DIPHTHERITIC PARALYSIS:

ITS NATURAL COURSE, PATHOLOGY, TREATMENT, AND RELATION TO PARALYTIC AFFECTIONS FOLLOWING FEVERS.*

By SIR JOHN ROSE CORMACK,

Chevalier of the Legion of Honour; M.D. Edin. and Paris; F.R.S.E.; Fellow of the Royal Colleges of Physicians of London and Edinburgh; Physician to the Hertford British Hospital, Paris; etc.

(Continued from page 106.)

THE following case is one of the most interesting of those of the class to which it belongs, which I have been able to watch minutely throughout the whole of the primary and secondary symptoms. To be rightly appreciated, it must be studied in all its details, and viewed in conjunction with other cases apparently but not really different from it in their pathology.

CASE.—Alice B., an English girl, aged 21, nursery-maid in an English family residing at Passy, Paris, was admitted to the Hertford British Hospital on September 30th, 1874. She had then been only one month resident in France. For the three days immediately preceding her admission, she had been under treatment by a French physician, who intimated that she was suffering from a *fièvre muqueuse*, likely to be of considerable duration and severity. Under these circumstances, I was requested to receive Alice B. into the hospital.

The following is a summary of the history of the case from its commencement up to the time of my reception of the patient. For ten days, she had felt weak and not up to her work; but till Saturday, September 26th, she did not state, or perhaps did not realise, that she was really ill. On that day, she complained of severe pain in the back, and repeatedly had trembling fits. Her mistress, who accompanied her to the hospital on the morning of Wednesday, September 30th, when I received her, informed me that the patient did her work on the 26th, making no complaint of being unwell. On that day, however, her manner was observed to be peculiar. On the evening of the following day (Sunday, September 27th), she became delirious. Against her inclination, she was sent early to bed on that evening, where she remained under medical treatment till her removal to the hospital on the morning of Wednesday, September 30th. When she arrived, I was engaged in making the ordinary visit. As soon as she was undressed and somewhat rested, I proceeded to examine her.

September 30th, 1874, on admission. Her face is slightly flushed. Her expression is vacant and bewildered. The pupils are equally and much dilated. The respiration is oppressed. "Breathing tires me," she says. The pulse is 100, feeble; the temperature is 40.1 C. (104.18 Fahr.). The tongue is moist, clean at the tip and edges; in its centre, there is a loose white fur. The bowels were much moved early this morning, soon after a dose of castor-oil. Some urine, passed an hour after admission, was found, on being tested by heat and nitric acid, to be slightly albuminous. The abdomen is moderately distended; it is nowhere tender on pressure. No gurgling can be detected in the right iliac fossa. There is no acute delirium, such as she is reported to have had on Sunday night. When first spoken to, her replies are hesitating, confused, and contradictory; when thoroughly roused, they become coherent; but, if questioned too long, she relapsed into bewilderment. No medicines are prescribed. She is ordered to have the usual nutritious liquid diet of our fever-patients, consisting chiefly of milk, beef-tea, and farinaceous substances, the former greatly predominating. The maximum allowance of stimulants, till further orders, is fixed at twelve ounces of claret in the twenty-four hours. As a common drink to allay thirst, she is ordered barley-water acidulated with lemon-juice.

October 1st, 11 A.M. The countenance is more natural than it was yesterday. Her mental state is very similar. She had no sleep from the time of her admission till six this morning, when she fell asleep, and slept quietly for nearly two hours. She now complains of insomnia, and begs for medicine to induce sleep. The urine, still slightly albuminous, is pale, and passed in large quantity. There is some diarrhoea, but no increase of abdominal distension or tenderness. The pulse is 100 and feeble. The temperature about eight this morning was 39.8 C. (103.6 Fahr.); the pupils are dilated as yesterday. There is no eruption on any part of the body.—5 P.M. Seven very characteristic rosy lenticular spots are visible on the chest, which disappear on pressure and reappear when the pressure is removed. She complains of being weary from want of sleep, but does not seem restless or in bodily discomfort. She is ordered to have, at 10 P.M., a starch-enema containing twenty-five drops of the *British Pharmacopœia*

solution of the hydrochlorate of morphia.—8 P.M. The temperature is 40.8 cent. (105.44 Fahr.)

