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ART. I.—*Cerebral Rheumatism*. By J. M. DA COSTA, M.D., Professor of Practice of Medicine in the Jefferson Medical College, Philadelphia; Physician to the Pennsylvania Hospital.

THE occurrence of decided cerebral symptoms in acute rheumatism marks a variety of the disease which, for convenience, may be designated as cerebral rheumatism. The disorder is a perilous one, but one which is, as yet, very incompletely understood. That the subject is an obscure one, its history attests. For a long time regarded as an inflammation of the brain of rheumatic kind, it was held, and is still held by some, to be a metastasis to the brain, and text-book after text-book may be found to have repeated the statement how the joint affection will show signs of abrupt change as the disorder falls on the brain. Then its association with the heart trouble of rheumatism was thought, or is still thought, to furnish the key to the explanation of the nervous disturbance; and even in the late edition of his lectures, Sir Thomas Watson gives the weight of his authority to this view. Very recently, again, the association of the cases with high temperature has been noticed, and this symptom and its immediate belongings are, if we examine the journals of the day, looked upon as furnishing the clue to the explanation of the cerebral or spinal symptoms.

The disorder is not a frequent one, and has been chiefly commented upon in isolated cases. Whether from a distrust of results thus obtained, or from a real rarity of the affection, or whatever the cause, the medical journals and hospital reports may for years be searched in vain for any detailed records of it; and Dr. Frank Woodhury, to whom I am indebted for valuable assistance in the preparation of this paper for publication, has examined, without finding more than here and there an instance,

tens of years of the *British Medical Journal*, the *Lancet*, the *Archives de Médecine*, the *Medical Times and Gazette*, the *Bulletin de la Société Médicale*, the *Practitioner*, the *American Journal of the Medical Sciences*, the *St. Bartholomew's*, the *London*, and *Guy's Hospital Reports*, and a few other similar prominent and popular vehicles of professional thought. But for the last year or two more cases are finding their way into medical literature, and it may, therefore, not be an inappropriate time to inquire, in a connected manner, into the malady. Lange, in a series of careful statistics, shows the singular variations in a number of years; the lowest estimate was 1.3 in every 100 cases of neutre rheumatism, while in some years the cerebral cases bore the proportion of 12.3 to 100. If this is to be anything like the proportion in which, in the near future, we are to meet with the dangerous complaint, it is an additional reason for its investigation.

Now, in describing the malady, I may at the threshold state, that I shall limit the term to cases in which the nervous symptoms are prominent, and appear to constitute the real features of the affection. Doubtless occasional restlessness, and even slight mental wandering at night, are not uncommon in decided cases of neutre rheumatism at the height of the fever, and are the more likely to be found if there be a cardiac complication; but such transitory and subordinate phenomena do not make a disorder which we can call cerebral rheumatism. Nor is it quite in accordance with the results with which this paper deals, to speak of the disturbance as one complaint, when we shall find that several morbid states may contribute to it. Yet partly because the thread may be often traced uniting even these, and partly because it is a convenience, in examining into the clinical manifestations, to treat of all decided head symptoms of rheumatic fever as marking the cerebral type of the malady, I shall discuss it—at least for the present—as if it were a separate and perfectly well-defined morbid condition, pointing out certain readily recognizable differences as we proceed in the inquiry.

This may be taken as the general description: In the course of acute rheumatic fever, usually after it has existed for some time, or even after convalescence and among the first signs of a relapse, appear symptoms of cerebral disorder, manifesting themselves chiefly by restlessness, passing into stupor or coma, or becoming associated with delirium. The former combination is less common than the latter, and of much shorter duration. The delirium is preceded by wakeful, dreamy nights, is generally mild, and it is during the restless nights that it shows itself most plainly. Though it may be a continuous, it is scarcely ever a fierce delirium, and is not, as a very general rule, linked either to headache, injected eye, or vomiting. It may run a rapid course, delirium or stupor quickly ending in coma, coma in death. But ordinarily it goes on for days, the patient gradually mending or becoming weaker and weaker, and passing, per-

haps, into a condition very similar to that of typhoid fever, excepting that the bowels are constipated. The likeness to the enteric fever is heightened by the presence of sordes on the teeth, and the appearance of an eruption. The temperature is apt to be high, the joint-affection persistent, or even showing signs of increase; the breathing is rapid; the pulse frequent, compressible, and at times irregular. A cardiac difficulty may show itself distinctly as a complication, or again be wholly wanting. In some cases convulsions, in others local palsies, happen; or we may have hemiplegia even suddenly developed. But these features are rare; and it is in the wakefulness and restlessness, in the stupor and delirium, that we mostly find the signs of how decidedly the brain has become disordered.

Let me now cite a few illustrative cases. And I will first take one of *stupor*, which, I think, will go far towards explaining what is probably its most common and little suspected cause:—

*CASE I. Acute rheumatism, with apparent convalescence; development of Bright's disease; occurrence of hebétude, passing into stupor; death, preceded by suppression of urine; autopsy.*—Richard D., admitted into the Pennsylvania Hospital December 26, 1871; a ship-carpenter; age 25; unmarried. Two weeks before admission he was exposed to wet weather while at sea. Shortly afterwards he was seized with chilly sensations, followed by high fever and sweating, and the larger joints became successively tender and swollen, but not discoloured. He had never had gonorrhœa, nor an attack of rheumatism.

On physical examination a soft, systolic, mitral murmur was found. The urine contained no albumen; its sp. gravity was 1020. The axillary evening temperature was recorded at 103°; the respirations at 24; the pulse 100. He perspired freely; his tongue was coated; and there was complete anorexia. The next morning the temperature was half a degree lower, the respirations 24, the pulse 104. The treatment consisted of the bromide of ammonium grs. xx, every four hours, and a Dover's powder at night.

Five days later he had greatly improved in general condition; the swelling had disappeared from the joints, but they were still tender. The cardiac murmur had become so faint as to be scarcely audible. Quinia, grs. viij, in twenty-four hours, had been added to the treatment two days before. It was now reduced to grs. vj daily. The bromide was also exhibited less frequently, grs. xx thrice daily.

A week later (toward the end of the fourth week of the disease) he was apparently almost well, the cardiac murmur was still faintly heard, but there was no swelling in any of the joints, he slept well, and passed water freely. The bromide was discontinued; the other treatment remained as before.

An unexpected change now occurred in the course of the disease. He had an attack of tonsillitis, which yielded soon to astringents. Yet he was very restless, and could not sleep at night; he had no headache, but complained of a constant pain in his loins—as, indeed, had been the case for some nights before the passing inflammation of the tonsils. The tongue became thickly coated; he had a troublesome diarrhœa, particularly at night, and lost his appetite. The face was waxy and cedematous, but the feet were not swollen. It was then ascertained that three nights before he

had, without permission, gone into the wash-room and bathed himself very freely.

