereal excesses. These facts, together with the absolute similarity of the essential phenomena observed in every instance of epilepsy—whether originated during the secondary or during the tertiary stage of syphilis—lead us to recognise that, under such circumstances, precocity in the evolution of epilepsy depends altogether on the nature of the soil; that is to say, the nervous predisposition of the patient, rather than on conditions connected with the stages of the syphilitic diathesis itself. If the nervous system is in any way impaired in its activity, and, through disturbing nutritive agencies set up by accidental organic derangement, does not keep within the normal standard, syphilis will operate simultaneously with such agencies to favour with strange rapidity the evolution of epilepsy, or any other nervous disorder; just as with certain individuals the constitutional accidents and cachexia develop themselves sooner, while in others they happen at a remoter date, on account of organic defects, more or less appreciable, influencing the manifestations of syphilis from its very stage of incubation. Syphilis, in one word, operates like any other encephalic lesion capable of inducing epilepsy, without submitting it, however, by the specific nature of its etiology to exceptional laws of development. The nervous disorder exists correlated with the syphilitic diathesis; both have a place in the explanation of the phenomena displayed; but, I repeat it, the manifestations of the epileptic malady remain essentially the same as in any other case, notwithstanding its specific cause and its inception at any earlier or later period of constitutional syphilis. And, because the attacks during the secondary stage may explode and disappear simultaneously with the irruption of the specific accidents, thus showing, as Fournier says, a parallel evolution, are we to conclude therefrom that the epileptic phenomena are not connected with some material lesion of the nervous centres? Hemiplegia,

local paralysis, and other affections of the nervous system, generated during the secondary stage, are attended by structural changes which have been revealed by the autopsy on several occasions. As regards syphilitic epilepsy, the opportunities of demonstrating such lesions are not frequent, but there is not the least doubt of their reality, since in two typical cases I have examined, manifest pathological changes were discovered in the membranes, the cerebral hemispheres, the medulla, and the sympathetic ganglia accounting for the convulsive symptoms, and which, it is legitimate to presume, must exist likewise in other similar instances. In proof of these assertions I briefly report the principal characters of these two examples.

Case I.—Female, aged 24. Four months after appearance of a chancre in the fourchette, she presented a roseola over nearly the whole body, ulcerations of the throat, and vaginitis with swelling of the inguinal glands. She had besides iritis in the left eye; pain in the lower part of the back, and complained of tingling and numbness in her limbs, particularly in the legs. The first fit occurred in the night, with severe laceration of the tongue, and was followed all the day after by a depressed condition, with violent pain, chiefly over the parietal regions. This headache has troubled her very much, with vertigo, great irascibility, sleeplessness, and neuralgia in the præcordial region and lower limbs. The fits regularly recurred every night, sometimes four or five in succession, until she was seized with double pneumonia, and died three weeks after the accession of the epileptic malady.

On post-mortem examination, the lungs were found in a state of red and grey hepatization, with emphysema in the anterior part of the upper lobes. Heart rather enlarged, with right cavities filled by coagulated blood. Nothing wrong with the abdominal viscera. The brain presented the following appearances:—Dura mater normal looking, but very adherent to the calvarium. The arachnoid, dense and thickened in several circumscribed places, was firmly united with the cortical substance, yellowish and denser under these spots. Terminal branches of the left Sylvian artery with a notchy appearance, and surrounded by a glutinous exudation, which also covered the basilar artery. Membranes over the medulla thickened. Sympathetic cervical ganglia enlarged, with a red pellucid aspect.

Case II.—Male, aged 19. Entered the hospital in a very agitated condition of mind and prone to violence, after having had for three days several convulsive fits, alternating with vertiginous attacks. He laboured under the delusion of being persecuted by his mother, which rendered him extremely impulsive and excited, feeling at other moments quite low spirited and depressed. He was wakeful, talka-

tive, and noisy at nights. Whilst in the hospital he had eight very severe attacks of general convulsions, though obviously more violent in the right limbs. Curiously enough, in every instance the fits seized him just after voiding urine, preceded by a vertiginous condition and a long piercing cry. The first fit occurred early in the morning on getting up, six months after he had had a chancre and gonorrhœa, and when he had a papular eruption over the face and trunk, with condylomatous sores on the tongue and lower lip. Four days after admission he drowned himself. A letter disposing of his effects, and full of terrible invectives against his mother, showed that the suicide was a premeditated act.

The examination of the brain disclosed alterations similar to those noted in the preceding case. The arachnoid on the left side over the convolutions bordering the fissure of Rolando, presented, almost uniformly, a yellowish opalescent colour, with considerable thickness and firm adherence to the cortex, but in other places a limpid serosity filled the sulci between the convolutions. The cerebral tissue, very moist, firm, and highly congested, displayed in several points a denser structure of a yellowish hue. A much larger surface of exudation covered the summit of the right occipital lobe, and thence extended along the upper border of the hemisphere until the tip of the parietal region. The fissure of Sylvius was also masked by exudation on both sides, but more on the left. The cortical arteries, coated with a glutinous exudation, exhibited in lesser degree the notchy appearance noticed in the former case. The ventricles were rather distended by limpid fluid, and the choroid plexus covered with minute semi-transparent granulations. Membranes over the medulla, thickened and opaque. Sympathetic ganglia, red and swollen. Nothing particular with the other viscera, excepting some slight indications of perihepatitis.

Microscopic examination of the cerebral tissue, in both cases, showed a proliferation of nuclei and connective fibriles in the neuroglia, with notable enlargement of the cells in many places. In the sympathetic ganglia the cells were filled with dark pigment granulations, in addition to the hyperplasia of connective elements in the interstitial tissue, and the proliferation of nuclei along the fibres. The medulla showed its capillaries in a granular state, and with varicose distensions. The nerve-cells, dark, irregular, and véry granular, were surrounded by heaps of fine granulations and amyloid corpuscles, also abundant around the cerebral bloodvessels in the cortical substance. The vessels in these regions owed their thickening and notchy aspect to several nuclei and granulations filling the interstices between the muscular fibres of the inner coat. The muscular elements were less altered in the more constricted parts, which in some points were plugged by a mass of blood discs, white cells, and fine granulations. These elements in advanced cases undergo a retrograde change, forming a fatty mass tinged with an ochre colour, from decomposition

of the hæmatic crystals. In the second case the ependyma of the fourth ventricle was thickly interspersed with amyloid corpuscles and a finely granular semi-transparent amorphous matter. Finally, the above changes in the medulla and sympathetic were those I have long ago described in these nervous centres, as always existing in epilepsy.

If we deduct from the whole series those cases in which the onset of epilepsy took place during the secondary period of syphilis, we have 93 patients who exhibited unmistakable signs of tertiary syphilis, and 9 without any appreciable external manifestation of the diathesis, notwithstanding the previous existence of chancre and inguinal adenitis, at a more or less remote date from the outbreak of the syphilitic affection. The latter cases have not escaped those who have closely studied the etiology of syphilitic nervous disorders, having been particularly pointed out by Lanceraux and, more recently, by Buzzard. But although we might not discover plain proofs of constitutional syphilis in these instances, the diagnosis, in regard to syphilitic epilepsy, is not so obscure as it would at first appear, on account of the mark deeply stamped on the disease by its peculiar evolution and symptoms.

The changes undergone by the nervous system do not differ essentially in each individual syphilitic nervous affection. The pathology of the encephalon, and particularly of the brain, as established by Charcot, is immediately dependent on the circulatory system, and no more direct illustration of this truth could be had than in cerebral syphilis. There is, however, a proportion of cases, not exceptional, in which the nutritive histological changes effected by syphilis primarily arise in the nervous elements themselves, without impairing the vascular or interstitial structures of the nervous centres. I have met with the two following examples of spasmodic dorsal tabes and epilepsy belonging to this class.

Case III.—A man, aged 34, with constitutional syphilis and caries of the nose, and who had been greatly exposed to dampness, presented a paretic state of the lower limbs, with spontaneous epileptoid *trepidation*, which could be equally induced by flexion of the feet, and contraction of the two legs. No brain symptom or strabismus, trouble of sensibility, or shooting pain, existed at any period of the disease, which gradually ran its course in five years, until the patient, whom I had seen several times with Dr. F. J. Bumstead, died of tuberculosis of the lungs.

On post-mortem examination we found a symmetrical and primitive

sclerosis of the lateral columns in the dorsal region of the cord, without any degeneration in the anterior cornua, and no cerebral lesion.

Case IV.—A female, aged 40, died at the Hospital in the last stages of constitutional syphilis. She had been, for three years, subject to diurnal fits followed by profound coma. With the exception of its very anæmic state, no marked lesion was discovered in the brain, nor in its bloodvessels, the morbid alterations remaining limited to the medulla and sympathetic. In the medulla the nerve cells, irregularly shapen, were much enlarged, with an areolar aspect, or densely loaded with pigment, in the midst of a considerable quantity of amorphous matter. The sympathetic cells in the cervical ganglia appeared infiltrated with pigment, and shrunk or broken up, a great hyperplasia of the connective elements and several oblong nuclei in the exceedingly attenuated nerve-fibres, being no less conspicuous.