October 2nd, 11 A.M. Her appearance is very much the same as it was yesterday; perhaps there is more hebetude. She had several short sleeps of from five to ten minutes several times during the night. Since admission, no active delirium has been observed. There is no tympanitic distension, and very little tenderness of the abdomen. Since 5 P.M. yesterday, a few more rosy lenticular spots have appeared; they are situated on the back and arms. When there is a long interval between the doses of wine, the breathing always becomes oppressed; she asks eagerly for wine. The full allowance of twelve ounces of the best claret in the twenty-four hours is being taken. She takes willingly a sufficient quantity of beef-tea and milk.—8 A.M. The pulse is 120, and the temperature is 39.8 C. (103.6 Fahr.). The diet and wine are to be continued as at present. She is to have a starch-enema containing twenty-five drops of laudanum every night at 10 P.M. till farther orders.—6 P.M. The pulse is 116, and the temperature 40.8. No more spots have appeared.

October 3rd, 11 A.M. Her general appearance is very similar to that which it presented yesterday. Though she has had very little sleep, she has remained tolerably quiet since having the morphiated starch-enema. Once only during the night—for about half an hour—she was restless and delirious. She then several times addressed by name the children of whom she had charge before admission, rising up in bed and screaming to them, to warn them of some impending danger. No more fever-spots have appeared. At 8 A.M., the temperature was 40.2 cent. (104.36 Fahr.), and the pulse 116. At present, the pulse is 120.—8 P.M. There has been low muttering delirium during the day. The temperature is now 40.3 C. (104.54 Fahr.), and the pulse 120.

October 4th, 11 A.M. The wine and diet have been continued as prescribed. The morphiated enema was not administered last night. She is at present free from delirium and is calm. During the night, however, she was very delirious, twice tried to get out of bed, struck the nurse several times, and made many complaints of being cruelly treated, particularly of being placed on a bed of rotten potatoes. In the early dawn, when she had been quiet for some time and was apparently emerging from a slumber, she was asked by the nurse if she felt better. Her reply was, "I am very weary; for, till I lay down here, I had been walking about the streets of Paris all night, seeking for, and unable to find, the hospital." She had a somewhat loose motion early this morning; but neither now nor since admission to the hospital has the looseness amounted to diarrhoea. About 8 A.M., the temperature was 39.7 cent. (106.43 Fahr.), and the pulse 116.—4 P.M. She is very excited, and has been so since she received a visit from her late mistress at 2 P.M. The respirations are 36; the pulse is 124; and the temperature 40 cent. (104 Fahr.). There is an icteric tint of the eyes and of the skin all over the body. The urine since yesterday has assumed a very dark colour, and to-day is quite like the urine of jaundice. She is reported to have had increased excitement immediately after the last two or three doses of wine. Orders are given to diminish the wine one-half, if it seem to induce excitement. An enema containing twenty-five drops of the *British Pharmacopœia* solution of the hydrochlorate of morphia has now been administered, and another similar enema is ordered to be given at midnight.

October 7th, 11 A.M. Since Sunday (the 4th), she has been restless, almost sleepless, and in a state of active delirium. She is at present delirious. She is now calling out to absent persons as if they were present, and manifesting a delirious loquacity very like that which is common in delirium tremens. The lower half of the left lung is dull on percussion, and in the same situation the breath-sound can scarcely be heard on auscultation. The respiration is short and shallow; and occasionally, for a few minutes at intervals, she has a paroxysm of very hurried breathing. From her extreme restlessness, jactitation, and subsultus tendinum, it is impossible to take the pulse, respiration, or temperature. There is slight abdominal tenderness on pressure, and a moderate amount of tympanitic distension. The urine and feces are passed unconsciously. The urine—judging from the wetness of the napkins placed under her—is not scanty. The alvine evacuations are copious, black, and loose, but not watery. Her countenance has a wild and restless expression. Her pupils, which, since her admission, have been very dilated, are now more dilated than they have yet been, and are irresponsive to light. Her voice, like that of an inebriated person, is thick, and, at times, almost inarticulate. Since yesterday her wine has been increased to a *litre*, and to her hourly dose of wine two or three teaspoonfuls of brandy are occasionally added; the maximum quantity of brandy to be given in the twelve hours being three ounces. Immediately after taking a brandied dose of wine, she moved her tongue better, spoke much more clearly, and became less agitated. I asked her how she felt; when she at once replied:

* Partly read before the Medical Section at the Annual Meeting of the British Medical Association in Norwich, August 1874.