On the evening of the 8th of January he complained to the nurse that he had passed no water during the day; a catheter was introduced, but no urine could be obtained. Dry cups to the lumbar region were ordered; also hot fomentations, and acetate of potassium in twenty-grain doses every three hours. There was hebetude, but he was not comatose, and had no convulsions. The skin was slightly dusky; there was no urinous odour, yet the whole aspect of the case suggested uræmic poisoning. His breathing became more laboured and rapid; but the pulse was not above 80; the pupils were dilated; and he died in a stupor, January 9th, after suppression of urine for a period of twenty-four hours.

*Autopsy.*—The examination was made twelve hours after death. There was considerable general œdema, but the body appeared otherwise in good condition. *Thorax*—Nothing abnormal was noticed in the lungs or pleura. The pericardium did not contain any excess of fluid. There was a distinct injection of the mitral valves, with a slight swelling of the free border of one of the leaflets, but the valves were free from any deposit, and were not irregular, roughened, or notably thickened. *Abdomen*—The liver was considerably enlarged and bronzed. The spleen measured six by eight inches, and was somewhat softer than in health. Nothing abnormal was noticed in the peritoneum or intestines. The kidneys were enlarged, and felt firm to the touch. The capsules were easily detached, and the cortical substance was red. When a section was made the substance was seen to be pale, and there was some exudation present. General irregular enlargement of the cortical substance at the expense of the pyramids was observed; indeed, the tubular element was much atrophied in one of the kidneys, and, in one place, had disappeared. A small amount of urine which was obtained was found to be highly albuminous, and to contain numerous granular casts. A section of the kidney was sent to the microscopist of the hospital, Dr. Jos. G. Richardson, who reported that "the fragment of kidney, in this section, showed enlarged and congested Malpighian corpuscles, and uriniferous tubules choked up with desquamated epithelial cells, leucocytes, and much granular matter. The tubules were in many places distended and distorted, and even those which at first appeared comparatively healthy could generally, on tracing them out, be found obstructed at some part of their course. In one instance a small hyaline tube-cast was seen projecting from the ruptured extremity of a tubule." The brain could not be examined.

This case is a striking illustration of the occurrence of cerebral symptoms after apparent convalescence. But it is chiefly valuable because it proves the lesion of the kidneys that may happen in acute rheumatism, and that did happen after the case had been actually some time under observation, for the first records show that the urine was healthy. Moreover, it shows in what manner exposure may act, and explains the occurrence of suddenly developed stupor passing into coma; and I suspect that nearly all of the so-called apoplectic instances of cerebral rheumatism, which have been placed on record, are of a nature which this case brings out, as indeed it suggests the explanation of many of the other nervous phenomena of the morbid.

Here is another instance in which there was stupor as well as delirium, and in which the examination after death showed the kidneys diseased, but not the brain.

**CASE II.** *Appearance of cerebral symptoms during a relapse of joint affection; stupor and delirium; urine albuminous, and found to contain granular and oily casts; autopsy.*—Marry Mc., an Irish domestic, single, aged 25. Her general health had been always good, with the exception of an attack of acute rheumatism eight years before, which, although accompanied by cardiac pain and dyspnoea, was without sequelæ. Two weeks before coming under observation, her toe-joints became painful and enlarged, the disease then extended to the larger joints, involving them successively.

She was admitted to the women's medical ward of the Pennsylvania Hospital on Feb. 25th, 1871, when all the principal joints were found to be more or less affected. There was no cardiac pain, but the existence of tenderness was demonstrated when pressure was made over the apex. The first sound was prolonged and murmurish; the second sound rather abrupt. The tongue coated lightly; appetite poor; bowels were constipated; she slept badly.

She was ordered bromide of ammonium grs. xx every four hours, with a restricted diet.

The case progressed well, no complications occurred, the skin became moist, the tongue clean, and she seemed about to enter into convalescence, when on the 4th of March, the twenty-first day of the disease, the evening temperature advanced to 100.5°, and within the next few days the affection returned to the wrists and the knees, and the tongue again became coated. A mild delirium now appeared for the first time; she was noticed to be very imaginative and talkative, and to sleep very little. She was ordered (March 8th) to take at night forty grains of chloral hydrate with five drops of deodorized tincture of opium. The bromide was still continued, and on the next day five drops of tincture of digitalis were added to each dose, and compound cathartic pills administered. She was now quite dull, had considerable mental wandering, and was very sleepless; the heart's action became more forcible, and there was throbbing of the temporal arteries.

Two days later she was noted as having slept better, but her mind was more dull and her countenance stapid. The joint trouble was less marked, and she passed water freely. Her skin was sallow; tongue dry and glazed; pulse 112; respirations 36; evening temperature 103½°. She stated that she had no headache or cardiac pain. Physical examination demonstrated the absence of any increased area of cardiac dullness, or any signs of lung trouble. There was no distinct cardiac murmur; the slight alteration of the first sound previously referred to was still noticed.

Spt. of nitric ether was ordered in addition to the previous treatment.

The next few days she became more dull; the pupils were sluggish and somewhat dilated; there was no injection of the conjunctiva; the tongue was still dry and red, and bore white crusts upon it. The evening temperature was 102° (March 12th). There was no change in the heart-sounds, but there was percussion dullness at the base of the left lung posteriorly, without bronchial breathing; anteriorly the lungs were clear. The urine was voided involuntarily in the bed, and the quantity of it was small. She had been receiving some stimulant, but it was now increased to one

ounce of whiskey, in panch, every three hours. The former treatment was suspended and acetate of potassium grs. xx ordered every three hours, and a blister was applied to the nape of the neck. No chloral had been taken since the 11th.

On the 13th of March, the thirtieth day of the disease, the cardiac impulse was noticed to be somewhat jerking in its character. No murmur could be detected, but at the left base one of the sounds was followed by a little irregularity as if due to a slight pericardial roughening. Pulse 120 and very compressible. The joint affection still lingered on the right side, but had entirely disappeared from the left half of the body. She had now become duller and almost comatose, the *alæ nasi* were widely dilated; she had almost entirely lost the power of swallowing, and could only take her medicine by drops. The urine was passed in the bed but not freely, that taken from the bladder contained about one-sixth albumen, and under the microscope showed tube-casts containing epithelium in an advanced stage of fatty degeneration. She died the same evening.

*Autopsy.*—The examination was made eighteen hours after death. The body was fairly nourished and the rigor mortis well established. *Thorax*—Each pleural cavity contained about a pint of clear fluid. There were no evidences of recent inflammation, the lungs were somewhat congested posteriorly. The heart was rather larger than normal, but otherwise appeared healthy; both ventricles were distended with large recent clots. *Abdomen*—There was apparent incipient fatty degeneration of the liver, but it was not very marked. The kidneys were large and pale though somewhat congested, and the existence of fatty degeneration was demonstrated by the microscope. The spleen and intestines were apparently normal. *Encephalon*—The large venous sinuses were moderately full of dark blood. The membranes were carefully examined, but showed no evidence either of congestion or any product of inflammation. The substance of the hemispheres appeared absolutely healthy, the puncta were not abnormally numerous nor very distinct. The lateral ventricles each contained about a drachm of serous fluid. There was no evidence whatever of any lesion within the cranium. An examination of the blood for urea by Dr. Hare gave negative results.