I do not ignore the fact that exposure to cold dampness was the determining influence of the disease alleged in several of the cases of spasmodic dorsal tabes observed by Charcot, who, however, regards its immediate causes as unknown. For which reason, I attach a chief etiological importance to the operation of syphilis on the spinal cord in the case just noted, and, principally, because the patient acknowledged that the first indication of a weary and fatiguing feeling, with the contraction in the legs, and his inability to use them freely after getting up in the morning, existed long before he had to expose himself to dampness, which, of course, helped the progress of the disease. Lastly, the fact that syphilis is often a cause of locomotor ataxy, determining a primary spinal sclerosis, strengthens the diagnostic views here maintained.

But, notwithstanding such important category of cases (which mostly refer—and this is an important distinction—to spinal affections commonly consequent, as shown by Vulpian and Charcot, on systematic lesions confined or circumscribed within definite boundaries), syphilis when it affects the encephalon, involves primarily, in the majority of instances, the vascular structures, the cerebral membranes, and the neuroglia. Ischæmia from obstructed circulation on one side, and, on another, the proliferation of connective elements compressing the nerve-cells, lead ultimately to disintegration or atrophy, and a retrogressive change with fatty degeneration of the cerebral tissue.

Notes of thirty-six examinations of the brain in different cases of syphilitic mental and nervous disorders, including ten of epilepsy, show more or less thickening, or an athero-

matous degeneration of the cerebral arteries, in thirty-one cases, distributed as follows:—Anterior cerebral artery, 3; Sylvian artery, or its terminal branches, 6; Posterior cerebral, 4; Cerebellar arteries, 3; Basilar artery, 4; Cortical arteries, 9; Circle of Willis, 2. In two of these instances the right Sylvian artery, and in one the basilar, presented an aneurismal dilatation caused by thrombosis and obstruction of the vessel. The three patients had epilepsy, the two first with left hemiplegia. In one instance, to be presently described, the superior longitudinal sinus was completely obliterated, and in another the right cavernous sinus was almost obstructed by a gummatous deposit on the same side of the sella turcica. Finally, the above thirty-one patients were—twenty-two males and nine females.

I could not better illustrate the histological changes undergone by the arteries and tissue of the brain than by the history of two most typical examples I have already published, in addition to the two cases, just reported, in proof of the lesions that exist in epilepsy developed during the secondary stage of syphilis.

Case V.—A female, aged 26, had constitutional syphilis: enlargement of the cervical and inguinal glands, roseola patches in the genitals and leucorrhœa, with obstinate headache, paralysis of both third nerves and left hemiplegia. The anti-syphilitic treatment proved of no more avail than to remove the skin accidents. The epileptic attacks persisted with troublesome coughing, vomiting, and other nervous symptoms, with a gradual failing of the intellectual faculties, until, passing into a somnolent condition, the patient finally died in a fit. In the commencement an aura, starting from the fingers on the left hand, preceded the paroxysms, but subsequently this warning ceased. During the fits the patient used to bite the tongue and to froth considerably at the mouth.

Autopsy.—Calvarium normal, vessels of the diploe very congested. Meninges opaque; serous effusion in the cavity of the arachnoid, which was opalescent on the anterior part of the base of the brain. Right middle cerebral artery plugged by a firm, laminated, orange-tinted clot, adhering to the walls, and inducing aneurismal dilatation of the vessel, with gummatous thickening of its external coat. The retrogressive change in the contracted portion of the vessel beyond the aneurism, caused its tearing asunder; and to the circulatory obstruction were due the infarctus and ischæmic softening in the parietal and frontal lobes. A large surface of the cortical substance around the fissure of Sylvius and over its posterior extremity, was covered by a film of coagulated blood; these regions were infiltrated and softened in many spots, without delimited boundaries with the white

substance underneath, which had a yellowish colour from the ischæmic change just noticed. On section, the brain-tissue looked rather wet, with two yellow patches the size of a hazel nut, in the right centrum ovale, near the anterior part of the corpus striatum, and surrounded by softened tissues. Ventricles containing turbid serosity, choroid plexus rough, covered by small, yellow granulations. These miliary bodies covered also the ependyma of the fourth ventricle, and the pia-mater over the medulla. Both lungs, with tuberculous deposits at the apex, extensive pleuritic adhesions on right side, with grey hepatization of the lower lobe. Heart natural, without any valvular disease. The other viscera presented nothing worthy of notice, excepting the liver traversed by fatty streaks. Uterus enlarged; granular cervicitis. Gummatous patches on labia minora.

The granulations in the lining membrane of the ventricles contained a cheesy matter, easily pressed out from an envelope formed by delicate connective fibres. Large oil cells and granular nuclei mixed with fatty particles composed the above matter. Same fatty metamorphosis in the patches of the centrum ovale, with more or less addition of neuroglia and nerve-fibres or cells, in granular disintegration. The surrounding softened tissue contained nervous elements fragmented, large granular corpuscles, and amorphous matter. The cortical matter under the apoplectic effusion showed no nervous elements among the granular cells, fatty granules and hæmatic crystals and globules constituting its softened structure. While such retrograde metamorphosis was thus evinced in these regions of the brain, the left optic thalamus and the cervical sympathetic exhibited a typical sclerosis, with its characteristic exuberance of connective elements. In the oblong medulla the fatty degeneration existed chiefly on the left side, along the path and nucleus of the hypoglossus, and hence extending to the fourth ventricle. The vessels, distended and granular, were masked by fine fatty granulations, grouped along their course. The cerebral capillaries, and those of the cerebellum, had undergone the same but less general alteration. The cerebellum exhibited an increased amount of connective nuclei and amorphous matter stuffed with fatty molecules.

The change in the roots of the hypoglossus was remarkable. Primitive fibres reduced in great number to their sheath and cylinder axis; medullary substance lost or fragmented into fine brilliant granules. This lesion had also invaded many of the primitive fibres in the roots of the right pneumogastric, the majority of those of the third nerve, and those of the sympathetic. No change in the median and ulnar nerves which were also examined.

The degeneration of the right middle cerebral artery chiefly involved its outer and muscular coats. The muscular fibres pressed asunder by heaps of nuclei, and fine granulations filling their interstices, had lost their apposition. In the outer coat there were large fusiform and round cells, mixed with a considerable amount of connective elements,

replaced entirely by fatty ones in those points where the retrogressive metamorphosis had already taken place. The swelling of the muscular coat, narrowed or completely occluded the calibre of the artery. This, and the increased thickening of the outer coat, gave to the vessel the notched aspect noticed in many of its branches.

There can be no doubt that the plugging of the middle cerebral artery produced its aneurism and the local infarctus with ischæmic degeneration of the cerebral tissue. Such morbid accident occurring without evidence of cardiac disease, and dependent on the diseased condition of the vascular walls, as much as on the influence of the cachexia, is always favourable to the formation of coagula obliterating the blood-vessels. Bristowe* has shown twice the occurrence of these cerebral aneurisms in connection with secondary syphilis, and occasioning, in one of the cases, epileptic hemiplegia. Similar observations have been reported by Virchow, Huebner, Lanceraux, Wilks, Broadbent, Allbutt, Hughlings Jackson, and several others. And these facts, too numerous, demonstrate how groundless was the opinion of Gouguenheim, who, in his interesting memoir on Aneurismal Tumours of the Cerebral Arteries, regards the influence of syphilis as a problematical source of their occurrence, whereas experience, on the contrary, proves it to be one of the commonest.

Case VI.—In February, 1866, I visited, in consultation with Dr. Perry, of Brooklyn, a shipmaster, who, for nearly a year, had suffered from fits, attended with vertigo, temporary paralysis, sometimes in one lower limb, sometimes in both, and most severe headache. He had been subject to fits some years before, but they gradually disappeared. Prior to their accession, he had chancres, with enlargement of inguinal glands, and, when I saw him, copper-tinted blotches on the skin were the chief indications of constitutional syphilis. The fits then recurred, four or five in succession, every two or three days, preceded by neuralgia in the legs, and constant violent pain in the fore part of the head. I suspected the dura mater and, most probably, the brain involved by gummatous deposits at the site of the cephalic pain. The antisyphilitic treatment, instituted by Dr. Perry, was kept up, increasing the doses of iodide of potassium, belladonna, and ergot to allay pain and cerebral excitement; but this proved unsuccessful, and the patient died, not long after my visit, in a comatose state consecutive to several fits.