"Quite well—are the boxes packed?" Several times since this report was commenced, she has exclaimed: "Are the children all right?—Who are with the children?" Those questions are evidently suggested by the fretful cries of an infant in an adjoining ward. Her eyes are expressionless and never closed. She seems to see objects imperfectly, for she cannot tell me whether a chair near her bed is a chair or a table. She at times addresses the nurses as "nurse;" and at other times names them by the names of persons who are in England. At present, and occasionally at intervals, her delirium is characterised by loquacity and excitement. The lady-superintendent and nurses concur in stating that during the last three days there has been a well marked periodicity in the maximum of her excitement, and that this has occurred twice in the twenty-four hours, viz., between 4 and 5 A.M. and 4 and 5 P.M. She is ordered to have, at 3 P.M., an enema, consisting of twenty-five drops of the solution of the hydrochlorate of morphia of the *British Pharmacopæia*, four drachms of spirit of turpentine and one ounce of camphor water.—5 P.M. She is much quieter, a noteworthy fact, for lately the maximum excitement and jactitation have occurred very regularly at this hour. There is no increase in the abdominal tenderness. She is now in a profuse perspiration. Since the morning visit, she has passed unconsciously a consistent stool and some urine. She takes her wine with avidity, but now it is only almost by compulsion, that she swallows milk or beef-tea. The milk, beef-tea, arrow-root, wine, and brandy are to be continued as at present. Another enema similar to that given at 3 P.M. is to be administered at 10 P.M.

October 8th, 10 A.M. The instructions of yesterday have been carried out in every particular. She slept very little during the night. The countenance has improved. She is now lying on her back with her eyes closed, but not asleep. When asked to open her eyes, she makes a visible unsuccessful effort to obey. She is placed from time to time on her side, but at once reverts to the dorsal decubitus, unless so propped as to render this impossible. There is no jactitation. The subsultus tendinum in both arms is incessant. Elsewhere at present there is neither subsultus tendinum nor muscular twitchings. At eight this morning, her pulse was 120 and her temperature 39.5 C. (103.1 Fahr.)—10 A.M. The pulse is 120. The respiration is unequal in depth, and varies from 30 to 34 in the minute. When told to open her eyes and put out her tongue, she does both to the best of her ability, but very imperfectly. The eyelids separate slightly, and the tip of the tongue is shown at the half-open mouth. The pupils are still much dilated, but to a less extent than yesterday; they are sensible to light. The tongue and lips are parched and covered with black sordes. The speech is shaky, hesitating, slow, thick, and difficult to understand, much as it was yesterday. Since noon yesterday, she has had no stool. She continues to pass urine unconsciously; it does not appear to be scanty, but, being passed in napkins, it is impossible to estimate its quantity. From 11 o'clock last night till 7 this morning, she perspired profusely; the skin is still very moist. There is some loose cough, but no expectoration. The crepitant râles in the lower third of the left lung are much louder and coarser than they were yesterday; they are chiefly heard behind. Whilst this report was nearly finished, the patient, immediately after a brandied dose of claret, slowly opened her eyes, and said, "Am I better?" She had evidently been attending to the record which was being made of her symptoms. When I replied "Much better", she smiled intelligently. This incident is specially noteworthy. Several physicians who have been present when I have interrogated this patient have supposed that, when I got no replies, she was in a state of imperfect consciousness; whereas her not putting out her tongue when told, and not replying, has arisen from want of muscular power. To-day, till she had her wine twice, she could neither speak nor show her tongue. Two tablespoonfuls of castor-oil are to be immediately administered. The brandy is stopped, and in its place four ounces of rum are to be given in the twenty-four hours in milk. The wine and aliment are to be continued as at present, and the morphia enema is to be repeated at 3 P.M.