These cases show then a remarkable coincidence in some of the symptoms, and tell us in what direction we are to look in instances of stupor, or stupor and delirium, arising in the course of cerebral rheumatism, before we seek for the explanation elsewhere.

Cases in which delirium alone occurs may be, but are not so apt to be, referable to the same category. That no urea was found in the blood in the second of these cases is no proof that the symptoms were not largely uræmic; for recent experiments have clearly demonstrated how the morbid manifestations of uræmia may happen without urea accumulating in the blood.

As another instance of cerebral rheumatism, chiefly marked by stupor, I subjoin this case, which (though, owing to the limited character of the autopsy that alone was possible, it cannot be here adduced as a proof of what I suspect is the most common cause of a group of the disorder

mainly characterized by stupor and coma) is valuable on account of the absence of heart lesion, and of the minute examination of the brain.

**CASE III. Occurrence of stupor in the course of mild acute rheumatism; no heart trouble; autopsy; microscopical examination of the brain.**—Mria D., domestic, single, age 40, born in Ireland, was admitted to the women's medical ward, Pennsylvania Hospital, on the 23d of April, 1872, with a mild attack of acute rheumatism, which began ten days before admission, and was not her first attack. There had been no cardiac trouble, and the articular affection was mild. The intelligence of the patient was naturally feeble.

Bromide of ammonium was ordered, as in the preceding cases, in twenty-grain doses every four hours, and she was placed upon a light nutritious diet.

Four days after admission she was noticed to be drowsy and dull, and when roused would slowly answer questions and immediately relapse into a stupor. She refused to swallow, but there was neither spasm nor vomiting. A blister was applied to the back of the neck, but without improvement becoming manifest. No special change in the joint affection was observed. The next day the pupils were noticed to be contracted, and did not react. The head was not retracted; the pulse was small and very compressible; there was some throbbing of the carotids. The act of swallowing was accomplished with great difficulty; she had some cough. A few doubtful reddish spots were seen upon the abdomen. The urine was passed involuntarily, and an attempt to collect it, for examination, was unsuccessful. On physical examination the action of the heart was found to be accelerated, but no murmur was evident. Anteriorly the lungs were clear, but the right lung was somewhat dull posteriorly, and the respiratory murmur was fainter than upon the left side. The patient died the same evening (April 29th), six days, therefore, after her admission into the hospital.

*Autopsy* made thirty-six hours after death, the brain only being examined. The meningeal vessels seemed congested, but the brain substance was firm, pale, and anæmic; the circle of Willis was distinct; the arteries at the base contained soft coagulated blood, but nowhere were found any firm clots, or evidences of inflammation of the walls of the vessels, except a faint, unequally-distributed pinkish blush, most marked at the points of greatest accumulation of the soft clots mentioned, which, before it was closely inspected, was thought to be due to staining from hæmatin.

After hardening in alcohol, a portion of the brain was examined microscopically by Dr. Richardson, who reported that "the specimen sent does not exhibit any changes indicating organic disease, although the unusual abundance of red disks in the arterioles and capillaries evidence a decided congestion of the organ. This congestion is still more manifest in the choroid plexus, where many leucocytes appear to have wandered out of the vessels into the surrounding tissue; not, however, in sufficient quantity to constitute an effusion of pus, but only to cause a slight cloudiness of the membrane."

I have already alluded to the kind of *delirium* usually met with. It is not violent, and is rarely associated with headache; but the restlessness that attends it is extreme, and often the patient will have to be restrained from fulfilling his chief desire—to get out of bed. It is generally worse at

night; and sometimes has a strange hysterical semblance. This case showed it markedly, and is also interesting on account of the lesion found in the vessels of the brain.

*CASE IV. Marked delirium of hysterical type; absence of headache and high temperature; long duration of case; autopsy; occlusion of finer vessels of brain by plugs.*—Helen F., a seamstress, widow, age 30, born in America. She had had an attack of acute rheumatism eleven years before, from which she recovered without any sequelæ. The attack for which she was admitted to the hospital, Jan. 18th, 1872, began insidiously four days before. The knee and wrist-joints were soon involved, and there was considerable fever. The joints indicated were very tender to pressure and upon motion, and were swelled, but not discoloured. The left ankle was also implicated, and like the others was enlarged but not red. The tongue bore a whitish coating; the bowels were constipated. The treatment ordered was bromide of ammonium twenty grains every three hours.

The next morning the pulse was 84, temperature  $101\frac{1}{2}^{\circ}$ ; in the evening the pulse was 88, and the temperature  $101\frac{1}{2}^{\circ}$ .

The patient was noticed to possess a highly hysterical temperament. The cardiac sounds were feeble, and the first sound was murmurous; she did not complain of precordial pain or tenderness. The urine was turbid from urates, of acid reaction, specific gravity 1034, and did not contain albumen; the total quantity passed in twenty-four hours was forty ounces.

20th, A. M., pulse 84, temp.  $99^{\circ}$ ; P. M., pulse 92, temp.  $101\frac{1}{2}^{\circ}$ . 21st, A. M., pulse 88, temp.  $99^{\circ}$ ; P. M., pulse 84, temp.  $101\frac{1}{2}^{\circ}$ . The disease now extended to nearly all the remaining joints, involving them in succession; those first attacked had become less painful. For the first time a faint systolic cardiac murmur was heard over the apex.

Three days later the urine was again measured, and the quantity voided in twenty-four hours was found to be  $\text{f}\overline{\text{3}}\text{xxxij}$ , the specific gravity had fallen to 1022, but the increase of urates persisted, and there was still no albumen. The general condition was then more comfortable; the cardiac murmur was very indistinct, and her chief complaint was of muscular soreness. The evening temperature was only  $99^{\circ}$ ; the pains had almost entirely disappeared; there was no cardiac murmur, and the patient appeared January 29th to be convalescent.

On Feb. 3d a curious mental state was observed. She was seemingly well, but very fidgety, and when only partly aroused there was mild, good-natured, mental aberration, which would disappear as her attention was strongly attracted, and, when formally questioned, she gave rational replies. The pulse ranged from 80 to 90; no fever or other constitutional affection was noticed. She did not complain of headache; the pupils reacted well, but were slightly larger than usual; there was no vomiting. She fancied that she was in the bed of some one else, and constantly endeavoured to return to her own. The treatment was changed by adding tincture of cannabis Indica to the bromide.

Two days subsequently, the 5th of Feb., the delirium was more marked; the previous treatment was suspended, and full doses of opium were ordered.

Feb. 10. She seemed somewhat relieved, and was taken before the class. She there became very hysterical, weeping and troubled. The skin was cool, there was no headache nor vomiting, nor lesion of heart or lungs.



