once lost is lost irretrievably; and even the more specialised tissues, as muscle and ganglionic nervous matter, are usually replaced by other tissue, not actually restored. These very tissues, it is worth notice, rarely or never appear in new growths. New growth, taken as a whole, has, perhaps, greater possibilities than has the process which constitutes repair—giving rise to more various and more specialised products. On the other hand, the latter process is far more completely subject to the general law of evolution of the whole organism, for the parts reproduced always conform to the size and shape of the whole body; while it is, of course, the most remarkable feature of new growths, that they are so entirely unlimited in these respects. In other respects, the reproduction of lost limbs in some of the lower animals, has a decided analogy to the production of a tumour. Harry Goodsir (*Anatomical and Physiological Observations*, 1845) described, for instance, long ago, the reproduction of a claw in the crustacea, as starting from one nucleated cell, which multiplies and gives rise to other centres of growth. In fact, there is a true cell-proliferation.

With regard to the minute processes of repair, they differ from the corresponding processes in new growth very greatly, in the degree to which the vessels and the blood with its formed elements participate therein. The share taken by vascular changes in ordinary repair is known to be very great; so much so, that it has been the great question with surgeons, whether the healing of wounds is possible without inflammation. In new growth, vascular phenomena seem to play a subordinate part, though perhaps their importance has been underrated. At all events, in order to compare the one with the other, we must leave out of account the vascular changes; and then we find that the residue, or changes in the fixed tissues in repair, bear the closest analogy to new growth, being really, in the early stages, processes of germination and proliferation. These, of course, are also the tissue changes in early stages of inflammation, with which repair is so intimately connected. In describing one, we are, therefore, describing the other. Of course, the extent of these germinative changes is a matter of much controversy; and I am, therefore, glad to be able to show you the results of some direct observations.

As an instance, we may take the changes produced in an extremely simple structure, such as the omentum, by inflammation and by new growth respectively.

It is well known that mechanical injury, heat, and the action of various irritating substances, all give rise to the same series of changes called inflammatory. We may, then, take any one of these as a type of the rest. I have accordingly represented on the diagram the appearance of a human omentum inflamed in consequence of perforation of the bowel. The endothelial cells covering the fibrous trabeculae are seen in several places to give evidence of proliferation; that is to say, one sees divided cells, cells with divided nuclei, groups of cells showing by their shape that they have been formed under mutual pressure, and, therefore, probably from one original mass; and also what look like compound, or mother cells.

These are the evidences of tissue-germination, and agree with the observations of Stricker, Burdon Sanderson, and others, on the cornea. They also resemble the phenomena brought to light by the comprehensive researches of Dr. Klein on the serous cavities of animals in which he has found germinating endothelium. Now, in the early stages of three different new growths—namely, cancer, sarcoma, and tubercle—we see the same or similar proliferative changes, sometimes affecting the endothelium, sometimes the connective tissue. Without now dwelling on other peculiarities of these minute changes, it will be enough to have shown that in the early stages of all these growths there is actual germination of the tissues, and that the same is to be seen in inflammation. The appearances of inflammation in connective tissue are still more like those of certain stages of new growth. The diagram, for instance, representing indifferent cell-proliferation, might equally well stand for one of inflammation. At the same time, I must venture again to lay stress upon the immense preponderance, in the latter process, of phenomena connected with the vessels and blood-corpuscles, which are only subsidiary in the case of new growths. We know, moreover, that even the resemblances are only like the resemblance between all embryonic tissues, for instance; it is a resemblance involving great latent possibilities of difference.

Products of the Reparative Process.—If we pass to the more definite structures produced by the process of repair, we still see a considerable analogy between them and new growths. The repair of many tissues passes through a stage very fairly comparable to what we called the indifferent cell-proliferation of new growths. Granulations are tumours in everything but in permanence. It is unnecessary to describe their structure minutely. Essentially outgrowths of vessels, they possess a framework or stroma which, except in its extreme vascularity, is not unlike that of a lymphatic gland, and to which histologists have not