October 10th, 10 A.M. Her condition yesterday was very much the same as on the previous day. The bowels were relieved early yesterday morning by an enema of tepid water some hours after the administration of the castor-oil. The treatment ordered on the 8th has been continued till this time. Since last report, she has been gradually becoming less restless, and has several times given indications that she was interested in what was passing in the ward. She has been perspiring so profusely as to require several changes of linen in the twenty-four hours. The countenance is more intelligent, and her expression, when spoken to, shows that she understands what is being said to her. Superficial examination might lead to an opposite conclusion; for she does not reply when spoken to, and, when asked to put out her tongue, she makes no other sign of attempted compliance than a slight separation of the lips, accompanied by an earnest gaze

which clearly declares, "I would if I could". She lies on her back, moving neither upper nor lower extremities, as if she were paraplegic. There is some difficulty in swallowing. Fæces and urine are passed involuntarily. There is no jactitation. There is subsultus tendinum in both arms, which is always at its maximum before, and at its minimum soon after, she has had a dose of stimulants. The pulse is 124, and very feeble. The treatment is to be continued.—8 P.M. The pulse is 116, and still very feeble. In the morning, at 8, the temperature was 37.9 C. (100.22 Fahr.); it is now 38.8 C. (101.84 Fahr.)

October 11th, 10 A.M. She passed a good night. A great change for the better has taken place in her appearance. Her countenance has nearly lost the remains of vacancy which still existed yesterday. She can somewhat protrude the tongue in obedience to orders; and can answer with perfect intelligence—in one, two, or three cautiously enunciated words—the questions I put to her regarding her symptoms. The skin is very moist. At intervals, she has paroxysms of sweating so profuse as to drench her personal linen and soak the sheets of the bed. Yesterday, she seemed to have no voluntary power of movement in the limbs. To-day, she slightly moved her arms and legs when urged to do so; but, after having repeated this performance by my request, three or four times in quick succession, the motor power was gone. She does not seem to experience any difficulty in swallowing.—8 P.M. When raised for a minute or two, about an hour ago, to a semirecumbent position, she nearly fainted. Up to that time, she had seemed stronger, and had been able, when requested, to flex, to a certain extent, her arms and legs. At 8 this morning, the pulse was 126, and the temperature 37 C. (98.6 Fahr.); at present, the pulse is 100, and the temperature 37.4 C. (99.3 Fahr.) The pulse is exceedingly feeble. The instructions now in force in respect of treatment are renewed, with this addition—that, without being raised from the horizontal position, she is, from time to time, to be placed alternately on either side; and that, in the event of a threatening of faintness, she is at once to have one or two tablespoonfuls of port wine.

October 12th, 11 A.M. She had port wine several times during the night in consequence of her exceedingly exhausted state on awaking at intervals from sound sleep. She continues to perspire very freely, but the perspirations are not to-day of a drenching character. The tongue is cleaning. The state of the abdomen is normal. The urine and fæces are generally, but not always, passed involuntarily. The countenance is flushed. She takes large quantities of beef-tea thickened with tapioca or arrowroot, and at the rate of a *litre* of milk daily. Notwithstanding this alimentation, she is exceedingly dependent upon the free use of alcoholic stimulants. Were they not given in abundance, and at the exactly required time, she would certainly die from failure of the feeble heart. On the 8th, 9th, 10th, and 11th, she had, each day, thirty-six ounces of strong claret, four ounces of rum, and six ounces of port wine. The instructions now in force are renewed, with this reservation—that the quantity of stimulants is to be reduced should headache or flushing supervene.

October 13th, noon.—During the last twenty-four hours, she has had a large quantity of beef-tea and milk. During the same period she has had also thirty-six ounces of claret, but no other stimulant. She is weak, exceedingly drowsy, and remains in a state of considerable perspiration. Her pulse is 64, and her temperature 37.7 C. (99.86 Fahr.) Occasionally, she has a little loose cough. The respiration is slow and weak, but she does not seem to experience any discomfort in breathing. The tongue is moist: it is clean except towards the root, where it is slightly coated with a brownish fur. There is neither tenderness nor distension of the abdomen. She has had no stool since the evening of the 11th. For some days past she has shown so great an aversion to beef-tea, that she has taken much less of it; but to compensate for this, her allowance of milk has been greatly increased. During the last twenty-four hours she has drunk very nearly two *litres* of milk. Early every morning and afternoon she is to have an egg-flip, containing in each an ounce of brandy. During the twenty-four hours, she is to have one or two small custards. Add to the beef-tea, in addition to the tapioca or arrowroot, two or three tablespoonfuls of a *purée* of mixed vegetables—viz., carrot, turnip, and Brussels sprouts. She is to have immediately a draught containing three drachms of (*British Pharmacopæia*) compound tincture of rhubarb, five grains of carbonate of ammonia, and an ounce-and-a-half of camphor-water, to be followed in three or four hours by an enema of tepid water, if the bowels have then not been moved.