She was so strikingly hysterical that before the crisis the point most insisted on was the hysterical nature of the delirium in connection with acute rheumatism. The joint trouble had wholly subsided, and the urine was free from albumen and not otherwise abnormal. She was directed to be placed upon a generous diet, to which a little stimulant was added, and to have deodorized tincture of opium, twenty drops, at night.

No change occurred during the subsequent week. She still had nocturnal delirium, chiefly manifested in attempts to get out of bed. During the day she lay in a half-stupid condition, whining occasionally, while at other times there was low muttering delirium. She refused food and medicine, gave no warning of the movements of her bowels, which were frequently disturbed, and voided the urine in bed. When addressed, signs of attention were shown, and her reply, though slow and indistinct, was rational. The pulse was 112; there was some cough; the skin was cool, and the face slightly flushed. There had been recurrence of the joint affection, chiefly in the left wrist and fingers.

During the succeeding week, the fifth of the disease, she became quieter and more stupid, and progressively weaker and thinner. She began to swallow a little better, however, although she took nourishment with difficulty, and had to be propped with pillows to prevent her from falling out of bed. She was getting now  $\frac{3}{4}$  viij of whiskey daily.

The area of cardiac dulness was not increased, and there were no endo- or pericardial murmurs; the first sound was short, the second distinct; the pulse was compressible; the diarrhoea had ceased, but she had emaciated rapidly during the preceding two weeks. There was no paralysis, and she slept well with an opiate.

She was more restless during the next week. The urine was still passed in bed, but the bowels were constipated. She was not able to project the tongue further than the teeth, when requested to show it. Pulse 100, and the skin felt dry and hot. The pupils were about the normal size, but now responded very sluggishly to light. There were no evidences of any cardiac lesion. A drooping of the upper eyelids now was noticeable, and was accompanied by a thick secretion which collected about the canthi, probably connected with a tarsal ophthalmia which she had had for several weeks. The skin of the forehead seemed bluish and had a drawn appearance; the forehead looked large. Tickling of the extremities gave rise to no reflex movements, but no paralysis existed. The head had not been retracted at any time, and no pain was produced by bringing it forward; this was tried on several occasions. There had been no complaint of headache at any period in the history of the case, and the temperature did not go above  $101^{\circ}$ . The variations between the morning and evening temperatures were scarcely ever above half a degree, as the record proves. 21st, P. M.  $100^{\circ}$ ; 22d, A. M.  $100^{\circ}$ , P. M.  $100.5^{\circ}$ ; 23d, A. M.  $101^{\circ}$ , P. M.  $100.5^{\circ}$ ; 24th, A. M.  $101^{\circ}$ ; 27th, A. M.  $99^{\circ}$ , P. M.  $100^{\circ}$ ; 29th, A. M.  $100^{\circ}$ , P. M.  $100.5^{\circ}$ .

During the eighth week the treatment was principally nourishment. A blister was applied to the nape of the neck, but the opium was suspended.

March 2. At the beginning of the ninth week she died exhausted and in a comatose condition.

*Autopsy.*—*Thorax*—No pleural effusion existed; a few old adhesions at the right apex were found, but nowhere else; the lungs were normal; the heart was of the usual size and its substance firm. Some congestion and thickening of the mitral valves existed, but no exudation or roughening;

the tricuspid was normal. In the endocardium of the left auricle, about half an inch above the valvular insertion, were a few minute granular points, occasioning a slight roughening of the membrane. *Abdomen*—The liver and kidneys were normal; the spleen was unusually small, it contained no embolic patches. *Encephalon*—The dura mater was normal, save a slight fulness of the large vessels. No effusion or pus, nor appearance of exudation or opacity, was found either at the base or on the convexity of the hemispheres; there was no subarachnoid effusion; the vessels of the pia mater were deeply injected, but there were no signs of exudation. Some of the small arterial branches towards the convexity of the brain, which presented the appearance of being plugged at several points, were retained for microscopic examination; the arteries forming the circle of Willis were full of blood, but had not the knotted appearance shown by the other arteries; the brain-substance was firm and apparently normal; the puncta vasculosa were numerous and distinct in the white substance; the gray layer was perhaps thinner, but neither redder nor paler than usual; there was no gross appearance of softening. Part of the brain being sent to the microscopist, Dr. Richardson, he reported: "Careful microscopic examination of the portion of brain sent me fails to reveal any organic changes. The walls of the bloodvessels (although containing more blood corpuscles than usual) appear quite healthy, and the nerve-cells of the gray matter, as well as the nerve-fibres of the white substance, present no abnormal aspect." The vessels of the choroid plexus were very full; on the left side there was a fusiform distension of a vessel which had the appearance of a small aneurism; another was found on the right side. No effusion existed in either ventricle, nor was the surrounding brain-substance softened. The optic thalami and corpora striata were normal in appearance. The third and fourth ventricles and the nerves at the base of the brain were apparently healthy. The vessels around the medulla were injected, but there was no exudation. The distended appearance of the vessels of choroid plexus was found, on examination, to be due to an effusion between the vessel and its sheath. The vessels coming from some of the smaller divisions of the middle cerebral arteries on both sides, examined with reference to their knotted appearance, were found to be occluded by fibrinous plugs, which was confirmed by microscopic examination.

Here is certainly a case of very great interest, alike in its symptoms and as throwing light on their cause. The absence of renal, and I may say even of cardiac trouble, makes the record a very pure one of cerebral rheumatism with a definite lesion. Were the plugs washed into the brain? Or did they form in its finer vessels? I am inclined to think the latter. There was really no disease of the heart, for the granular exudation above one of the cardiac orifices mentioned in the record of the autopsy was not marked—no mere trifling roughening of the membrane, from which nothing could have been washed away.

One of the recorded symptoms of this case demands a word of explanation. It is the remark about the face. I have never seen the expression here referred to excepting where there was organic trouble within the cranium, and I do not recall that I have ever encountered it excepting in cases that have ended fatally. The forehead appears to have grown in

size and width, it looks so large and the skin seems drawn more tightly over it, and may have even a slightly bluish cast. The eyes are apt to be sunken. This physiognomy here alluded to as occurring in a case of cerebral embolism or thrombosis, I have also met with in simple and in tubercular meningitis, and in cases of acute softening.

The examples of cerebral rheumatism we have been hitherto studying are marked by an absence of heart disorder, and are, therefore, in themselves of some value as deciding that the head symptoms of acute rheumatism are not simply due to a cardiac complication. I shall now bring forward a group in which there was disease of the heart, though the cerebral symptoms threw those of the cardiac malady into the background, and were not, I think, wholly owing to them.

**CASE V. *Acute rheumatism with pericarditis; restlessness and delirium; recovery.***—Patrick D., admitted into the hospital January 3d, 1874, a hotel-porter, thirty years old and unmarried. He had had an attack of rheumatism nine years before. The present one began four days prior to admission, after exposure to a draught while overheated. Fever and thirst had been present from the commencement, and all of the large joints had been affected, although when first seen he complained most of pain in his knees, which were puffy and tender, but not markedly red. Pulse 96, respirations 24, and temperature 101°. The urine was of an amber colour, acid, specific gravity 1018, and did not contain albumen. Twenty grains of bromide of ammonium were ordered every second hour, and infusion of digitalis; also four ounces of whiskey in milk-punch daily.