I did not attend the autopsy, but my friend Dr. E. R. Peaslee, who had also visited the patient, was kind enough to send me the brain and medulla for examination. The dura mater, covering the

* "Trans. of the Pathological Society of London," Vol. x., p. 44.

upper surface of the hemispheres, was very much thickened. The superior longitudinal sinus completely obliterated and reduced to a fibrous tissue, like a tendinous ligament, for the distance of three inches, remained partially pervious in its posterior extremity, where concentrical layers closely filled out its cavity, thus indicating the manner in which the obstruction had been effected. This deposit was three-quarters of an inch long and half an inch thick. On the left side of the sinus there were several patulous, soft, not vascular, yellow patches, overhung by an irregular border. These ulcerations corresponded with similar ones involving the upper part of the ascending parietal convolution, nearly to the central white substance for the space of half a dollar, there being a well-established vascular connection at that point between the membranes and the cortical substance. The right cerebral hemisphere was less hurt by the gummatous ulceration not extending beyond the margin of the great longitudinal fissure. The cerebral tissue, uniformly indurated, approached a lardaceous consistency. The left hemisphere seemed as though swollen, with a noticeable bulging of the base of the middle lobe, the anterior perforated space and the peduncle of the brain. Just behind the optic chiasma there was a mass, about the size of a robin's egg, and stretching over the outside of it was the left optic nerve, which was torn. Whether this tumour affected the sight of the patient before his death I did not know.

The ulcerated tissue of the dura mater consisted principally in connective fibres and nuclei, more abundant in the gelatinous-looking soft parts. With these elements there were large irregular corpuscles containing fine granulations, and sometimes a round nucleus; some of these corpuscles shrivelled, keeping their nucleus, were attenuated and elongated like a fibro-cell, and had the characters of lymph corpuscles in a retrograde state. In addition, a finely granular, semi-transparent, amorphous matter abounded, mixed with brilliant fatty molecules and elastic fibres. The capillaries were rare, and in a transparent granular condition.

The structure of the cerebral tissue in the circumscribed ulceration, varied from that of the rest of the organ. The adventitious growth nearly deprived of vessels, formed the centre of a thick capillary network in the pia mater. No capillary congestion of the brain; brain substance firm, elastic and pellucid after section. The yellow, cheesy portions of the ulcer had a structure quite similar to that of the dura-mater, but with more fatty elements. The soft, central parts, circumscribed by a denser structure of a yellow colour, abounded in nuclei, and thick meshes of connective fibres, intermingled with fatty molecules, large fatty globules, and a considerable quantity of corpora amylacea. On approaching the apparently sound cerebral tissue, the neuroglia increased in nuclei, always mixed with a semi-transparent amorphous matter, and considerable proportion of corpora amylacea, fatty granulations, and scattered fragments of nerve-fibres and mye-

line. The fatty elements were not, however, uniformly distributed, and were more multiplied in the mass behind the optic chiasma. Different sections of the medulla manifested the same sclerosis, coincident with dilatation of the capillary vessels, granular, and surrounded by heaps of fatty molecules. These varicosities would be discovered likewise in many capillaries around the cerebral ulceration. The increased amyloid corpuscles and nuclei of connective tissue caused the elastic lardaceous appearance of the cerebral tissue. In the medulla the degeneration was strongly marked in the vicinity of the restiform bodies, and in the corpora olivaria. The cells in these latter had lost their fatty aspect, becoming dark and granular.

The foregoing example of cerebral syphilis, in its last stages, shows a gummatous internal pachymeningitis extending to the adjacent cortical substance, together with a general sclerosis of the brain tissue, less advanced in the right than in the left hemisphere, both being, however, much increased in size. Virchow draws a distinction between the internal pachymeningitis and the external, affecting the periosteal layer of the dura mater, and commonly attended with erosions, atrophy, exostosis, and caries or necrosis of the inner table of the skull. This division is more pathological than clinical, for in every case, including the one just related, in which the periosteal layer of the dura mater was firmly adherent to depressions in the inner table of the parietal bones, the two kinds of pachymeningitis invariably accompany each other, the predominance, not of a range of symptoms, but of certain cadaveric lesions being their only distinctive characteristics. Furthermore, and in confirmation of this statement, when, contrary to the present instance, the osseous lesions predominate, the meningeal layer of the dura mater becomes also thickened, and the seat of a subacute inflammation spreading to the meninges and the brain, this latter and its coverings being then, as in the other kind of cases, intimately united to one another. Nor do I, finally, know of any positive sign enabling us to discriminate when local pains in the cranium, accompanied by sensory or motor disorders, proceed from external or from internal pachymeningitis, and not from partial arachnitis or a gumma in the cortex of the hemispheres.

I have met with instances of syphilitic epilepsy among intemperate subjects, in which existed throughout the brain a marked hypertrophy of connective elements with a considerable but less uniform hyperplasia, similar to that causing the enlargement of the hemispheres in the case just described.

Identical hyperplasia must have occurred in the example reported by Virchow,* of a prostitute who, shortly after being seized with singular nervous symptoms, died with acute hypertrophy of the brain; but this opinion, as it seems from the brief account of the case, was only based on the naked-eye cerebral appearances.

I have not pretended to describe in detail the morbid anatomy of cerebral syphilis, when mentioning the histological changes met with in syphilitic epilepsy, and which do not differ from those observed in other nervous affections of the same specific nature. To sum up, syphilis of the nervous centres determines either inflammation or thickening of the membranes, or myelitis, and, not seldom, systematic sclerosis in the spinal cord; whereas, in the brain, vascular and interstitial morbid changes predominate, more or less diffused throughout the organ, when not consecutively affected by initial lesions in the membranes or cranial bones. The arterial sclerous and gummatous degenerations determine an impediment to the flow of blood, producing cerebral infarctus and local ischæmia, while the syphilitic inflammation of the cerebral membranes may give rise to pachymeningitis, partial arachnitis, or meningeal sclerosis, with proliferation of connective elements that also characterizes the syphilitic neoplasms of the encephalic tissue, ending in retrogressive or fatty degeneration, or in ulceration from necrobiosis upon the local ischæmia, due to narrowing and to thrombosis, obliterating in different parts, the arterial vessels.

Syphilitic epilepsy does not explode, as most writers state, in the midst of apparent good health. Violent pain on the parietal or frontal regions, and, generally, spreading all over the head, precede, very often for weeks and months, the accession of the first fit, to continue thereafter equally relentless. A præcordial distress or pain, of a decidedly paroxysmal form, with a dizzy or vertiginous feeling, of short duration, accompany often the cephalalgia. In repeating the patients' own expressions of præcordial "pain," I do not mean thereby the osteocopic pains in the sternum, observed in the later stages of syphilis, but those paroxysmal seizures suddenly causing an uneasy sensation in the præcordial region, with momentary shortness of breath, and neither excruciating nor persistent like the cephalic pains. These latter show little

* "La Syphilis Constitutionnelle." Trans. by P. Picard. Paris, 1860, p. 84.

remission and as much intensity in the day time as at night, although ordinarily there is a greater nocturnal exacerbation. The importance of this symptom has been particularly pointed out by Buzzard and Charcot, who assigns to the extreme violence of the syphilitic cephalalgia its diagnostic distinction from the similar circumscribed pain in the head that may exist with the various kinds of partial epilepsy.

I find noted among the antecedent phenomena of the first attack in the 118 patients here considered:

Cephalalgia, in 45 males and 38 females, or 83 patients, amounting to 70·33 per cent. of the whole cases.

Præcordial pain in 27 males and 32 females, making 59 patients, or just 50 per cent. of the whole cases.

Of the 83 patients with cephalalgia, 10 males and 16 females experienced the pain in the parietal regions; in 19 cases, 11 males and 8 females, the pain was principally located in the temples, or supra-orbital regions; and in the occipital region in 16 cases, 9 males and 7 females. In the remaining 22 cases, the pain spread all over the head; and the same happened in most of the cases, when the intensity of the cephalalgia reached its maximum.

Although violent cephalalgia anteceded the beginning of the epileptic attacks, these generally did not explode when the pain was in its greatest intensity, but, on the contrary, at a moment of remission, and often when the patient had appeared very somnolent. And, notwithstanding the exacerbation of osteocopic pains at night, the same peculiarity was observed in connection with the nocturnal fits supervening during the sleep of the patient.