October 14th, noon.—Yesterday the bowels were freely moved, after the rhubarb draught and enema had been administered as directed. If there be any change since yesterday in her condition, it is for the better. She takes her food well in accordance with yesterday's programme. The treatment in respect to food and stimulants is to be continued.

October 15th, noon.—During the early part of the night she slept

well, but towards morning became wakeful, very hot in the head, and flushed the face. These symptoms were relieved by the diligent application of cold water to the head. She is certainly in a less favourable state than when reported at noon yesterday. The aphasia is nearly complete. During the night and early morning she complained, in thick and difficultly understood speech, of severe pains in the arms and legs. The bowels have not been moved since the enema. The treatment to be continued in respect to food and stimulants so long as they are taken willingly, and without causing increase of flushing or excitement.—4.30 P.M. The nurse reports that she has been yawning and sighing incessantly for the last three hours; she is doing so at present. There is cutaneous anaesthesia, and severe shooting muscular pains in the left leg, in which the motor power is less than in the right leg. In both lower extremities the power of voluntary movement is small, and is soon exhausted by being exerted. She feebly squeezed the hand with her right, and also with her left hand when told to squeeze; but on her repeating the squeezing several times in succession, it was found that the amount of pressure went on diminishing, till at last it was not appreciable. When asked to show her tongue, she partially protruded it; but, after protruding it several times, she lost the power to do so. That she did her best, was evident from her separating the lips and pushing the tip of her tongue against the teeth.

October 16th, 11 A.M. The night-nurse reports that during the greater part of the night there was considerable restlessness and stertorous breathing. Between 7 and 8 A.M., when seen by Mr. Baillie Cormack, the patient was not restless, but was breathing stertorously. Her pupils are exceedingly dilated—much more dilated than I have yet seen them. There is complete aphasia. When asked if she had headache, she put her right hand to her head, and looked at me, as if she meant thereby to answer in the affirmative. This she did three times, looking earnestly at me at the same time, as if she would fain explain herself in words if she could. Her expression was that of perfect but anxious intelligence. She continues to pass her urine and faeces in bed; both are voided involuntarily, but not always unconsciously. About seven o'clock this morning, the nurse, when removing the soiled napkins from under her, observed that there was complete paralysis of the left arm and leg. At that time, the nurse assures me that neither leg was swollen, but that, two hours later, the right leg began to swell. It is now quite cold, has a glistening appearance, is very much swollen as high up as the knee. It does not pit much on pressure. On examination, I find that the patient is hemiplegic. The left leg is absolutely palsied; the right leg, on the other hand, is more under the influence of volition than either has been for some days. On tickling the sole of the left foot, it is energetically drawn up; and, on the tickling being continued, the leg is almost convulsed. The right—the non-palsied leg—is very much less influenced by tickling the sole of the foot. Although the non-palsied lower extremity is responsive to the will of the patient, its motor power is very soon diminished, and is at last exhausted by continued use. In both lower extremities, there is increased cutaneous and deep-seated sensibility, as is proved by a cry indicative of pain and a wincing of the features immediately following slight or firm pressure. The pulse is 128, and the temperature is 38°C. (100.4 Fahr.) The bowels are confined; the tongue is foul and dry. She is to have a saline purgative enema. The lower extremities are to be swathed in several folds of cotton wadding, and then packed up in warm flannels. India-rubber bags filled with warm water are to be kept close to the limbs, so as to maintain a warm equal temperature. Cold water is to be kept diligently applied to the head so long as its use continues to be, as it now is, soothing and agreeable to the patient. The wine is to be given very moderately so long as the heat of head and flushing of the face continue. She is to have milk and water as an ordinary drink; and milk-diet and beef-tea as hitherto, except that the quantity of beef-tea is to be diminished so long as the heat of head and present high temperature exist. A cradle is to be placed over the legs, to bear the weight of the bedding.