always done justice; and, beside, we have a large number of lymphoid corpuscles. The structure has been compared to that of a round-celled sarcoma, but in reality it is only the cells that are alike; the architecture of the growth is very different. It might rather be called, in the nomenclature of new growths, a highly vascular fibroma, with very numerous migratory cells. But, as we know, this condition is far from permanent. Granulations either die away or else they lose their abundance of lymphoid cells; the fibrous element increases; and they become organised, as it is said, into fibrous connective tissue and similar tissues. Do they also become organised into epidermis? We know that some epidermis commonly covers them; and, according to the more generally accepted view, this is produced by metamorphoses of some of the lymphoid or indifferent cells. Some authorities, again, regard the epidermis as of different origin; and the question is so undecided, that we must hesitate to pronounce an opinion. The only point on which we must insist is that, both positively and negatively, these results agree perfectly with what we said just now about the indifferent cell-proliferation. The question of the origin of all epithelium produced for purposes of repair is one which I prefer to consider in the next lecture.

So far, then, as we are able to compare the phenomena of repair and inflammation with those of new growth, there are important analogies; but a large part of the phenomena of the two former processes—those, namely, connected with the vessels, exudation and cell-migration—have not, so far as is yet known, their parallel in the development of tumours, except as simply subsidiary to the germinative changes.

[To be continued.]

LETTSONIAN LECTURES ON SYPHILIS AS A CAUSE OF DISEASE OF THE NERVOUS SYSTEM.

Delivered before the Medical Society of London.

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LECTURE III.—*Concluded.*

Syphilitic Disease of the Cerebral Arteries.—Varied and important as are the effects of syphilitic disease in the membranes and substance of the cerebrum, not less so are the results of syphilitic disease of the cerebral arteries. Here, again, as in every part of my subject, I have to acknowledge my indebtedness to Dr. Hughlings Jackson, who has led the way in this as in many other investigations, and has repeatedly insisted on the importance of recognising the effects of syphilitic disease of the arteries. The arteries of the brain in syphilis are frequently attacked by inflammation, usually beginning in the outer coat. This may lead to thrombosis, which cuts off the supply of blood, and produces the result now known to follow this event. The effects are first an accumulation and stagnation of blood in the capillaries in the area of distribution of the vessel blocked, and, unless collateral circulation can be established, there will subsequently be softening. The symptoms will depend upon the part fed by the artery which is obstructed. I am disposed to think they are more varied than those produced by embolism, since a fragment carried from the valves of the heart, or from the aorta, appears to find its way into certain vessels (notably the left Sylvian artery) in preference to others, while syphilitic thrombosis may occur anywhere. Identical situations, the effects of thrombosis and embolism would, of course, be identical.

Syphilitic thrombosis must be of very frequent occurrence, judging from my own experience and from the number of cases collected by Zambaco, Gros, and Lancereaux, but set down as examples of inflammatory softening.

CASE 1. *Left Hemiplegia, affecting chiefly Face and Upper Extremity; Convulsive Attack followed by Mania; Peculiar Loss of Intelligent Use of Hands, without Loss of Power; Syphilitic Disease of Arteries; Thrombosis of Right Middle Cerebral; Softening of Convolutions near the end of Fissure of Sylvius, etc.*—Emma C., aged 30, dressmaker, was admitted into St. Mary's Hospital, under my care, on March 28th, 1873, suffering from partial left hemiplegia. She had been married four years, and, during that time, had had four miscarriages before the completion of the sixth month of pregnancy. Her husband was found to be suffering from ulcers on the tongue and plantar psoriasis from syphilis contracted eighteen months before marriage. Her health had not been affected till two days before her admission, when she suddenly lost the use of the left arm. There was first twitching in the fingers for about