Cephalalgia has been one of the most prominent symptoms throughout the progress of the epileptic malady in every case; but as it did not then acquire any different aspect from that it exhibited during the premonitory stage, I shall end here its description. Charcot thinks that the crossed disposition of the parietal pain and the convulsions in a certain number of cases of syphilitic epilepsy, is worthy of attention, since it points out to a connection with the motor zone, which is the only region in the cerebral cortex capable of producing upon its irritation convulsions on the opposite side of the body.* It is undoubtedly true that the parietal pain appears distinctly noticed in several of the recorded cases of partial epilepsy, whether syphilitic or otherwise; but the

* "Leçons sur les Maladies du Système Nerveux." Paris, 1877. Tome ii., Deuxième Edition, p. 357.

distinction drawn by Charcot is too precise, and neither upheld by a close analysis of clinical facts, nor by experimental Physiology, nor, lastly, by his own observations. Dalton, Carville, Duret, and more recently Bochefontaine, have shown that mechanical or electrical irritation of the dura mater produces contractions of the face and limbs on the same side of the irritation, and, if the stimulation is very powerful, of both sides of the face and the four limbs. In addition, Ferrier has demonstrated that "Epileptic convulsions can be produced with quite as great readiness by application of the irritation to the sensory areas as to the motor centres. In some cases it would seem as if convulsions of a more general nature can be so excited. And it would appear as if in such cases the loss of consciousness occurs more early in the train of symptoms."* Bearing these facts in view, and the frequent injury of the dura mater in syphilitic epilepsy, no surprise need be felt at the changeable relation actually manifested between the site of the most intense pain, or of the cerebral lesion beyond the area of the motor zone, and the convulsions. Pachymeningitis may, therefore, induce simultaneous convulsions, at first limited to regions of the face and the limbs on the same side, to extend afterwards to the two sides. In like manner, gummatous lesions involving the cortex in the occipital, temporo-sphenoidal, and frontal regions are, in the aggregate, accompanied by convulsions in a number of cases, according to my experience, superior to those in which the motor districts bordering the fissure of Rolando are involved. In 21 autopsies of syphilitic epilepsy the cerebral lesion was located as follows—general, throughout the brain, in 8 cases; the motor zone, 4 cases; temporo-sphenoidal region, 2 cases; occipital region, 3 cases; base of the skull, 4 cases. In 10 of these cases there was atheromatous, or sclerous degeneration of the arteries, twice with aneurisms of the right Sylvian artery, and once of the basilar. In the remaining cases the lesions consisted in gummy tumours on the cortex or in the substance of the hemispheres and ganglionic centres, or in cerebral sclerosis. These instances find their explanation, as given by Ferrier, in the production of convulsions with quite as great readiness by application of the irritation to the sensory areas as to the motor centres. There are yet several cases of epilepsy in which no cerebral lesion can be detected, the medulla and

* "Pathological Illustrations of Brain Function." West Riding Lunatic Asylum Medical Reports. Vol. iv., 1874, p. 50.

sympathetic being then, as I have pointed out, only affected. Their pathogeny is fully accounted for by the essential part which the medulla and sympathetic take in the production of epilepsy, without ascribing it primarily to the cerebral cortex, which acts when irritated, not in an autonomous manner, but by means of a reflex action exerted through the motor centres at the base of the brain and the medulla. On the ground of these assumptions, the latter instances present no singularity, and, whether the explanation be or be not correct, the existence of such examples entirely opposed to the theory of the epileptic zone, exclusively located in the motor centres of the cerebral cortex, is strongly corroborated by Charcot himself and Pitres, who emphatically assert:—"Several cases observed during this year (1878) at the Salpétrière, and which will be soon published, have demonstated to us that the most characteristic symptoms of partial epilepsy may have existed, and have even persisted for several years, without any lesion whatever being detected by our actual means of investigation."*

This explicit and authorised declaration, founded on accurate clinical and pathological inquiries, needs no comment. Let us now see what was the connection between the side of the convulsions and the cephalic pain in the 26 patients with parietal cephalalgia. Eight had the convulsions on the same side of the pain, 11 on the opposite side, and 7 in all the limbs. Two males with pain in the supraorbital region had convulsions on the same side of the pain, 4 other patients on the opposite side, and in 13 others the convulsions were general. Finally, 5 patients with occipital pain had unilateral convulsions. These results, besides the autopsies above cited, do not countenance Charcot's supposition, prompted perhaps by too great an extension of Ferrier's recent discoveries.

A large number of subjects exhibit, prior to their first attack, the aspect of the diathesis, "a muddy pallor and dazed expression," prominently and very properly noted by Buzzard among the pathognomonic signs of neuro-syphilis. This earthy tinge renders itself more conspicuous during the progress of the epileptic malady, and may be extremely marked, with comparatively little amount of other cachectic signs. I have noted it in 42 of the 65 males, while it appeared in 48 of

* "Nouvelle Contribution à l'etude des Localisations Motrices dans l'Ecorce des Hemispheres du Cerveau." "Revue Mensuelle de Médecine et de Chirurgie." Novembre, 1878, p. 814.

the 53 females, 18 of the former and 26 of the latter showing a very dry earthy pallor, without affections in the cutaneous surface to reveal the specfic nature of their malady.

Mental and moral disturbances are more apt, perhaps, than any other premonitory phenomena of syphilitic epilepsy to mislead us, not only as to their specific source, but also as to the impending explosion of the fits. The sudden moral change, or the depression and mental feebleness, as well as the uncontrollable impulses, all precursors of the threatening paroxysm, are often looked upon either as strange eccentricities, or as consequences of the gastric disturbances no less obvious at this stage, particularly if no well-marked constitutional accidents, enduring for a short time, have passed unnoticed by the patient, or if the fits explode during the relapse of syphilis. In cases affording so indefinite data, the criterion to recognise the specific nature of the epilepsy is the singular evolution and disjointed series of paralytic symptoms engrafted on it, and, above all, the beneficial effects of the specific treatment, which gives additional proof of the correctness of the diagnosis.

The question whether epilepsy or insanity might be developed without concomitant constitutional accidents perceivable by the eye—or, more correctly, the relation borne by syphilis to the above affections—is a subject which, after being at first much doubted or denied, has come to the opposite extreme of regarding syphilis among the common causes of epilepsy and certain forms of insanity. Leaving these latter out of discussion, it is notorious that convulsive disorders, the result of syphilis, may occur without sufficient evidence of constitutional accidents to demonstrate their specific nature; but the fact, so far as my experience goes, is infrequent. Should it exist, the peculiar character and unconnected grouping of the paralytic symptoms that usually accompany abrupt convulsive seizure are distinctive features, seldom clustered on any ordinary variety of epilepsy. Furthermore, although syphilitic nervous affections may occur at a very remote period from the date of infection, I have not seen this anomalous neuro-syphilis, if we may so call it, developed at a later period than four years after the undoubted existence of the infecting chancre with consecutive swelling of the inguinal glands, which remained—very often together with the cervical—still enlarged at the irruption of the epileptic malady, not seldom betrayed also by copper-tinted blotches in the skin. But, I must notice that, in all

such instances no anti-syphilitic treatment had ever been followed by the patients, for a proper treatment insufficiently prolonged may bring about the complete disappearance of the constitutional accidents without averting the liability of the patient to be suddenly seized with syphilitic epilepsy, or other nervous disorder, several years after his apparent recovery from syphilis. This class of cases is the commonest, and, without referring to the fact, Charcot describes a very typical example in his lecture on "Partial or Hemiplegic Syphilitic Epilepsy."* It would be easy to demonstrate that several of the examples of neuro-syphilis, and principally of epilepsy, classed under the above anomalous category, are altogether spurious, for they neither exhibit the acknowledged generic features, nor the plain previous existence of syphilis, freely attributed as their source. Not only do we find in genuine syphilitic epilepsy, when closely investigated, real antecedents of syphilis, but also such association of symptoms as belong to their specific origin, and distinguishing them from those of another nature; indeed, the diagnosis is then less difficult than in those hybrid forms, when syphilis and some other agency, such as alcoholism, traumatic injury to the head, lead poisoning, &c., exist in an apparent pathogenetic relationship, that renders it embarrassing to decide the part corresponding to each in the causation of the epileptic malady.

Vertigo, mental depression, and feebleness, with weariness, loss of memory, and a great apathy or disinclination to intellectual work, were symptoms displayed for several weeks, and even months, before the first epileptic paroxysm. Such intellectual disturbances seemed prevalent among patients free from cutaneous constitutional accidents, but who suffered from sore throat, with articular pains, sleeplessness, and very distressing cephalalgia, side by side with an unnatural change in their moral disposition. In females, the premonitory nervous disorders chiefly affected a sensory character much less noted in males. These symptoms have been—rush of blood to the head, coldness and shivering of the extremities, periodical fever, simulating ague; epigastric pain; nausea, with choking sensation in the throat; suppression of breath, with dizziness and singing in the ears; and queer, vague peripheral feelings, in addition to change of character and great irritability.

* Op. cit., Tome ii., p. 346.

Both males and females frequently complained of sleeplessness and obstinate dyspeptic troubles, besides the phenomena just described. Mental confusion or depression, loss of memory, apathy, and change of character, appear noted as premonitory symptoms in 76 cases; 54 males and 42 females; sleeplessness in 43 males and 38 females; and dyspeptic trouble in 46 male and 49 females.

The pathogenetic influences capable of hastening the development of syphilitic epilepsy extend over a wide range, but I shall only refer to those met with in the present cases—namely, an inherited neurotic predisposition, inherited syphilis, alcoholism, traumatic injuries to the head, lead poisoning, and debilitating organic general changes.

That individuals with an inherited neurotic temperament should be in a favourable state to manifest its morbid consequences upon the supervention of the least cause susceptible of operating upon the nervous system is a fact too evident to need demonstration. Such predisposition existed among these patients in three males and one female. The first male, the offspring of an insane mother, had an insane sister; the second had a mother epileptic, who died in convulsions; and the father of the third was an intemperate lunatic, with a sister epileptic. The female's mother and maternal grandmother were insane.

Two of the males, as before noted, became epileptic while affected with secondary syphilis, and a third committed suicide. The remaining male and the female were also prematurely affected, the former ten months, and the latter seven: after infection—tertiary accidents, syphilitic psoriasis, choroiditis, ulcers in the tonsils, condylomatous patches on the tongue, and periostitis, being in both instances plainly developed.