October 17th, 11 A.M. The night-nurse reports that during the night the patient, on awaking from sleep and having a dose of wine, made several great efforts to speak, and succeeded to some extent, with thick voice and active eye, to express that she was suffering great pain in both legs. At 8 A.M., the pulse was 120, and the temperature 38.1°C. (100.6 Fahr.). At present, the pulse is 110. The head is cool, and the countenance tranquil. The tongue is rather moist. The skin is dry, but not hot. The right—the non-palsied leg—has no longer a glistening appearance, and is now hardly at all swollen. The left—the palsied leg—has become very much swollen, as much swollen as was the right leg yesterday. There is no increase in the sensibility of its general cutaneous surface; but slight pressure, made in the course of both the internal and external saphena veins, causes the patient to move the limb with almost spasmodic energy, and to give evidence by the wincing of

her features that great pain is being caused. The veins are invisible, from their deep-seated adipose position and the swollen state of the limb. Manipulation gives so much pain, that their state cannot be determined satisfactorily by tactile examination; but the touch nevertheless gives an impression that cord-like bodies exist in the course of the veins. By the exercise of voluntary power, the patient cannot move in the smallest degree the left upper or lower extremities. The mouth is drawn to the right side; but this is only slightly apparent when the countenance is in a state of repose, though strikingly visible when she smiles, which she has done repeatedly since this report was commenced. When asked to show her tongue, she protrudes it very slowly, very carefully, and with an air of deliberation, just as if she were performing an operation requiring adroitness and nicety of calculation. The tongue, however, is fully protruded. After she had exercised some minutes in protruding the tongue, its protrusion became increasingly difficult, and was at last temporarily extinguished. There is less aphasia. She has to-day a peculiarity of speech which I have not before observed. Her voice is still so thick that it is very difficult to recognise the words she employs; but she has a new peculiarity—the words are as it were thrown out of her mouth by a concentrated effort or jerk. Her intelligence is perfect. She asked and answered questions regarding her paralysed state and her general condition in a correct discriminating manner, though much distressed by the physical impediment to speech. Her three principal complaints are, that she can hardly speak; that she has pain in a situation she indicates—viz., in the course of the left internal and external saphena veins; and that she is now stunted in her wine, without which she cannot utter words. She has some difficulty of breathing, but it is neither an urgent nor a constant symptom. The breath-sound is feeble posteriorly in both lungs, but is feebler in the lower third of the left lung than in any other situation. The alvine and renal evacuations are natural. The dingy yellow hue of the skin is disappearing. Let a large blister be applied to the front of the chest, and treated with poultice, cotton-wadding, and linimentum calcei.—8 P.M. Visiting another patient, I casually asked her how she felt. I am struck by the improved voice in which she has replied “Much better”. Her countenance is cheerful and natural. She had just taken a tumbler of milk containing an ounce of rum. On telling her to flex the forearm on the arm of the palsied extremity, I saw the biceps feebly but distinctly contract, the result of which was a corresponding slight flexion of the forearm. On a second trial, a similar result was obtained. A third and a fourth trial proved complete failures.

October 18th, 2 P.M. She passed an excellent night. The countenance is very cheerful. The oppression in breathing seems nearly gone. The blister rose well, and has discharged an abundant serosity. The blistered surface is now covered with layers of wadding in the usual way. She remarked that she liked the blister, and hoped that she would soon have another. There is no swelling of the right leg. The left—the paralysed leg—is much less swollen than yesterday; it is still painful on pressure in the course of the saphena veins. No indurated cords can be made out, but nevertheless it is possible that they exist. The pupils, though still very much dilated, are less dilated than I have observed them since the hemiplegic attack. The skin is very moist, but for some days there have been no profuse perspirations. The dingy yellowness lately so apparent on the face, neck, and arms, is less to-day than it has been for a week. There is no longer any yellowness of the conjunctivæ. She can converse fairly well for two or three minutes, after which her speech becomes thick and embarrassed, and at last fails.

October 31st, 11 A.M. Since the 18th, there has been a steady daily improvement. To-day, she is sitting up for the first time. She can speak for a few minutes without being fatigued. The face, however, betrays the paralytic affection. She can, by leaning on a chair and pushing it before her, move about a little, dragging the left leg. She has regained very little squeezing power in the left hand, but in this respect for some days past there has been decided amendment. Since the 25th, she has taken with her principal meal—ordinary hospital fare of soup, meat, and vegetables—a pill containing one grain of the extract of nux vomica, one grain of the saccharine carbonate of iron, and two grains of the compound rhubarb pill. She has likewise had every morning an enema of tepid water, by which means a satisfactory state of the bowels has generally been maintained. There is now a greater tendency to constipation. Her allowance of stimulants has for the last few days been one *libre* of claret in the twenty-four hours, and one ounce of rum. The latter is taken in a tumbler of milk when the morning movement of cleaning begins in the ward about seven o'clock. She is not now fed during the night, as she sleeps soundly without awaking.