five minutes; the limb then dropped, and felt cold and insensible; she lost her speech for an hour, and it had not since been quite the same as before; there was no loss of consciousness. The legs were unaffected, and she walked home, half an hour's walk, after the attack. Up to the time of her admission, the hand remained clenched, but, when first seen, she could move the rest of the limb freely, and soon the hand also. The tongue was protruded with difficulty, and deviated greatly to the left. Articulation was a little indistinct. The face was much distorted to the right, especially on talking on laughing. Both eyes were winking, and closed voluntarily, but the left was not capable of winking alone. There was no loss of sensation, nor impairment of intellect; the emotions were easily excited. The pupils were equal. Her sight was good; the optic discs were normal. She had a little headache over the eyes; there was no pain in the head before the attack. She had a peculiar red, blotchy eruption on the face, especially the forehead; she said that it had come out since the attack. There was no heart-disease; the apex-beat was a little outside the normal situation; both sounds were short and well-defined; the second rather marked, and heard well in the neck. Pulse 80, rather hard and durable; bowels regular; urine normal. She took iodide of potassium, in doses gradually increased up to twenty grains, three times a day, and recovered rapidly, leaving the hospital on April 24, after a stay of barely four weeks, apparently well.

She returned, however, on May 3rd, with great pain and swelling of the face, which was found to be due to a node on the left jaw. The paralysis had recurred, but in a slighter degree, and was more marked in the face and tongue than in the arm; the eruption had also reappeared. She was now very emotional, crying when spoken to, and complained of headache. Pulse, 80, hard; temperature, 98.3. The iodide was again given, but the progress was not satisfactory till, on May 24th, she was delivered of a dead foetus of about the sixth month, after which she recovered rapidly, and again left the hospital on June 12th. Traces of paralysis, however, were still perceptible in the tongue and face. There was no optic neuritis. It was remarked, but not at the time considered at all important, that, when she had so far recovered the use of the hand as to be able to do sewing, this was for a time extraordinary, quite childish in its execution; much more irregular than was accounted for by the impairment of power. She continued well while taking iodide of potassium, but, when the supply which she took from the hospital was exhausted, she did not apply for more, and gradually became worse. The hemiplegia returned, and she had an attack of momentary unconsciousness. About two or three months after leaving the hospital, and a month before her readmission, she became violently maniacal for a time, but had partly recovered, and, on admission, October 3rd, was quiet, but extremely emotional, laughing and crying by turns, while the intellect was greatly impaired. She answered questions, but was unable to give any account of her condition since she was last under observation, and appeared helpless and "dateless". The hemiplegia was again very apparent, and the leg was weak when she walked, as well as the arm. The eruption was conspicuous; she complained of headache, and vomited daily.

On October 5th, after restlessness, she had a convulsive attack, which began with a loud scream; all the limbs were rigid and violently convulsed, but the left most; the head was drawn back; the face was purple; unconsciousness was complete. The convulsions lasted about ten minutes; she lay in a state of stupor for an hour afterwards, the skin being cold and clammy. When she recovered from this, the left arm was quite paralysed. She was very restless for the remainder of the day, complained much of headache, and had no sleep at night. Next day, she talked perpetually, and in a random way, recognising, however, and naming anyone. She vomited two or three times; laughed almost without cessation from 10 A.M. to 6 P.M., and then became noisy, violent, and quite unmanageable, shouting and raving all the night. There were distortion of the face and deviation of the tongue. She used the left hand, and moved the leg freely when in bed, but was unable to stand. The face was flushed; the head hot. The pulse was 80, sharp and weak; but the artery was full in the intervals, if not compressed. The tongue was dry and furred. The bowels were confined; her urine was passed in bed. Medicine was vomited. She continued in this state for many days, only quieted by large doses of chloral and morphia injections. She talked incessantly, and her language was abusive and bad; but she would frequently express her regret for it, saying she could not help it. She always recognised and named me and the nurses, and, in my presence, was quiet, or only muttered, or laughed, or cried, put out her tongue, and answered questions, usually saying she was better. Her mood was most variable, laughing one moment, crying the next; she often sighed deeply, and frequently, after either laughing or crying, gave a peculiar inspiratory snort. The peculiar minutely dotted papular eruption was present on the face, forehead, and chest, with an occasional acneiform papule. The treatment consisted in the administration of

iodide of potassium in drachm doses every four hours by enema, as the medicine was vomited when given by the mouth in doses of twenty or thirty grains. The bowels were kept freely open.