Inherited syphilis has engaged the attention of several competent observers, although the proportion of general nervous disorders which are its outgrowth is yet in great part based on vague conjecture, or on dubious and inconclusive evidence. I cannot discuss now this important point, but confining myself to epilepsy entailed on inherited syphilis, I may assert that I have never seen it appearing after the age of adolescence, and in all instances, whether the fits began in early childhood—as they usually do—or later, the patients suffered in first infancy from specific affections, leaving indelible marks of their existence. Looking at the prevalence of syphilis, one would expect to meet with a large number of

inherited nervous maladies as the effect of its pernicious influence, when we come to inquire into the individuals with unmistakable proofs of the heredito-syphilitic diathesis; but such is not the case.

Thus Hutchinson, in his most valuable and practical work, "On Certain Diseases of the Eye and Ear consequent on Inherited Syphilis," refers to 162 patients with iritis, interstitial keratitis, inflammation of the choroid and retina, amaurosis, deafness, &c., due to inherited venereal taint, and among them there are—

1. Male, aged 19, with double keratitis and epileptic fits, which began at the age of eleven. (Case XCIX., p. 104.)
2. Half-idiot boy, with almost total blindness and white atrophy of the optic nerves. Head large and mis-shapen. Subject to convulsive fits while teething. (Case II., p. 164.)
3. Female, aged 21 months. Iritis, with occlusion of both pupils and entire loss of sight. Hydrocephalic. Had fits while teething. (Case VI., p. 197.)
4. Female, aged 8. Abscess in lachrymal sac. Bygone keratitis. Partial paralysis of right arm. (Case IX., p. 191.)
5. Female, aged 8. Keratitis of right eye. Hydrocephalic and idiotic. (Case LXXVIII., p. 89.)
6. Female, aged 4. Suppuration of lachrymal sac. Hydrocephalus. (Case VIII., p. 190.)

Therefore, out of 162 patients with inherited syphilis only one was epileptic; two others, of whom one was half idiotic, had suffered from convulsive fits while teething; and two more were hydrocephalic, one of them idiotic. Carrying the examination into the family history, noted in the majority of cases, it is further remarked that among those patients free from nervous diseases only one had a living brother liable to fits. The mother of another lost five children, in infancy, of fits; while a female with chronic keratitis and suspicious indications of inherited syphilis, and whose sister was also subject to inflammation of the eyes, had an only child, who, like the brother of another patient, died of convulsions in early infancy. One boy and one girl had, the former a younger sister with convergent squint and oscillations of the eye, and the latter two brothers with strabismus. Finally, one of the brothers, in two other cases, died respectively from brain disease and "water on the brain." In most cases, apart from those just quoted, the patients were not the only victims of the specific disease afflicting their parents, for

when neither still-born nor dying in their first infancy, some of, and often all, the other offspring manifested also evidences of inherited syphilitic taint.

In the interesting "Gulstonian Lectures on Epilepsy," recently delivered by Dr. Gowers, in dealing with the subject of the causation of the disease as evinced in a series of 1,450 cases, he states, in reference to the predisposition of epilepsy by any other morbid heredity than that indicated by the occurrence of its own allies, that "in eight cases the patients were the subjects of well-marked inherited syphilis. In all these cases the attacks had the aspect of idiopathic epilepsy, cases in which there were symptoms suggestive of local brain disease being excluded. In only two of these cases did the attacks begin in infancy. In all the others they commenced towards the end of or after childhood." *

If I lay before the reader these self-speaking forcible data, it is to show that to no exceptional occurrence, or imperfect inquiries, could be attributed the meagre number of seven cases of epilepsy from inherited syphilis I have discovered among 618 patients whose etiology was well known; and, all source of error inherent to the complex subject of morbid heredity was in these instances avoided, since the testimony afforded by the patient's family history was corroborated by the existence of the unmistakable special signs of hereditosyphilitic disease established by Hutchison. I have excluded a few cases from the preceding number because the inherited taint was only presumptive, the parents of the patients admitting their great exposure to the risks of syphilis, without positive primary or constitutional accidents at any time, and, above all, because, nor in infancy or later, the patients themselves suffered even from vanishing symptoms that could have been referable to syphilis, in addition to the absolute absence of any physiognomical, dental, or other peculiarity to indicate that the epileptic disease was remotely dependent upon inherited syphilis.

The following is a summary of the seven cases with epilepsy, due to congenital syphilis:—

CASE VII.—Girl, aged 16. Seized with nocturnal fits at the age of 13, on the establishment of menstruation. She has in the day time frequent attacks of *petit mal*, with slight twitchings of the eyelids. Intellectual faculties deficient. She is well developed, but has a very pale earthy complexion, and a marked asymmetry of the face,

* "The Lancet," No. ix., Vol. i, 1880, p. 316.

with protuberant forehead. Her lips are fissured, the palate V shapen, and the teeth stumpy and notchy. This girl's father died with tertiary syphilis, and her two elder brothers, in infancy, from convulsions. She died after a series of nocturnal fits.

Case VIII.—Boy, aged 10. Epileptic, with diurnal fits since the age of 7. Suffered in early infancy from sore mouth, and eruptions over the body. Had interstitial keratitis of left eye, causing slight opaqueness of the cornea. Upper incisors notched and peggy. Is well grown and robust, but his intelligence very low. Mother had syphilis during pregnancy, and has lost two other children a few weeks after birth, both with an eruption over the whole body.

Case IX.—Imbecile boy, aged 14. Epileptic since the age of 5, with *petit mal* and *grand mal*. Has large scars of suppurated glands in the neck. Mouth puckered by fissures; upper incisors very small and notched; head large, with very prominent forehead. Suffered in infancy from otorrhœa, and is very deaf. Though unsteady in his gait, he shows no paralysis, nor arrested development in any of the limbs; and his complexion has a dirty yellowish tinge. The father was severely affected with constitutional syphilis.

Case X.—Girl, aged 13; epileptic, with diurnal fits since the age of 4. Well grown and robust. Head large and asymmetric; bridge of the nose flattened. Upper incisors peggy and serrated at their extremities. Intelligence low. The father suffered from constitutional syphilis, but got well before marriage. Has had three children, two stillborn and the patient.

Case XI.—Girl, aged 15. Epileptic since infancy, with diurnal and nocturnal fits. Imbecile and very impulsive, with ophthalmia and double otorrhœa. The teeth, of a very dark colour, were very peggy, and stood apart. History of parents unknown.

Case XII.—Boy, aged 7. Epileptic since infancy, with diurnal fits. Head very asymmetric; right arm paralyzed and contracted; but is strong and well developed for his age. Right eye hazy from keratitis when three years old. Upper incisors very irregular and serrated. The mother miscarried several times; the patient is the only child born alive; but was very delicate in infancy, and his father died consumptive, with ulcers in the legs and throat.

Case XIII.—Boy, aged 11; idiotic and epileptic since infancy, with frequent diurnal fits. Face flat and broad lips, with several fissures. Teeth very irregular and stumpy. Enlarged glands of the neck. Psoriasis on the thigh. Hardly able to speak, and extremely mischievous. His father, very intemperate, died with tertiary syphilis. The patient and a very puny young sister, with sore eyes, are, according to the mother's statement, her only living children, five others having been stillborn.

Case XIV.—Idiotic girl, aged 9, with diurnal fits since she was teething. She has a coarse skin, with a dry, dirty yellowish tinge, and is well grown and rather robust. Head large, broad nose, and

fissures at the angle of the mouth. The upper incisors, just showing, are dwarfed and notched, with wide interspaces. Her mother has two other very delicate living children, and has had two still-births. The husband had been affected with syphilis, but underwent a treatment, he thought complete, before marriage.

A glance at the preceding cases shows their two most striking peculiarities: namely, the onset of epilepsy in childhood, and the full growth and even robustness of most of the patients, which indicates that, though capable of deeply injuring the nervous system, heredito-syphilis does not necessarily arrest development. Nor did severe affections of the skin or mucous membranes in early infancy, exist in any of the seven patients. This fact fully agrees with Hutchinson's remarks:—"That heredito-syphilis does not always impede development is not unfrequently seen to be illustrated in patients between fifteen and twenty, who are in every respect well grown. Whenever, however, the infantile symptoms have been extensive and severe the growth is impeded, and often in a very remarkable manner." *

Intemperance and traumatic injuries to the head, associated with syphilis, favour in the highest degree the development of epilepsy in its worst forms, without any prolonged period of incubation. That intemperance alone, without being carried to actual drunkenness, most efficiently helps forward the potency of syphilis to undermine the nervous system, is obviously manifested by several of the cases under consideration. Perhaps the reverse has taken place; but be this as it may, it is nevertheless a fact that epilepsy often occurs as the outgrowth of conjoined syphilis and alcoholism.

Intemperance was noted in 39 males and 28 females, or 67 of the whole 118 cases, and it appeared associated with traumatisms to the skull in four males and one female. Frequent maniacal paroxysms were displayed by patients with traumatisms to the head, whereas those of intemperate antecedents usually exhibited, on the contrary, dullness and abasement with constant insanity.