November 1st. She is progressing favourably. She is allowed to

sit up some hours daily. She is to take one of the pills prescribed on the 25th after each of the two principal meals; and, when necessary, she is to have a tumbler of Pullna water as an aperient.

November 5th, 11 A.M. Since November 1st till yesterday, her condition in respect of the hemiplegia has remained stationary. Her general state has been less satisfactory; but till yesterday, except occasional complaints of frontal headache, there has been nothing in her symptoms to attract particular notice. She awoke yesterday morning with severe headache, flushed face, and dry tongue; and has not since been able to sit up for a short time, as she had been doing daily. Her relapse is probably the result of over-eating and having had more than enough wine. Prior to the 1st, she had for some days been quite ravenous for food. For wine, her craving was also inordinate. To satisfy these desires, she had been supplementing her own very abundant alimentation by using secretly wine and meat which other patients gave her from their superabundance. Her pulse is 120, and her temperature 39.0 cent. The urine is rather scanty. The bowels are confined. She has no appetite. She is to return to a liquid diet, to discontinue the pills, and to have forthwith a tumbler of Pullna water. Till the headache and heat of head cease, cold water is to be diligently applied to the head.

November 9th, 11 A.M. Both symptoms and treatment have continued very much as reported on the 5th instant till this morning, when some amendment in her state is observed. There is a slightly increased power both in the arm and leg. The headache continues, but is rendered bearable by the diligent application of cold water to the entire head. She still sleeps badly, but she slept better last night than for some previous nights. The bowels are moved once or twice daily—sometimes without, and sometimes with, the aid of Pullna water and an enema. The tongue is cleaning. The respiration is natural. The skin is soft, but not moist. The pulse is 104, very compressible; the temperature is 37 C. (98.6 Fahr.) She refuses her food, but takes wine greedily. A very careful examination of her state has now been made. The veins are rendered invisible by the swollen state of the limb and their deep-seated subadipose position. Digital examination occasions so much pain, that it cannot be satisfactorily employed to determine their condition; but it is nevertheless correct to state that the touch gives to a certain extent the impression of cord-like bodies existing in the course of the veins. There is not the slightest voluntary motor power in either the upper or the lower left extremity. The mouth is considerably drawn to the right side; this is much less apparent when the countenance is in a state of repose; it is very striking when she smiles, as she has often done during the preparation of this report. When asked to show her tongue, she protrudes it very slowly and with an air of thoughtfulness, as if she were performing an operation demanding the exercise of the greatest skill. The protruded tongue deviates to the right.

November 16th, 11 A.M. Since the 9th instant, there has been a distinct daily amendment in all the symptoms. To-day, she is ordered to have ordinary diet. The only addition to the ordinary allowance of food and wine is a continuance of the morning ounce of rum in a tumbler of milk. She sits up daily for an hour.

November 17th, 11 A.M. She is up and dressed. She looks well. The pupils are now very moderately dilated. The tongue is clean; the pulse is 70. She speaks without hesitation, and her articulation is distinct and perfect. She cannot, unless supported, take more than three or four steps; even when supported, her gait is very unsteady, and the left leg is slightly dragged. She says that she has not quite as much power in the left arm and hand as in the right; but she uses both arms apparently as well as other people, and the grasp with the left hand is not weaker in proportion to the grasp with the right hand than is usual.

December 1st. She is now quite well. Except a very slight weakness in the left leg, no trace of any paralytic symptoms remains. The rum and milk to be discontinued.

December 8th. No trace of the paralytic symptoms remains. She can walk up and down stairs. The catamenial discharge has returned in a normal manner after missing three periods.

December 16th. She has remained since the 8th free from any paralytic symptoms or local weakness of any kind. She leaves the hospital to-day, plump, and in excellent health.

On every occasion in which the temperature was taken in this case, the thermometer was introduced into the axilla. The cold affusion was frequently used in a modified form throughout the treatment, and generally with the result of abating restlessness, and sometimes of inducing sleep.