The examination of the heart showed somewhat increased percussibility dependent upon a moderate amount of pericardial effusion. The impulse was weak, and the pulse seemed weak when contrasted with the stalwart appearance of the man. His general condition for some days remained the same, and is thus noted:—

*Jan. 4, A. M.,* pulse 84, resp. 24, temp. 101°; *P. M.,* temp. 102°. *5th, A. M.,* pulse 92, resp. 30, temp. 101°; *P. M.,* pulse 100, resp. 30, temp. 102°. *6th, A. M.,* pulse 84, resp. 18, temp. 98°; *P. M.,* pulse 84, resp. 24, temp. 102°. *7th, A. M.,* pulse 80, resp. 24, temp. 100°; *P. M.,* pulse 80, resp. 18, temp. 100°. *8th, A. M.,* pulse 80, resp. 30, temp. 100°; *P. M.,* pulse 84, resp. 24, temp. 101°. *9th, A. M.,* pulse 86, resp. 24, temp. 100°, some congestion at base of left lung. *10th, A. M.,* pulse 90, resp. 24, temp. 99°; *P. M.,* pulse 96, resp. 30, temp. 97½°. *11th, A. M.,* pulse 84, resp. 30, temp. 97½°; *P. M.,* temp. 98°. *12th, A. M.,* pulse 84, resp. 24, temp. 100; *P. M.,* pulse 90, resp. 30, temp. 100°.

*12th.* A blister was ordered over the heart, and the infusion of digitalis was increased to one drachm thrice daily; an opium pill was directed to be given p. r. n. The bromide was discontinued, but the whiskey (f3iv) was kept up, and twelve ounces of beef-tea added to the treatment. There was impaired resonance at the lower part of the left lung with a number of coarse râles. First sound of the heart was very faint and both sounds were feeble; it was observed that he talked in his sleep.

*13th, A. M.,* pulse 104, resp. 30, temp. 99½°; *P. M.,* pulse 96, resp. 36, temp. 103°. The patient was worse; there were some moist râles over the left lung posteriorly; there were fine râles and faint friction at the lower part of the right lung; both lungs were congested. He com-

plained of oppression in the chest, and his breathing was rapid. First sound of the heart was feeble, and there was a faint murmur; the pulse was compressible and of moderate volume. The change in his condition was attributed to his getting out of bed. Dry cups were directed to be applied over both lungs; and acetate of potassium, twenty grains every three hours, was given.

14th, A. M., pulse 98, resp. 38, temp.  $103^{\circ}$ ; P. M., pulse 108, resp. 36, temp.  $103^{\circ}$ . 15th, A. M., pulse 92, resp. 24, temp.  $99\frac{1}{2}^{\circ}$ ; P. M., pulse 94, resp. 30, temp.  $101^{\circ}$ . Slight mental aberration was noticed, but there was less fever; the heart sounds were more distinct, and the pulse had more volume.

16th, A. M., pulse 92, resp. 30, temp.  $99\frac{1}{2}^{\circ}$ ; P. M., pulse 80, resp. 24, temp.  $102^{\circ}$ . His general condition was much improved; there was a little more strength in the cardiac impulse. The urine was strongly alkaline, specific gravity 1030, and loaded with urates.

17th, A. M., pulse 78, resp. 24, temp.  $98\frac{1}{2}^{\circ}$ . All the joints were free from pain, but the tongue was still coated and he was restless at night. The acetate of potassium was reduced to ten grains thrice daily, and the next day entirely discontinued. Six grains of sulphate of quinia were directed to be given daily.

18th, A. M., pulse 78, resp. 20, temp.  $97\frac{1}{2}^{\circ}$ ; evening temp.  $98\frac{1}{2}^{\circ}$ .

The next day there was incoherence of speech and the patient appeared dull; the tongue was pasty, the appetite poor. The whiskey was increased to six ounces, and the quinia to grs. viij daily.

19th, A. M., pulse 70, resp. 18, temp.  $97^{\circ}$ ; P. M., pulse 70, resp. 18, temp.  $97^{\circ}$ .

20th, A. M., pulse 60, resp. 18, temp.  $97^{\circ}$ ; P. M., pulse 60, resp. 18, temp.  $97^{\circ}$ . The infusion of digitalis was now stopped, and the whiskey was increased to eight ounces. The second sound of the heart was much more distinct, it was so even towards the apex, but the first sound remained feeble. There was still mental wandering, and he got out of bed at night without seeming to know what he was doing. His delirium was nearly constant but quiet and good natured, and though once or twice when pressed to do or take things, he expressed resentment and a determination to make short work of the attendants, he did so with the air of a man obliged to perform a painful duty. There was no stiffness or pain in any of the joints, but the tongue was heavily coated and some sordes on the teeth were noticed.

From this time he steadily recovered, the heart-sounds became more and more distinct, and the percussion-dulness declined to the normal area. He was discharged on the 2d of March, after he had been well for several days, and been acting as assistant in the ward. I have since heard of him as having grown very stout and being as vigorous as ever.

The next case I only investigated on admission. Its marked features happened while under the care of my colleague Dr. Aitken Meigs; and case VII. I saw with another colleague, Dr. Hutchinson, by whose permission I here record it. The time at which I examined it was while the pericardial effusion was most marked, and the question of tapping arose. But we decided against it on the ground of the collection of fluid being too small, and that it was not from pressure on the heart that the dangerous symptoms had arisen.

*8 febrile delirium but large amount of fluid*

**CASE VI.** *Acute rheumatism with endo-pericarditis; delirium; stupor, but absence of headache; autopsy.*—A widow, age 24, born in New Jersey, was admitted May 9th, 1873, after suffering for a week from pain and swelling of the wrists and knees, with considerable fever. She had had no treatment before coming to the hospital excepting rest in bed. Frame small; skin sallow; general condition impoverished; action of the heart rather accelerated, and a decided mitral murmur, blowing in character and systolic in time; axillary temperature  $103\frac{1}{2}^{\circ}$ ; urine was strongly acid, specific gravity 1024, containing albumen, but no casts, says the note recording her state. The treatment instituted was bromide of ammonium, grs. xx, every three hours, with morphia, hypodermically, at night. The joints were wrapped in cotton wadding. Flying blisters were applied over the heart. The joint affection slowly subsided in the course of the next two weeks, but the heart became more irritable, a marked friction sound was evident, and she complained of pain in the cardiac region. She had been using tincture of digitalis, ten drops, three times daily without much apparent effect. This was suspended on the 22d and tincture of aconite root, two drops thrice daily, exhibited.

On the 24th of March, the twenty-third day of the disease, she became delirious at times, and tried to get out of bed. She talked incoherently and could not be roased so as to answer intelligibly; complained principally of cardiac pain; no headache was noticed. The aconite was cautiously increased to twenty-four drops daily, but without checking the rapidity of the heart's action, and veratrum viride, afterwards substituted, proved equally inefficient.