Eight of the whole patients—five males and three females—had also received a traumatic injury to the head. Two males had a fracture of the left parietal bone, as they suffered from constitutional syphilis; on the remaining cases the injury to the skull happened prior to the primary syphilis.

* Op. cit., p. 214.

Three males and one female, after the attacks had lasted some time, became hemiplegic, with contraction of the arm and hand. In the female, the fits were preceded by a cold sensation, without any spasm, starting from the left great toe to spread up the leg to the trunk, and, without going to the head, descended through the arm to the hand, before consciousness was lost with convulsions chiefly unilateral. She had met with a severe fall on the head, and became epileptic immediately thereafter; but there was no fracture of the skull. She died comatose after several fits. The dura mater in the anterior part of the base of the skull, about the *sella turcica* on the right side, was considerably changed by a diffuse gummatous swelling. The anterior temporal artery, and most of the other branches of the right posterior cerebral artery were extensively altered by sclerous and atheromatous degeneration. The cortex over the gyrus uncinate and the inferior temporal convolution was destroyed by a gummy deposit. A yellow, transparent gelatinous and fibro-caseous mass, the size of a large bean, was also found at the anterior part of the right internal capsule.

One male had the left arm in permanent flexion, with contraction of the fingers, which were very sensitive. Any attempt to stretch them induced *trepidation* of the whole arm, and often a convulsive fit, which, singularly enough, was usually initiated by trembling of the right arm and leg, with involuntary passage of urine. He had a fracture with depression in the right temporo parietal region.

All these patients were maniacal and very dangerous, as illustrated in this case.

Case XV.—A sailor, aged 38, received a severe blow on the head, which made him senseless, producing a depression of the left parietal bone near its anterior lower angle. He soon recovered from the effects of the blow, although showing mental confusion and inability to express himself. At the time of the accident he had a scar of a deep chancre in the glans, with enlargement of the glands in the groin, sores on the tongue and corners of the mouth, a serpiginous ulcer over the left forearm, and a rash over the thighs and scrotum. Five days after the blow, he was seized by the first nocturnal attack, or rather, by three successive fits in the middle of the night, which left him very stupid and sullen, with the right arm paralyzed and contracted. The fits kept in the beginning their nocturnal character, but subsequently they also occurred in the daytime, commencing with shaking of the paralyzed arm, and drawing of the mouth and twitchings of the eyelids in the right side. This patient was subject to the most violent

maniacal paroxysms during the intervals of his fits, and would attack his attendants without any provocation. He improved considerably under the specific treatment, but left the hospital still subject to nocturnal fits, in great fear of being trephined.

Slow lead poisoning acted in conjunction with syphilis to produce epilepsy in two males, who quickly recovered. The first had one attack of colica pictonum, from which he got well under treatment, but soon followed by pain in the joints, and stiffness of the hands, when he became affected with gonorrhœa and a chancre, with enlarged inguinal glands. Four months later, while the preceding symptoms were still present, he had a syphilitic rash over the face, trunk, and arms, ulcers in the tonsils, and cellular indurations in the legs, with most violent cephalalgia. He was then seized with diurnal fits. The second patient had suffered from several attacks of lead colic, when the chancre and painless bubo appeared, followed by a rash in the thighs and scrotum, and, seven months after, by epididymitis, patches and fissures in the tongue, psoriasis palmaris, intense occipital cephalalgia, with articular pains and jerkings in the legs, which had existed prior to the development of the constitutional accidents. The first fit occurred early in the morning, succeeded by three others the same day, accompanied with profound coma and temporary paralysis of the left arm.

The gums displayed in both instances a characteristic blue line, and the patients became very agitated before the outburst of the fits, with bilateral convulsions of a tonic nature and complete loss of consciousness. The patients were seized between the attacks by a sudden jerk of the body, as though they had received an electrical shock. This phenomenon is altogether different from the general convulsive movements of flexion and extension, without loss of consciousness, often observed after fits of a saturnine character, and I have pretty constantly noticed it in epilepsy from lead poisoning. The first patient remained excitedly talking to himself, very much troubled by hallucinations of sight, of the strangest character, after the fits, which, as well as the other symptoms, yielded to a treatment with the binioduret of mercury, iodide of potassium, and sulphur baths.

Reference has been made to a patient who during the convalescence of yellow fever, and while exhibiting secondary symptoms of syphilis, was seized with epilepsy, favoured in its development by the enfeebled condition of the organism.

Similar in nature were three other cases, among males, very much debilitated by ague, when affected with the constitutional accidents, and who thereupon became epileptic. Finally, in a female, protracted lactation was the weakening cause, joined to syphilis in its tertiary stages, for the production of epilepsy, soon followed by furious mania. The child of this woman, whose husband was very intemperate, died of fits at the age of twenty-six months, with hydrocephalus, extremely emaciated and with an eruption over the body.

There is no difference between the fits of syphilitic epilepsy and those acknowledging other etiology. Ivaren and most French authors state that syphilitic epilepsy is generally nocturnal; but the assertion is not sustained by the analysis of these 118 cases, for only 7 patients—2 males and 5 females—had fits nocturnal from the beginning, and which continued so thereafter. It should be, however, noticed that in 21 patients—9 males and 12 females—the convulsions at first diurnal, occurred subsequently by both day and night, but with the diurnal character most preponderant, for which reason, I have never regarded them as nocturnal fits.

In 7 males and 13 females, the fits repeated at a fixed hour, always during the evening, excepting in one female, whose fits recurred daily, at nine o'clock in the morning, and she had secondary syphilis. The largest number of patients—31 males and 18 females—were seized with the first and most of the subsequent fits in the evening; and 17 males and 10 females, early in the morning on getting up. In 19 males and 23 females, the malady began with several successive fits. Finally, 6 males and 8 females, had the first attack at night, but all the following exclusively on arising in the morning.

If we now pass to the nature of the fits in the whole cases, we find that—

5 males and 7 females had *petit mal* alone.
31 males and 17 females, *grand mal* alone.
27 males and 24 females, *petit mal* and *grand mal.*
2 males and 5 females nocturnal attacks.

Fournier says that, *petit mal*, vertigo, sudden irresistible impulses, and cerebral accidents generally, are infinitely rare, if not altogether absent, in *secondary* epilepsy; but I have not so observed it. Of the 16 patients with secondary syphilis six had *petit mal* and *grand mal*, whereas nine exhibited also vertigo, and such cerebral disorders, as already evinced in Cases I and II.

In regard to the age at the beginning of the fits, we have seen that in the four patients with an inherited neurotic predisposition epilepsy began in two of the males at 20, in the third at 19, and in the female at 17, *i.e.*, at the age of puberty.

In the seven cases with heredito-syphilis, the males were seized with epilepsy between infancy and the age of 7, and the females between infancy and the age of 13. This development of the fits during childhood agrees with that shown by the cases of Hutchinson and Gowers.

The 16 patients with epilepsy and secondary syphilis—4 males and 12 females—were of ages ranging from 19 to 31 with the males, and from 21 to 28 with the females. But one of the males, aged 19, belonged also to the category of patients with an inherited neurotic temperament. The remaining 54 males and 37 females became epileptic at ages varying with the former, from 27 to 53 years, and with the latter from 28 to 47 years. To sum up, in cases of inherited neurotic predisposition, or syphilitic taint, epilepsy was developed during childhood, or in the prime of puberty; in cases of secondary syphilis, at ages varying from 19 to 30 years; and in cases of tertiary syphilis, from 27 to 53.

Fournier attaches considerable diagnostic value to the age of the first appearance of epilepsy due to syphilis. Should the initial fit—he asserts—happen at an adult or mature age of 30, 35, 40, or 45 years, it precludes the existence of genuine or essential epilepsy, for this never delays its first accession until adult or mature age, it being an extraordinary or unheard of fact that such kind of fits should commence at the age of thirty or forty years. Therefore, under these circumstances, in nine out of ten cases, when the patient has enjoyed apparently good health prior to the first seizure, the probabilities are that the epilepsy arises from a syphilitic source.*

My enquiries do not confirm these absolute views of the distinguished French syphilographer. The foregoing analysis shows that 21 per cent. of the whole cases with a neurotic predisposition, or congenital syphilis, had their seizures at ages under 20, and, consequently, before complete manhood. But a more extensive series of 618 cases, of all kinds, in which the etiology was well known, manifests that, exclusive of the syphilitic patients here reckoned, there were 164, or 26·5 per cent. of the whole patients, who became affected with

* "De l'Epilepsie Syphilitique Tertiaire." Paris, 1860, pp. 4 and 15.

epilepsy after the age of 25 years, from various exciting causes other than syphilis. These results are fully corroborated by those of Gowers, who in regard to the influence of age on the occurrence of epilepsy in 1,450 cases states that—"Just three-quarters (75 per cent.) of the cases commenced under twenty years;" and this calculation is also exclusive of syphilitic cases, as distinctly established by the further assertion that—"No facts which have come under my notice suggest that acquired syphilis is a cause of idiopathic epilepsy."* I confess that this result is rather remarkable, since nothing indicates that Gowers has any reason to exclude syphilis from the general organic or traumatic influences capable of causing the disease, inasmuch as he takes into account blows and falls on the head, chronic alcoholism, lead poisoning, scarlet fever, &c., which operate entirely like syphilis in producing epilepsy.