After ten days, she became profusely salivated, and was very prostrate; the iodide of potassium, therefore, was discontinued. Improvement had begun, and she gradually became more quiet. On October 25th, she was better in all respects; was delirious only for an hour or so at a time in the night. She got up to the chair when the bowels acted, but passed her urine in bed during the night. The pulse was particularly hard and long, and, as I feared, this betokened another outbreak. I gave iodide of potassium in doses of fifteen grains. On the 27th, however, she was more helpless, and passed her urine in bed by day as well as by night. The iodide was discontinued. Her answers were rational, but not always accurate. The pulse was now soft.

From November 1st to 4th, she was better, eating, drinking, and sleeping well; answering questions, and quite rational and sensible, but evidently feeble in mind. The urine and fæces were passed naturally. A curious fact, however, was, that she appeared to have no intelligent use of her hands. She was quite unable to put on a jacket, and fumbled in a most extraordinary way in the attempt. She would notice when the bed-clothes were a little awry, and try to arrange them, but would fail altogether, and bring them into the greatest confusion; so also with the box at her bedside for her clothes and other things. She would apparently form an intention of putting in or taking out something, and fumble about the lid, but only once succeeded in raising it. She could, however, feed herself. This condition brought to mind her extraordinary sewing when previously in the hospital, and an interesting field for inquiry was promised in the investigation of this peculiar mental condition. Unfortunately, the amendment was only temporary. On November 7th, she began again to be noisy; and, from this time, while she lived, she was always more or less in the same condition, talking loudly, calling out, crying, laughing, but usually with some reference to the people about her; almost always able to command herself during my visit, recognising and naming me, saying she was better, and had no pain in the head, putting out her tongue, and permitting ophthalmoscopic examinations. If I reminded her that she had been violent or abusive, she would acknowledge it, and express regret. The urine and fæces were passed in bed. She always took food very well. The eyes were frequently examined. Nothing abnormal was seen beyond a degree of hyperæmia of the disc, which did not pass physiological limits. Phosphorus was given, and large doses of iodide of potassium were again tried. There were occasional gleams of improvement for a few days, but, no lasting impression being made, biniodide of mercury was given rather freely. This failed either to affect the gums or to produce any good effect on the symptoms. Mercurial inunction was, therefore, tried. She had appeared to be better for a few days, when, on January 17th, she was suddenly seized with convulsions, which continued with little intermission for twenty-six hours, when she died.

Post Mortem Examination, January 19th, 1874.—When the cranium was removed, the dura mater was found normal; there were no adhesions. On removing the dura mater, fluid was seen beneath the arachnoid, over the convolutions, in unusual quantity; it was limpid. The membranes were a little opaque. From the posterior end of the right fissure of Sylvius, two small arteries were seen to issue, which were empty, and had numerous small white patches in their walls. The same was observed on the left side, but less marked. There was much fluid about the base. The arteries of the base, both large and small, but especially the basilar, were thickly studded with white patches. In the basilar, they lay transversely round the artery, and were not so thick, or hard, or rigid as is usual in atheroma. There were no great irregularities in diameter. An empty dotted artery ran obliquely across under the surface of the right hemisphere of the cerebellum. The membranes were very lacerable. There was no special change round the crura. In the right fissure of Sylvius, nothing was found, except the condition of the arteries described above. On the right, when the middle cerebral artery was followed to the end of the fissure just before emerging, it was found embedded in a small yellow hardish substance, and occluded. Three empty branches emerged on the surface, and ran, two obliquely upwards and backwards, the other downwards and backwards. There was no softening in the fissure of Sylvius. The convolutions posterior to the end of the fissure of Sylvius were shrunken and small, depressed, soft, different in colour, but not distinctly yellow. The softened convolutions did not belong to the temporo-sphenoidal lobe, but began behind the lower end of the second ascending parietal gyrus, which was not affected; they involved the supramarginal lobule, the angular gyrus, and the lower annectant gyri, not reaching the occipital lobe. When a section was made, the subjacent parts were found softened, and two large cavities of very irregular shape, but with defined walls containing only a little turbid fluid, were found, each of which might have held a nut.