Stimulants were added to the treatment, and on May 30th the bromide was discontinued and carbonate of potassium, grs. x, given every three hours. The tongue became dry, brown, and fissured, and she gradually sank into a stupor, in which she died June 17th.

*Autopsy* made fourteen hours after death. Rigor mortis well established; considerable saggregation posteriorly. *Thorax*—No effusion in the pleural cavities and no adhesion. Lungs normal; the pericardium adherent throughout, being connected by a mesh-work of recent lymph. Heart about the normal size, and the ventricular walls of the usual thickness. The mitral valves were thickened and had a few moderate-sized vegetations upon the free border. The tricuspid valves were, at first sight, pronounced normal, but, upon examining their substance between the fingers, small angular bodies were found to be imbedded therein. The semilunar valves were healthy and competent. The abdominal viscera were normal; the kidneys were not microscopically examined. An inspection of the brain was not permitted.

**CASE VII.** *Acute rheumatism with pericarditis; delirium; muscular tremours; gradual sinking; autopsy.*—Ida H., æt. 22, married, born in Philadelphia, was admitted to the hospital Dec. 23, 1873, under the care of Dr. Hutchinson. She had always had good health until the present attack, and was free from any hereditary tendency as far as she knew. Five weeks before admission, after getting her feet wet while scrubbing, she had severe pain in her knees accompanied by swelling and fever. From the onset of the disease, she had been confined to bed and all the large joints had been successively affected, the disease pursuing the course of an ordinary attack of acute rheumatism of some severity but without complications.

When admitted all the large joints were painful, moderately swollen, and extremely sensitive. The area of cardiac dulness was somewhat increased

and the sounds were slightly muffled, but there was no murmur. She was feverish and had frequent sweats; the tongue was coated; the pulse 120, and the evening temperature  $101^{\circ}$ . The urine was acid, specific gravity 1028, and did not contain albumen; it was loaded with urates.

She was ordered twenty grains of acetate of potassium every second hour, and infusion of digitalis, a drachm every third hour. Pericardial friction of small extent was developed during the succeeding week; otherwise the case progressed well.

The treatment was modified on the 24th by the addition of six grains daily of quinia; afterwards, on the 27th, the acetate of potassium was discontinued on account of diarrhoea, and the bromide of ammonium was substituted. Three ounces of whiskey, daily, were ordered on the 26th.

On the 30th the morning temperature was  $100^{\circ}$ , and the pulse and respirations 80 and 24 respectively, the joints were not so painful, the tongue was cleaning, the bowels were open, the pulse was stronger, and the pericardial friction-sound less distinct than on the day preceding.

The succeeding day she complained of more pain in her joints, but the pericardial dulness was evidently diminishing, and the heart-sounds were becoming more distinct. The bromide was ordered to be discontinued, as she again had an attack of diarrhoea. A mental dulness was now noticed for the first time, and was thought to be due to the opium which had been given at night to relieve pain and procure sleep. Pulse very feeble, and intermitted occasionally. A few sonorous râles were heard in the chest posteriorly.

Jan. 1, 1874, pulse 128, resp. 20, and temp.  $100^{\circ}$ , in the morning; and in the evening, pulse 132, resp. 32, and the same temperature. There was active delirium during the preceding night, with attempts to get out of bed and marked trembling of the muscles in the morning, with intense pain in the knee; the tongue was heavily coated. She was ordered bromide of potassium at night, and five drops of dilute muritic acid with ten of turpentine to be given every second hour; the digitalis was suspended, but the quinia continued.

The next day the tongue was not so dry, and the muscular tremours, which in truth had been gradually coming on for some days, were less marked. A. M., pulse 120, resp. 22, temp.  $99^{\circ}$ ; P. M., pulse 128, resp. 40, temp.  $101^{\circ}$ .

On the 5th it was noted that the temperature was  $102^{\circ}$ , the wandering and restlessness were decided, especially at night. There was no increase in the pericardial dulness or effusion. The acid and turpentine mixture was stopped on the 3d, and the digitalis and bromide of ammonium resumed, but were again discontinued this day. She was directed to take five grains of Dover's powder every three hours, night and day, the quinia was continued and the stimulant increased to eight, and on the 6th, to ten ounces daily.

Two days later there was but little change in the patient's condition; tongue still pasty but moist, mind dull, pulse feeble and irregular, and the heart-sounds rather more distinct.

From this time she gradually sank, the pulse became less frequent and distinctly intermittent; the mind continued dull, until the 14th, when death occurred.

The temperature records of the last week were: Jan. 6, A. M., pulse 82, resp. 24, temp.  $101^{\circ}$ ; P. M., pulse 116, resp. 24, temp.  $103^{\circ}$ . Jan. 7, A. M., pulse 134, resp. 32, temp.  $101^{\circ}$ ; P. M., pulse 140, resp. 24,

temp. 103°. Jan. 8, A. M., pulse 128, resp. 28, temp. 102°; P. M., pulse 132, resp. 28, temp. 100°. Jan. 9, A. M., pulse 132, resp. 28, temp. 100°; P. M., temp. 101°. Jan. 10, A. M., pulse 140, resp. 32, temp. 101°; P. M., pulse 140, resp. 24, temp. 102°. Jan. 11, A. M., pulse 120, resp. 20, temp. 101°; P. M., pulse 100, resp. 28, temp. 102°. Jan. 12, A. M., pulse 130, resp. 40, temp. 101°; P. M., pulse 135, resp. 44, temp. 102°. Jan. 13, A. M., pulse 108, resp. 36, temp. 101°.

*Autopsy*, twenty-two hours after death, showed the lungs free from disease, and normal except some hypostatic congestion. There were no pleural adhesions. The blood was fluid and dark-coloured. The cardiac valves were healthy, and sustained the hydrostatic test; a small, white fibrinous clot was found attached to one of the aortic leaflets. In the pericardium about three ounces of fluid were found; the visceral layer of the pericardium was dotted here and there with ecchymotic spots, and at one or two points were small patches of whitish lymph. The abdominal viscera were healthy. The brain was anæmic, the veins engorged, but no clots were seen in any of the vessels, and no inflammation or thickening of the membranes existed.

Now, as regards the cardiac phenomenon in these cases, they were not so striking that it seems possible through them alone to account for the head-symptoms. Doubtlessly they acted as favouring elements, by the weakening of the circulation they occasioned, and by disturbing the regulated supply of blood to the head. In one of them, and in which, moreover, there was albuminous urine, the products of the endocarditis may have found their way into the blood, and thus produced certain changes which favoured the development of brain disorder. But I think that in any case there is something more needed than a mere disturbed circulation to occasion such marked signs of disturbance. There is either a coincident action of the rheumatic disease on brain and heart, or such changes in the blood produced by the cardiac affection pouring its results into the circulating fluid as will lead to local disorder in the brain. Of course pericarditis cannot do this, and only severe instances of endocarditis would be at all likely to do it.