The age of the patient as a point of diagnosis in syphilitic nervous affections has all the absolute importance attached to it by Fournier, if instead of epilepsy we refer especially to hemiplegia, for then, it may be stated with little hesitation, as Buzzard very properly says—"That, putting aside cases of injury, hemiplegia, or paraplegia occurring in a person between twenty and forty-five years of age, which is not associated with Bright's disease, nor due to embolism (from disease of the cardiac valves), is, in at least nineteen cases out of twenty, the result of syphilis."†

A comparative study of the statistics published by various authors, and my own researches, demonstrates that the invasion of epilepsy gradually increases up to adult age, to decrease thereafter, in equally rapid proportion in the two sexes. The proportion in adult age does not fall off in any remarkable degree from that of adolescence, because it is beyond the age of puberty that intemperance, syphilis, and traumatic injuries to the head concur most efficiently to rise the number, the first-mentioned of these causes contributing, among lower and higher classes, to swell in a considerable manner the total of adults and old subjects affected with epilepsy. But the onset of epilepsy at adult or mature age is by no means almost exclusively dependent on syphilis, as Fournier supposes, because, apart from it, larger etiological shares belong to intemperance and to traumatisms to the

* "Lancet," No. ix., Vol. i., 1880, p. 317, and No. x., p. 355.
† "Clinical Aspects of Syphilitic Nervous Affections." 1874, p. 11.

head, or to the several remaining exciting causes of epilepsy. On thus rating the frequency of the association of syphilis to epilepsy developed at mature age, I do not pretend to deny it, but to demonstrate how very often its sudden accession, after manhood, acknowledges a different etiology from syphilis.

Having already described the symptoms that in several instances indicated the imminence of the epileptic malady, I will now consider those of the attacks. Several of the patients experienced feelings of different kinds as the *aura* of their fits. In 9 males and 6 females a tingling or creeping sensation, accompanied by contraction or twitching in the muscles of the face or neck, indicated the commencement of their attacks. The *aura* started from the limbs in 28 males and 35 females, and its origin is noted as follows:—From the arms, in 9 males (3 from right arm, 6 from left) and 11 females (4 from right arm and 7 from left). From both arms, in 2 males and 3 females. From the arms and face, in 3 males (1 right side, 2 left) and 4 females, all in the left side. From the arms and legs, 5 males (1 right side, 4 left) and 7 females (5 right side and 2 left). From the legs, 3 males (2 right side, 1 left) and 4 females (1 right side, 3 left). Trembling of right limbs with involuntary passage of urine existed in one male.

One female, previously cited, experienced a cold sensation, without any cramp, starting from the left great toe to spread up the leg to the trunk, and, without passing to the head, descend down the arm. Singing in the ears was complained of by 13 males and 17 females. One male felt a very violent pain in the stomach at the approach of the fit. In 3 females the pain was seated twice in the right ovarian region and once in the left, accompanied in the latter instance by shivering of the whole body at the beginning of the attack, which in 1 male was marked by a crawling disagreeable sensation ascending slowly from the right groin to the head.

Another male had a very strange feeling of numbness in the tongue and throat, with twitching of the eyelids and lips. In 1 male and 1 female the *aura* consisted in a choking sensation, with a large amount of flatulence raised from the stomach at the very inception of the fit. Finally, in 1 female the initial symptom was a considerable secretion of thick transparent saliva that dribbled from the mouth.

When the *aura* started from one or both arms, it com-

menced in the forefinger in 3 cases (1 male, 2 females); in the middle finger, 5 cases (2 males, 3 females); in one female in the two last fingers, in another in the little finger; and in all the fingers in 10 cases (4 males and 6 females). In the back of the hand, in 4 cases (3 males, 1 female). In the wrist, in 6 cases (2 males and 4 females). In the forearm, in 3 cases (2 males and 1 female). If the arm and leg were seized, the *aura* began in the whole hand and foot.

When the leg was the seat of the *aura*, it commenced in the great toe in 2 males and 1 female; in all the toes in 1 female; and in the dorsum of the foot in 2 females. In the calf of the leg in 1 male.

Consciousness was not entirely lost during the attack in 8 males and 5 females of those with a motor *aura* starting from the limbs; and, in every case either the arm or leg, or both, remained temporarily paralyzed after the fit. All the other patients had complete loss of consciousness during the fit, and in one female, her attacks of vertiginous *petit mal*, with slight twitching of the lips and eyelids, were followed by unconsciousness lasting for several hours, during which she seemed in a state of somnambulism.

The initial cry was only observed in the male who committed suicide, and in two females—one with inherited syphilis and the other with secondary accidents. Biting of the tongue during the fit occurred in 29 males and 32 females. Involuntary passage of urine, in 17 males and 26 females; not only urine but fœces being also passed, while in the attack, by 3 other males and 2 females.

It is commonly stated that the convulsions in syphilitic epilepsy are seldom bilateral, but I have not observed it so. Thus in 118 patients the convulsions were: equally strong in the four limbs in 23 cases; general, but with greater violence in the limbs of one side, in 53 cases; and decidedly unilateral, or limited to the arm and the head, in 29 cases. In 12 cases, as before noted, there was *petit mal* with slight convulsions in the muscles of the face and in the pupils. Therefore, I should think it more correct to state that: in syphilitic epilepsy, general convulsions, but with greater intensity in one or the two limbs of one side, exist oftener than the unilateral or partial convulsions, no great difference existing as to the frequency of the two latter separately.

Syphilitic epilepsy is commonly attended with hemiplegia, or local paralysis, of a transient or persistent character. This accident displays in its occurrence and relationship to

the other symptoms a sort of disjointed connection, which is a pathognomonic sign of syphilitic paralysis.

Permanent paralysis occurred in 38 males and 26 females. Its incursion took place after the first attack in 11 males and 8 females, and the nature of the paralysis was as follows:—

	M.	F.
Paralysis of third nerve (2 males and 1 female with optic neuritis)	7	4
Paralysis of sixth nerve (1 male with optic neuritis)	3	4
Facial paralysis	3	1
Right hemiplegia	2	
Right hemiplegia and paralysis of third nerve, with optic neuritis		1
Right hemiplegia and facial paralysis	1	
Right hemiplegia, paralysis of third and sixth nerves, with optic neuritis	1	
Right hemiplegia and aphasia (1 male with optic neuritis)	2	1
Left hemiplegia (in 2 males and 1 female with optic neuritis, and in 1 male with contraction of the hand)	5	3
Left hemiplegia, and paralysis of right third nerve, with optic neuritis in all but the female	3	1
Left hemiplegia and facial paralysis	2	1
Paralysis of right arm (in 2 males with aphasia and in 1 with choroiditis)	3	1
Paralysis of right arm and both legs		1
Paralysis of left arm (in 1 male with contraction)	2	3
Paralysis of one leg (in the males of the left, in the female of the right)	2	1
Paraplegia	2	4

In one male both arms were paralyzed with atrophy of all the muscles supplied by the brachial plexus. He had also ptosis and external strabismus, without optic neuritis, on the right side, and violent pain over the right side of the head and face. He displayed no other constitutional symptoms than epidymitis in the left testicle, with enlargement of the inguinal glands, and copper-coloured spots over the body and thighs. This patient, who was also seen by Professor Boeck,

of Christiania, and Dr. F. J. Bumstead, had reported very little benefit from the specific treatment, when I lost sight of him.

Aphasia alone existed in 9 males and 6 females, but in 6 males and 4 females it was of a transient character, lasting only a short time after the fits. Lastly, one of the females had aphonia with dyspnœa, for several hours after her fits.

All the above patients had *grand mal*, excepting three males and two females, who had vertiginous fits of *petit mal*, with slight convulsions in the face. These five cases exhibited monoplegia; in two males the right arm was paralysed, in one with aphasia, and in the other with choroiditis; the third male and the two females presented paralysis of the left arm.

Sight was affected, as already noted, in several of the cases with paralysis; but in 16 males and 10 females, double optic neuritis existed without any paralytic symptoms, and, very often, as it has been particularly pointed out by Hughlings-Jackson, without impairment of vision at the time it was discovered. This condition has been present, not only when the symptoms plainly evinced a syphilitic deposit pressing on the optic nerves, but also when there were no signs of such a cause for the consecutive atrophy of the optic discs. I have already spoken of syphilitic epilepsy with no remarkable external evidences of the diathesis, and it is in these very cases in which we are most likely to meet with optic neuritis associated with pain in the head, and in some instances with paralysis of the third nerve, or of the sixth. I have met with such a condition in 10 males and 7 females, the following being one of those not uncommon instances in which optic neuritis may progress unnoticed, until it reaches its extreme stages with irremediable loss of sight.