Softening did not reach the surface in the fissure of Sylvius, or penetrate to near the ventricle; it did not extend into the fissure of Sylvius or the occipital lobes. A small depression was seen on the surface of the corpus striatum (intraventricular), with yellow stain; this was soft, and, on section, a small cavity of the size of a split pea was seen; it was confined to the intraventricular portion of the corpus striatum, close to the surface, near the outer edge, and about midway in its length. A small cavity, of the size of a pea, was found in the thalamus, near the upper surface, about the middle of its length. The left hemisphere was normal, but the intraventricular part of the corpus striatum was depressed and softened to a greater extent than the right (to the area of a sixpence, nearly). A cavity with turbid fluid contents was found immediately beneath the ependyma; its posterior end was about midway of the length of the corpus striatum. The cerebellum, pons, and medulla were normal. The heart was hypertrophied; there was a little atheroma in the mitral and aortic valves, much in the aorta. The lungs were healthy. The liver was elongated, and had a depression on its surface near the anterior edge, and several pale yellow patches, which extended for a little depth. The spleen was very large. The kidneys were granular and rather small; the cortex was wasted, but not in a very advanced degree. The ovaries were large. There was a small tumour in the uterine wall. The Fallopian tubes were long.

It is easy to see, after the *post mortem* examination, why remedies failed to influence the disease. Iodide of potassium may, and, I think, does, facilitate the removal of the debris of softened brain, but can do nothing to restore the damaged structure; but there are several interesting questions suggested. 1. Was the maniacal excitement due to the conspicuous lesions, or to the general cerebral anæmia from the arterial disease? 2. Was the paralysis of the face and tongue the result of the extreme softening in the convolutions, or of the small patches in the corpus striatum and thalamus? 3. Was the peculiar loss of all intelligent use of the hands associated with the special situation of the softening? The last question is the most interesting.

CASE II. *Convulsion; Mania; Hemiplegia; Probable Thrombosis.*—The mistress of a gentleman had had syphilis seven years before I saw her; she had also been in the habit of drinking freely. Two years and a half previously, she had been found standing rigid and insensible; she had then had convulsions lasting some hours. Later, she had acute mania, for which she was twelve months in an asylum; afterwards, she became quiet; had no delusions, but her memory was poor, her mind feeble, her speech hesitating and slow. She stooped also, was unable to walk far, and often tripped.

At 4 A.M. on December 10th, 1871, she complained of pain in the left knee, and soon afterwards vomited. At 9 A.M., she was found to be unconscious, and the left limbs were useless, agitated, and rigid. She was unconscious for a great part of the day. I saw her with Mr. Coulson on December 11th. She had then lateral deviation of the eyes and head to the right, being unable to look to the left at all. The face was slightly distorted to the right, and the tongue pointing to that side when protruded. The fundus of the eye was normal.

A week later, after aperients and careful dieting, she had recovered the use of her limbs; her mental condition varied; at times quite equal to her condition before the attack, but, when I saw her, her state was childish; her conversation was limited to expressions of welcome, and her answers were brief. Even now the eyes were not brought readily to the left, and occasionally she had double vision looking to the left. Her aim, when told to take an object with the hand, was not good. Later, the symptoms of cerebral softening gradually came on, and she died. A *post mortem* examination was not permitted.

CASE III. *Syphilitic Thrombosis; Right Hemiplegia, with Tonic Contraction of Paralysed Limbs, relaxing during Sleep; Access sudden, and attended with Temporary Aphasia.*—Robert O'N., aged 27, formerly in the Royal Engineers, was under my care in St. Mary's Hospital from June 20th to September 2nd, 1873, suffering from right hemiplegia, with tonic spasm of the affected limbs of more than six years' duration. At the time when the attack came on, he had been breaking up antimony, and to this he attributed his illness; he was, however, suffering from syphilis, contracted about twelve months before. The attack was sudden; it was not attended with unconsciousness, but speech was completely lost for some time. He had regained speech, and a considerable degree of power in the limbs; he halted, however, in walking, and the right leg was stiff and awkward, and the foot came down with a "bang"; the right arm could be moved in most directions, but not freely and readily, on account of a degree of rigidity; the wrist was flexed, and the fingers bent, and he was unable to extend them, on account of tonic contraction of the flexor muscles. With the aid of the other hand, however, or by another person, the wrist and fingers could be straightened out readily, and the contraction was not the rigidity of paralysed and wasted muscles. On the contrary, the limb was well-developed, and the

muscles were full and firm. It was found also, on examination of the paralysed arm during sleep, that the contraction was entirely absent, and that the fingers moved freely and naturally. This was not simply from the warmth of the bed, since the patient himself never found the fingers relaxed while he remained awake, and it was only by requesting the nurse to make the examination while he slept that the fact was ascertained. There was no inequality of the two sides of the face. Sensation was not affected. The optic discs were more pink than usual, but well-defined, and not swollen; the retinal vessels were of natural size.