Thus far in examining the character of the cerebral symptoms we have been chiefly concerned with the restlessness, the stupor, and the delirium. The usual absence of headache and of vomiting too has been mentioned. Now in some cases, not in many, there is marked tremour, one-sided or double-sided; or spasmodic contractions of the muscles, especially of the face; or one-sided facial palsy or hemiplegia. The pupils are always apt to be small, and, whether small or not, very sluggish. Some of these points are made manifest by the following two cases:—

**CASE VIII.** *Restlessness and hysterical manifestations preceding stupor; headache; spasmodic contraction of facial muscles; coma; temperature before death 108½°.*—Susan McG., Irish domestic, single, age 24. Four weeks before admission she had been confined to bed with a transitory sickness, which she attributed to exposure to cold and wet. After a few days, however, she resumed her occupation and continued at it for a

week; then, according to her account, had pain and stiffness in knees, but her joints were not red nor discoloured, nor had she fever, but she felt weak and unequal to exertion. Twelve days before admission the ankles became red and swollen; subsequently all the large joints were invaded in succession, the disease being very migratory. She had received no special treatment.

When admitted into the hospital, March 4, 1872, all the large joints were affected, particularly those on the left side. Although she stated that she had perspired freely during the preceding week, the skin was not moist, and her face was flushed and bore an expression of great distress. She slept poorly, which she attributed to the pain of the joint affection. The tongue had a white coating; the appetite was poor, and the bowels were rather constipated. There was no cardiac murmur, but the first sound was duller than normal. She was placed upon the bromide of ammonium, grs. xx, every four hours, with a Dover's powder at night.

On the 8th, the pulse in the morning was 108, and temperature  $101^{\circ}$ ; in the evening pulse the same, but temperature had declined to  $100\frac{1}{2}^{\circ}$ . The pains were much less, and there was no cardiac murmur.

During the next week, the beginning of the third week of the disease, she remained in about the same condition; the pulse varied from 84 to 100, and the temperature was not higher than  $100\frac{1}{2}^{\circ}$ ; there being sometimes no difference between morning and evening, though the latter usually—not invariably—was higher, by about half a degree. The articular trouble subsided, so that the joints were neither swollen nor tender. The tongue was still coated; skin dry; appetite poor; bowels moved once daily. She had no headache, and the mind, March 16th, was noted as perfectly clear. The evening temperature now marked  $101^{\circ}$ , and she complained of pain in her shoulders and wrists.

On the 17th, pulse 120 in the morning, and temperature  $100\frac{1}{2}^{\circ}$ , but in the evening pulse 108 and temperature  $102^{\circ}$ . She complained very much of the pain in her upper extremities, at times crying out in a hysterical way. She derived great relief from half a grain of sulphate of morphia given hypodermically morning and evening.

The next morning the pulse was 120, but in the evening it was 108, and the temperature had gone up to  $103^{\circ}$ . This evening (the 28th) she began to complain of her head, occasionally crying out with pain, but generally she was dull and drowsy.

On the 19th, the morning temperature was  $103^{\circ}$ , in the evening it had gone to  $103.5^{\circ}$ , the pulse at each observation was 120. She now relapsed into complete stupor, from which she could not be roused either to reply to questions or to take her food. She passed her water in bed. The pupils were small and sluggish. No cardiac lesion could be detected.

A blister was directed to be applied to the back of the neck, and twelve ounces of whiskey ordered to be given, daily, in milk-punch.

The following morning, pulse 136 and temperature  $105^{\circ}$ ; pulse in the evening 160, but temperature unfortunately was not obtained; pulse very irregular, varying forty beats in an hour; heart's action feeble, and a faint systolic murmur audible at the apex. Face rather flushed, and there are occasional spasmodic contractions of the facial muscles with twitchings of the eyelids. The pupils quite small and reacted very slowly; no strabismus; respirations at times prolonged and sobbing. She had now ceased to cry out, and was quite unconscious. The head was not retracted, but there were occasional nodatory motions of the body, with tossing of the arms. The skin was moist; the bowels were constipated, and the orifices



was still passed in bed. She was ordered acetate of potassium grs. xx, every three hours, and a large turpentine enema. In spite of the treatment, however, she continued in the same condition until the following morning, when she died, the temperature before death being 108.2°.

An examination was refused, but the urine remaining in the bladder was found to contain a large proportion of albumen; no tube-casts, however, were found after a careful search.

**CASE IX.** *Cerebral rheumatism with delirium and one-sided facial palsy; slight motor paralysis of muscles of arm and leg, same side; gradual and complete recovery.*—I saw late in May, 1870, with Dr. Dunton, in Germantown, a lady of sixty, in whom curious mental symptoms had developed themselves in the course of subacute rheumatism. She had had for years, off and on, slight attacks of rheumatism, chiefly muscular, and for a year before the seizure, in which we saw her together, had been much depressed by family affliction. She was usually a woman of great composure, excellent judgment, and of a vigorous constitution. Her attack began about the last of April with rheumatic swelling of the knees and elbows, and the joint affection was already subsiding about the middle of May, when she became very much distressed mentally, showed signs of dissatisfaction with persons about her, insisted that she had swallowed a chicken bone, had restless nights, and finally a delirium, with occasional lucid intervals when strongly roused, which settled down into insanity. She only vomited at the commencement; had no headache; the urine was not albuminous; the pupils were sluggish and small; the heart was not diseased; the temperature was about 101°—I quote from memory, for the exact records were lost, but Dr. Dunton and myself remember that it was never a high temperature. Some time after the manifestation of the cerebral symptoms, the joint affection, already waning, disappeared more quickly, a facial palsy of the left side was noticed, with marked drooping of the eyelid; there was evidently loss of power in the left hand, and somewhat impaired power, though this was more difficult to establish, in the left leg. Sensation and reflex movements appeared good; the patient's mental condition making it difficult to study some of these phenomena accurately. The mental derangement continued until August, when the mind gradually cleared up, and the palsy passed away. She left for Newport October 1st, entirely sane, and is now as vigorous in body and mind as ever, having, however, occasionally very slight attacks of rheumatism.

There is, it is proper to add, one case of derangement in the family. She had been taking citrate of potassium, followed by lemon-juice and quinine, when first attacked. These were stopped, and though iodide of potassium and assafoetida were for a time given, her recovery was largely due to her systematic nourishment and her excellent digestion. For a considerable time she took milk-punch and beef-tea, both by the mouth and rectum.