Case XVI.—Female, aged 28. Had lost her husband from constitutional syphilis and rapid consumption. Three years after his death, she began to feel pains in the chest, supposed to be rheumatic, and which were soon followed by the most excruciating pain in the head, with vomiting, great dizziness, and hallucinations of sight. She saw balls of fire dropping all the time and bursting into brilliant sparks, or birds entering through the chimney to fly around her room, or the most extravagant and grotesque figures, without exhibiting, however, any mental aberration. She was also seized with vertiginous attacks, in which she would lose consciousness and fall, with slight twitchings in the right arm and oscillations of the eyes. She had no warning of these fits, frequently repeating through the day, and which had been preceded by the above pain in the chest, and imperfect sight in the right eye. She had suffered from leucorrhœa and

sorethroat, but had no exanthem, and the inguinal glands were enlarged.

The patient's condition had become extremely serious when I saw her, on account of the obstinate vomiting and the unremitting violent cephalalgia. Having known the history of the husband's case, I did not hesitate to ascribe the symptoms to syphilis. Ophthalmoscopic examination showed the optic discs covered by a whitish swelling, striated on its margin, the arteries being minute and more conspicuous in the left eye than in the right, where they appeared almost concealed in the ill-defined swelling, which was also whiter than in the other disc. The eyes had a vague look, with the pupils dilated, and sluggish to contract before a light. The patient could not distinguish any letters close to her eyes, and on walking was continually hurting herself against the objects. This made her gait unsteady, but there was no paralysis, nor any trouble of sensibility. A specific treatment, with very large doses of iodide of potassium and mercurial inunctions, arrested the symptoms and the fits, without any improvement in her sight. Nor did hypodermic injections of strychnia around the eyes prove more successful. The specific treatment continued for over two years, has prevented the recurrence of the fits, but the amaurosis is complete, from white atrophy of both optic discs.

Instead of optic neuritis, 7 males and 4 females, exhibited choroiditis and retinitis in conjunction with their fits. All, but one male, recovered perfect sight by the specific treatment. Two of the males and three females had secondary syphilis, and one of the latter presented double iritis. The fourth female, aged 27, pretended to be tainted with inherited syphilis, but without any physiognomical sign thereof. She was subject since infancy to *petit mal*, which continued alone until the age of 20, when the convulsive fits began, preceded by pain in the right side of the body. Her mother was phthisical, and she had ulcers in the throat and at the corners of the mouth, with copper-tinted blotches on the arms and trunk, and severe pains in the temples and vertex. She was also troubled with night-blindness. Ophthalmoscopic examination showed the optic disc in the right eye with indistinct borders, vessels thin, and numerous minute spots of pigmentary retinitis. In the left eye, the nerve appeared very indistinct in outline; patches of exudation above and below it, and along the turgid retinal vessels. Spots of pigmentary retinitis at periphery of fundus. According to Liebreich, idiocy usually accompanies pigmentary retinitis, which is, besides, peculiar to offspring of consanguineous marriage. Neither circumstance was observed in this instance, nor the heredi-

tary taint, admitted by Gräfe as a constant etiological element of the affection.

Mental disorders, as previously asserted, may be the forerunners, but more commonly they are the sequel, of the attacks of syphilitic epilepsy, which may again assume the larvated or mental form. One of the striking singularities of these insane cases, particularly if they arise from syphilis conjointly with alcoholism or traumatic injuries to the head, is the great propensity of the patients to unprovoked violence. In fact, we may distinctly observe among such class of epileptics, the characteristic belonging to all genuine forms of epilepsy, to wit: that the uncontrollable impulses and evil acts, though sudden in their explosion, spring out nevertheless from a pre-existing unsound mental state that does not end on the perpetration of the violent misdeed. Real insanity was noticed in 37 males and 28 females of the whole cases; 8 males and 11 females were melancholic; dementia existed in 29 males and 14 females, of whom 18 males and 7 females exhibited symptoms entirely like general paralysis, and of them, only 7 males and 3 females recovered by the specific treatment. Of the remaining, 2 males died in convulsions, and another male and 1 female from exhaustion, pulmonary tuberculosis having been also developed in the four cases. The other 11 patients, of whom 9 were inveterate drunkards, continued less subject to fits, but depressed and demented. Retraction of the wrists and hands, or of the masseter and sterno-cleido-mastoid, with grinding of the teeth, existed in the majority of cases; few, however, exhibited well-marked quivering of the lips, but in all the patella tendon reflex was very pronounced. In 1 male, the right great toe was frequently drawn up, and the leg seized with *trepidation.*

Paralysis of the third, or sixth nerve, was remarked in 5 males and 2 females. Inequality of the pupils manifested itself in all the patients. Those with melancholic depression often, but not uniformly, presented the right pupil contracted and the left dilated, whereas the reverse similarly occurred in those with maniacal symptoms and elated. These investigations, extending with the same indecisive results over other general paretics, were made to test Austin's assertion on the subject.

General sensibility did not seem much affected in these cases, although in every one there was unsteadiness in walking, diminished grasping power of the hands, and hesitating articulation. The temperature was observed to rise before

the convulsive paroxysms; and, in 1 male and 3 females, there was a periodical fever, of tertian character, which promptly yielded to the antisyphilitic treatment. I should add, that this singular symptom has been further noticed in 2 males and 6 females, which seems to indicate its prevalence among the latter, it being no less worthy of remark that these 8 patients, excepting one male, had secondary syphilis. Lastly, 1 male and 2 females showed a religious monomania; all had the most ravenous appetite, and were very noisy and restless at night; while the impulsive homicidal propensities of those who had been of intemperate habits, rendered them extremely dangerous.

The post-mortem examinations in the four fatal cases, disclosed extensive lesions and disintegration of the arterial capillaries. In two cases the inner layer of the dura mater, over the right parietal lobe, was covered by thick extravasations of blood in different stages of decomposition. In two other instances, there were respectively in the left anterior part of the centrum ovale, near the cortex, and in the cerebellar peduncles, circumscribed gelatinous-looking patches, containing small caseous nodules, in addition to the sclerosed state of the cerebral tissue previously described. As to the nerve cells, they presented a general, fatty, colloid and pigmentary degeneration, the two latter remarkable in the corpora striata and optic thalami. In all the cases the lungs showed tuberculous deposits in different stages. In two instances the liver lardaceous, exhibited several puckered cicatrices of gummata. The kidneys were fatty in three cases, and in one the spleen, very much enlarged and hardened, showed traces of former perisplenitis on its thickened capsules.

Hallucinations of sight and hearing were the most prevalent among the 38 insane patients; but their respective frequency could not be properly estimated on account of their common association. They were generally of a terrifying nature, the patients seeing red, fiery, or bloody objects, or hearing piercing noises and voices threatening and haunting them. In some instances the hallucinations of sight assumed a spiritual and religious character. One of the females thought her food was poisoned, and another complained constantly of a very fœtid smell, and would at times strip off her clothes to rid herself of it.

The total deaths in the whole cases amount to 21—13 males and 8 females. Of the former 5 died from meningitis, in convulsions, 1 committed suicide, 1 died from diarrhœa and exhaustion, 3 from paralytic seizures and coma, and 3 from

pulmonary tuberculosis. The females died—3 from meningitis and convulsions, 1 from double pneumonia, 2 from seizures rendering them paralysed and speechless before falling, like the males, into a comatose condition; and 2 from phthisis.

The result of the treatment was—complete recovery in 21 males and 23 females; 11 males and 5 females had a recurrence of the fits after having variously remained, from eight to fourteen months, without them. In 8 males and 7 females, who were very cachectic, the treatment did not produce any considerable change, and lastly, the final issue of the case was unknown in 13 males and 10 females, who were benefited by the treatment, and lost sight of before being completely cured.

I shall not dwell at any length on the details of treatment. In secondary cases mercury was resorted to, but using it from the beginning in conjunction with the iodide of potassium, as I always practice with cases of neuro-syphilis. In tertiary cases, large doses of iodide of potassium—from thirty grains to as much as two drachms, according to the gravity of the affection, were given three times a day, accompanied by mercurial inunctions, or the use of the calomel bath. I frequently prescribe Gibert's syrup, which contains a mixture of binioduret of mercury and iodide of potassium, very well borne by the stomach and not apt to produce salivation quickly. I administer the iodide of potassium, as generally practised in America, before or with the patient's meals, preferring to all preparations the sugar-coated pills, and generally using the dragées of Foucher, or of Garnier-Lamoureux. Under this form, the salt, as it needs to be, can be taken as food with every meal, free from any bad taste, and the amount required by the patient can also be easily and surely regulated. I do not remember that the symptoms of iodism have been hastened, or have persisted intensified, by the administration, in this way, of the large doses of iodide of potassium required to arrest from the beginning the untoward march of the disease. Such symptoms, on the contrary, diminish and wear off, especially if the patient is kept under a full meat diet, and drinks claret with his meals, which, in addition to fresh air, are important in the treatment.

Finally, trephining has been successfully employed by several English and American surgeons to remove the syphilitic cranial lesions; but in no case of syphilitic epilepsy have I had necessity to recur to this operation, which I should have no hesitation to employ when duly indicated.