The mode of attack and subsequent course of the symptoms seemed to point to obstruction of a branch of the left Sylvian artery, the most probable cause of which was thrombosis, from syphilitic inflammation of the vessel. It was not expected that any great impression would be made on the affection, but I thought it right to give him the advantage of any good to be obtained from iodide of potassium, which he took in full doses. Galvanism and faradisation were employed, and the general result was a decided improvement, so that the hand could be used at meals, and the walk was less clumsy, but the paralysis remained quite evident. A remarkable change was noted in the urine. For about three weeks after his admission, the specific gravity varied from 1010 to 1012. After this time, it was 1020 to 1030.

CASE IV. *Right Hemiplegia, Sudden, with Loss of Consciousness and Impairment of Sensation.*—George H., aged 52, a shoemaker, was admitted into St. Mary's Hospital on February 2nd, 1873, suffering from right hemiplegia of nine months' duration. He denied that he had ever had syphilis, but he had pigmented scars on the knee, shin, shoulders, and abdomen, and a serpiginous ulceration had, for eighteen months, been creeping down the right side of the neck towards the shoulder. The hemiplegia had come on suddenly with loss of consciousness, and the motor paralysis was accompanied by impairment of sensation. He had been brought to the hospital against his will, and was extremely lachrymose and full of complaints. The optic discs presented no distinct abnormality; the fundus of the eye generally was pale.

He wearied every one with his complaints, and insisted on leaving the hospital after a stay of only twelve days. The paralysis was probably due to thrombosis and softening, and therefore, in great measure, irremediable.

CASE V. *Syphilitic Thrombosis.*—Mary W., aged 30, single, a domestic servant, was not aware that she was the subject of syphilis. She had had no cutaneous eruption, but, five years before she came under observation, she had suffered from perforating ulcer of the soft palate, which had left a large aperture. One morning, at 4 A.M., while in bed, she suddenly lost the use of the left limbs, and, twelve months later, she was still suffering from marked hemiplegia. A little improvement was obtained by means of iodide of potassium, cod-liver oil, and iron; but the condition was evidently one of permanent damage, and almost certainly of syphilitic thrombosis of a cerebral artery.

CASE VI. *Syphilitic Thrombosis (?)*—Eliza W., aged 43, married, the mother of sixteen children, of whom ten were alive and well, came under observation on April 26th, 1867. She was aware that she had suffered from syphilis, and had scars on her forearms, from rupia thirteen years before. Two months previously, when apparently in good health, she suddenly fell down insensible while preparing dinner, and so lay for an hour and a half. When she came to herself, she found she had lost the use of both legs and of the right arm. She also saw double, and everything seemed to go to the top of the room. She had recovered power in the limbs, but suffered much pain over the right brow, and there was slight paralysis of the left side of the face. From this, and from the peculiarities of the attack, the seat of mischief was apparently the upper part of the pons. The nature of the lesion must be acknowledged to be uncertain; it might have been hæmorrhage or thrombosis. Small doses of iodide of potassium had not much effect, and she did not remain under treatment sufficiently long for large amounts to be reached.

CASE VII. John K., aged 50, had suffered from syphilis for five years, and, while under treatment for this disease, awoke on the morning of December 15th, 1870, with a sense of numbness and impairment of power in the right half of the body and face. He could squeeze the hand faintly, and could pick up a pin with the aid of vision, but could not feel it. He walked unsteadily, and stood with the legs apart. Here, again, the lesion might be either hæmorrhage or thrombosis.

A few words remain to be said on the diagnosis, prognosis, and treatment.