[To be continued.]

THE USE OF SULPHURIC ETHER AS AN ANÆSTHETIC.

By THOMAS KEITH, M.D., Surgeon for Ovarian Disease to the Royal Infirmary, Edinburgh.

I OUGHT ere now to have communicated to the JOURNAL my experience of sulphuric ether. I have given it in ovariectomy and other prolonged operations, or whenever it was necessary in feeble patients to give an anæsthetic, ever since the beginning of 1867, when I doubt if anyone used it in this country except myself.

In giving an account in the *Lancet*, August 1870, of my second series of fifty cases of ovariectomy, the following remarks were made.

"In Case LII, the excessive chloroform vomiting during the operation, and for some time after it, so prostrated the patient, that her chance of recovery was lost. In the early cases, I have frequently had to deplore the injurious effects of chloroform vomiting in ovariectomy, and so evident was the mischief occasioned by it in this unfortunate case, that I have since then entirely abandoned the use of this agent in ovariectomy and other severe and tedious operations, and now use instead anhydrous sulphuric ether, made from methylated alcohol, administered through Dr. Richardson's apparatus. The oftener ether has been given, the more I like it. How chloroform so quickly superseded it is a marvel. The anæsthesia of ether, though at first slower, is extremely steady and quiet. There is infinitely less vomiting than with chloroform, and, instead of the pallid face and feeble pulse of chloroform, the patient, after a long operation, is put to bed with a flushed face and a great surface-circulation. In cases of non-adherent tumour, vomiting is, I fancy, of little consequence; but, where there has been extensive adhesion, and when oozing may be set up by it after the wound is closed, vomiting can be no trifle, and may turn the scale. Sulphuric ether has now been used—at first with a small proportion of chloroform—in 53 cases of ovariectomy (of which 46 recovered), and something has been gained from the use of it. I would put in a word for the old anæsthetic. Chloroform certainly saves the surgeon five or ten minutes of time, and a little trouble. Had it never been heard of, I doubt if humanity would have suffered from the want of it."

This opinion was looked upon here as heretical, and, being adverse to chloroform, was attributed to personal motives; yet, after four years, I have little more to add than simply to endorse it.

The case above referred to was at the time published in the *Edinburgh Medical Journal*, and I felt so certain that chloroform vomiting killed the patient, that in the case which came next I took to sulphuric ether in a sort of despair. It was not new to me, for in 1847-48 we all looked upon ether as a good practical anæsthetic. When I began again to use it, a small proportion of chloroform was added; for the best English ethers were found to be very impure, and it was rare to get one with a specific gravity under .750. At length, Dr. Arthur Gamgee put into my hands a perfectly dry ether made from methylated spirit. It is manufactured by those conscientious chemists Messrs. Macfarlane. Its specific gravity is .715 to .717. It costs me three shillings a pound of twenty-four fluid ounces, and it answers admirably for local anæsthesia. For the last six or seven years, nothing but this ether has been used, except twice, when bichloride of methylene was given, and once, a few months ago, when operating at Newcastle, when chloroform was used. The apparatus employed has been the mask of Dr. Richardson's apparatus, with a sponge fixed in the bottom. It might easily be improved; but it answers its purpose well enough, though there is great waste with it. For many years, the ether was administered by my brother Dr. Keith; of late, it has been given by Dr. Foulis, who will at an early day give his observations upon it. There has been no difficulty in bringing patients under its influence. It is given freely, and plenty of air gets in with it. We have not observed the excitement which is said to accompany the inhalation of ether. It is always taken by the patient in bed, and no one is allowed to be in the room but the administrator and nurse.

But the great advantage of ether over chloroform in such operations as ovariectomy lies in the almost complete absence of after-vomiting. Vomiting with an open wound is of no consequence. With chloroform, after-vomiting was the rule, and, in the afternoon and first night of an operation, the nurse required to be always at hand with a basin for the vomiting. With ether, after-vomiting is quite the exception, and it is never severe or continued; while some patients sleep on, and often remain two or three hours without moving after being placed in bed.

My confidence in sulphuric ether as the best practical anæsthetic we yet have does not thus diminish. Its low specific gravity must make it less dangerous than the others. It is not perfect, but it answers my purpose better than any other. It saves my patients from the misery