DIAGNOSIS.—The considerations involved in the diagnosis of syphilitic disease of the nervous system are too numerous and elaborate to be resumed in the time which remains at my disposal. We have, on the one hand, to guard against the conclusion that whatever happens in a person who has suffered from syphilis is necessarily due to this disease; and, on the other, to avoid being misled by the absence of an acknowledged

syphilitic history or of traceable syphilitic antecedents. The period of life at which the nervous affection comes on is a great guide. In old persons—except in very obvious cases—we should arrive at a diagnosis of syphilis only after exclusion of other more common causes of disease of the nerve-centres; in young adults, syphilis would suggest itself early, unless there were heart-disease or disease of the kidneys. The chief aids in the diagnosis, in addition to evidences of syphilitic disease in other parts, which must be carefully looked for, will be the antecedent or associated symptoms, which we have learnt by experience to connect with syphilis, headache with nocturnal exacerbation, sleeplessness, and irritability. The gradual and irregular mode of access, except in the case of thrombosis, is again suggestive of syphilitic disease, and convulsions are very common.

PROGNOSIS.—In the prognosis, we have always to bear in mind the liability to relapse. Occasionally we see recoveries which are apparently complete and permanent; frequently, I think, when the symptoms have been only epileptiform attacks, and the associated nervous disturbances enumerated in speaking of syphilitic epilepsy; sometimes when there has been evidence of graver mischief; but in a large proportion of the cases the patients will enjoy immunity from similar or more serious symptoms only on condition of perseverance in the employment of the remedies.

The chief considerations which bear on the prognosis are the duration, nature, and seat of the lesion.

As to *duration*, the longer the mischief has existed the more likely are its effects to be permanent; for, although syphilitic exudations and growths are singularly amenable to the influence of remedies, if they be allowed to remain for any length of time they destroy the structures in which they are lodged. This is more particularly important in the spinal cord, in which a very limited lesion will involve the entire segment, and cut off the part below from the cerebrum. It is, however, remarkable how much relief is often afforded, even after a prolonged train of disturbances, by removal of the cause, especially when the symptoms point to an affection of the cerebral hemisphere.

As to the *nature* of the lesion, supposing it to have been determined that it is of syphilitic origin, the most important point is to distinguish between the effects of syphilitic disease in the membranes or nerve-substance, and of thrombosis from syphilitic inflammation in the arteries. As Dr. Hughlings Jackson has often insisted, the results of the blocking up of an artery will be independent of the nature of the obstruction. If a collateral supply of blood do not find its way to the part, softening is inevitable; and supposing that treatment could affect the original disease, as when a cerebral artery is included in a gumma, it would probably come too late to obviate the effects. Usually, as has been stated, thrombosis gives rise to sudden attacks without much pain.

Syphilitic epilepsy, so called, generally yields to treatment. We have here, in Dr. Jackson's language, only a "discharging" lesion, not a destructive one. In paralysis, on the other hand, there is frequently destruction; but recovery may be expected if we can exclude thrombosis and softening, and if the duration have not been too prolonged. The tumours which give rise to unilateral convulsion appear to be particularly liable to be attended with optic neuritis, and may wear out the patient's strength; but tumours at any part can sometimes be brought to a state of quiescence, and the effects of disseminated lesions are more serious than those produced by a single growth.

As to the *seat* of the lesion, I will only further add that growths from the dura mater are apparently less amenable to treatment than affections of the other membranes or of the nervous substance, probably because they are less vascular, and therefore less easily reached, and less freely acted upon by remedies.

TREATMENT.—The treatment is simple. The one remedy is iodide of potassium, or, this failing, mercury. I usually begin with doses of six grains, and always combine with it ammonia—the carbonate or aromatic spirit. Having, by one or two days' experience, ascertained that there is no special intolerance of the iodide, it may be rapidly pushed to doses of 12, 18, 24, 30, or 36 grains three times a day. Occasionally, even larger doses are necessary; and I have given a drachm every four hours. That large doses are often absolutely required, and that they succeed when moderate doses fail, I am convinced by abundant experience; and, if iodism be induced, which is very rarely the case in tertiary syphilis, it is almost always before large doses are reached. Large doses are better borne when taken after meals. Of course, iodide of potassium is more quickly taken up into the blood from an empty stomach, but it is also quickly out of the blood and in the urine; and, when a continuous action on the system is needed, which is what we require in dealing with the effects of tertiary syphilis, the indication is best met by giving so diffusible a remedy as the iodide of potassium after food.

If the iodide of potassium fail after a full and fair trial, a resort to mercury is always desirable; and the more recent the syphilis, the

earlier should this be made. In passing from the use of one to the other drug, either a certain interval should be allowed to elapse, or the mercury, if given by the mouth, should be in one of its most soluble and active forms—the bichloride or biniodide. More than once I have seen sudden and profuse salivation when this precaution has been neglected—no doubt from the mercury being converted into biniodide within the system. Sometimes I have employed mercurial inunction at the same time with the internal administration of iodide of potassium, and have frequently given the biniodide of mercury with iodide of potassium, either in the same mixture or in the form of pill at night.

One word as to the *modus operandi* of iodide of potassium. This was the subject of a beautiful explanation by Dr. Odling in his Goulstonian Lectures before the College of Physicians—hypothetical at that time, but demonstrated by experiment since. The active agent is the iodine, as is shown by the fact that other salts of potassium have not the same effect, while other combinations of iodine, such as iodide of ammonium or sodium, have. The iodine is permitted to exercise its influence on the seat of disease in virtue of the comparatively slight affinity by which it is held in union with the base; this being so feeble that, in the presence of certain forms of living protoplasm in active change, the salt is decomposed, and the iodine set free to exercise its solvent action on the organic matters. Whether this be direct, or indirect through the well known oxidising effects of free iodine, is not so certain.

In conclusion, I have only to offer to the Society my sincere thanks for the kind and patient attention to these lectures, which have not been all I could have wished, but which, I am already assured, have answered one great purpose I had in view—namely, that of calling more general attention to the subject of Syphilitic Affections of the Nervous System.

ON THE VARIOUS PREPARATIONS OF KOUMISS, AND THEIR USE IN MEDICINE.

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[Concluded from page 231 of number for February 21st.]

THE two following analyses, one of mare's-milk koumiss, made by Hartier, a chemist of Moscow, and the other of E. Chapman's medium cow's koumiss in London, made by Wanklyn, may be compared.

	Mare's Koumiss.	Medium Cow's Koumiss.
Alcohol . . .	1.65 per cent.	1.60 per cent.
Fat . . .	2.05 "	0.30 "
Milk-Sugar . . .	2.20 "	4.85 "
Lactic Acid . . .	1.15 "	1.08 "
Caseine and Albumen . . .	1.12 "	1.07 "
Ashes or Salts . . .	0.28 "	0.75 "
Carbonic Acid . . .	0.785 "	1.50 "

Thus we see that the caseine in both kinds of koumiss is the same to a fraction; much less is the butter or fat in the medium koumiss, for the simple reason that it is not advisable to send out the koumiss *à longue course* with all the fat contained in the milk, as it decomposes too quickly into butyric acid, which is deleterious to the digestive organs. Further, the lactic acid and alcohol show no difference worth considering; but the lactose in the medium koumiss is twice as much as in mare's koumiss, if Hartier's analysis deserve full credit for correctness, as Wanklyn's does, whose reputation as an analytical chemist is undeniable.

The *Whey Koumiss* (C) is derived from cow's milk completely freed from its butter and caseine, so that it merely contains some albumen, lactose, lactic acid, alcohol, and the salts. It affords the best proof of showing how wrong all the theories were which proclaimed the caseine or even the butter as being indispensable for koumiss-making, and may prove useful as a beverage in disease with even a strong febrile reaction, with copious or excessive expectoration, perspiration, or diarrhoea, either in plethoric or in strong constitutions, which do not require an increase of weight, or in patients with inflammation or fever. We must, however, not forget that in the latter case the treatment becomes more difficult and complicated; and we have to use all our skill to abate the fever by antipyretics, to calm the pain by sedatives and narcotics, and to prevent local inflammations from spreading, etc., according to the nature of the localised disease. According to the more recent school of medicine, whey is only of limited value, as it supplies the body with slight nourishment; and it is obvious that, on this account, whey can never take the place of the highly nutritious milk, and therefore can never be applied to the purpose of a proper plastic treatment. The