It is needless to dwell on the features of these cases any further than to state that I believe the latter to have been one of plugging of one or several of the finer arteries on the right side of the brain, and that gradually the circulation being re-established recovery took place. I may be wrong in this opinion; it may have been an instance of true rheumatic meningitis. But I read this case now in the light of that obtained by Case IV., in which the lesion supposed to exist was found. Case IX., moreover, is the only one in this paper which might be called rheumatic insanity,

similar to that described by Greisinger, and lately again by Benjamin Ball,<sup>1</sup> and in the able paper of Greenfield,<sup>2</sup> on insanity as a sequel of acute disease. To speak of some other morbid manifestation met with in cerebral rheumatism. In some of the cases, *hurried respiration* attracted my attention without anything in the condition of the lungs or heart to account for it; occasionally, however, there is decided congestion of the lower lobes of the lungs. The *eruption*, I find mentioned in my notes, may be scattered all over the body, even on the face (as in Case X.). It consists of irregular dull red spots sluggishly influenced by pressure, and which may be perceptible after death. It probably depends on stagnation of the blood in the capillaries from paralysis of certain vaso-motor nerves.

One of the most interesting questions connected with the study of cerebral rheumatism is the *temperature* of the body. As a rule, it is high; and the decided rise precedes the manifestation of the cerebral symptoms. Usually—and the record of a number of the cases in this paper proves it, for instance, Cases IV. and VII.—after the temperature has attained to full febrile heat it remains so without great variations, except a morning remission of about one degree, or oftener of less, until the disorder gradually terminates, or until just before death the animal heat rises considerably. Sometimes, where it is very high, it falls several degrees as a favourable indication, as in Case XII. On the other hand, a fresh joint-affection, of decided character, changes the even markings. In other words, in this respect cerebral rheumatism acts very much as rheumatism of any of the other internal organs. I have studied this matter carefully with reference to endocarditis, and partially with reference to pericarditis, and I have been struck with how comparatively little the thermometric record fluctuates during the internal inflammation—in fact, less than during the ordinary course of rheumatic fever; and decided fluctuations are very apt to be due to fresh rheumatic attacks of the joints or other parts. This general law I find, for the most part, reproduced in the study of my cases of cerebral rheumatism. But how is it with regard to the extreme temperature which is supposed to characterize cerebral rheumatism, so to characterize it that it has almost become the doctrine of the day that hyperpyrexia in acute rheumatism and brain symptoms are synonymous? The observations in this paper negative the necessary connection. True, high temperature is found, but very often it is a mere result immediately preceding death (as in Case VIII.), and not witnessed during the height of the malady, and while the struggle for life is still going on. It is needless to refer in detail to some of the cases already here recorded of leagith. But I will add two (Cases X. and XI.) bearing on this point. In the one, while the cerebral trouble was at its height, the thermometer did not rise above 102°; nor did it any time, unless, perhaps, just before

<sup>1</sup> Le Mouvement Médical, Oct. 1874. <sup>2</sup> St. Thomas's Hospital Reports, vol. iv.

death, when it was not taken. In the other case, the extraordinarily high temperature of  $110^{\circ}$  was reached—the highest that, so far as I am able to find, has been recorded as having been reached in any case of any kind of illness that ended in recovery; yet there was not a cerebral symptom from beginning to end.

*CASE X. Cerebral rheumatism terminating in a typhoid condition, without cardiac trouble, and but slight joint-affection; temperature not above  $102^{\circ}$ ; death.*—Alice M., domestic, aged 26, unmarried; was admitted to the hospital March 9, 1872. Her health had always been good in Ireland, which she had left a year before. After she had been here six months she had a severe attack of acute rheumatism; yet, although the large and small joints of both the upper and lower extremities were involved in the course of the disease, it subsided at the end of three weeks, and there was no cardiac complication. Following this acute malady, she was subject to pains in her ankles, especially in changeable weather; the joints remained swollen, and were liable to become œdematous when she remained long in the upright posture.

The seizure for which she came to the hospital began, after exposure, eight days before admission. No cardiac complication was discoverable; she complained of her shoulders and back, and of pain in some of the joints, which were slightly swollen and tender, but not red. She perspired, yet not profusely. Her appetite was poor; the tongue had a white, creamy coat; the bowels were constipated; the urine was not albuminous. She was ordered bromide of ammonium, twenty grains every three hours.

During the succeeding week she decidedly improved, and the articular affection greatly ameliorated. The tongue cleaned off; the bowels were easily kept open by laxatives, and the appetite improved; the heart was regular in its action, and was not too rapid; no murmur nor friction sound was audible; there was no irregularity of respiration, and her general condition was much better.

This progressive improvement continued until the 18th, when the evening temperature, which had remained steady at from  $98\frac{1}{2}^{\circ}$  to  $99\frac{1}{2}^{\circ}$ , advanced to  $102^{\circ}$ , while the pulse was 96; but there was no accession of the joint trouble, or signs of cardiac lesion. She slept poorly, however, and it was found necessary to administer morphia gr.  $\frac{1}{4}$  at night. On the 20th the evening temperature was  $101.6^{\circ}$ , the pulse 112. On the 24th, the twenty-third day of the disease, she had mild delirium both throughout the day and at night; but she had no headache. The pupils were rather small; the face was apparently puffy and pale, interspersed with large red spots; the pulse of fair volume—114. She complained of soreness in her throat, and some difficulty of deglutition; the tongue bore a thick white coating at its sides. She was put upon compound powder of jalap  $\mathfrak{ss}$  daily; and acetate of potassium grs. x every three hours. A blister was ordered to be applied to the sacra.

The following day there was some swelling and tenderness of the wrists and smaller joints. She was delirious, and frequently attempted to leave her bed. Three days later she was still delirious at times, but not so much so as when last noted, and had become more quiet and disposed to sleep. She had slept very well the preceding night, after taking a Dover's powder, and her mind became quiet. The eyes were not injected; the pupils were normal, and she could read. She had no headache, no vomiting, and the

howels were opened by the jalap powders. The tongue was rather dry. There were no signs of heart disease, and the urine contained no albumen.

At this juncture she was taken before the class. While lying quietly in the lecture-room, during the lecture, she suddenly began an explanation of something that had occurred in the ward, and continued quite volubly for several minutes, addressing the lecturer loudly by the title of "Doctor," but soon speaking in a vague and dreamy manner. The acetate of potassium was ordered to be increased to twenty grains every three hours. A small blister was applied behind each ear, and the one at the back of the neck was re-opened, and a stimulating dressing applied. She was directed to have a nutritious diet, without any stimulant.

The morning temperature remained at  $99^{\circ}$  to  $100^{\circ}$ , but the evening temperature, which had been  $100^{\circ}$  to  $101\frac{1}{2}^{\circ}$  since last note, rose on the evening of the 28th again to  $102^{\circ}$ . The variations in temperature at about this period may be seen from this record: 24th, A. M., pulse 100, temp.  $99^{\circ}$ ; P. M., pulse 102, temp.  $101\frac{1}{4}^{\circ}$ . 25th, A. M., pulse 108, temp.  $100^{\circ}$ ; P. M., pulse 102, temp.  $101\frac{1}{2}^{\circ}$ . 26th, A. M., temp.  $99^{\circ}$ ; P. M., pulse 108, temp.  $100^{\circ}$ . 27th, A. M., pulse 96, temp.  $99^{\circ}$ ; P. M., pulse 102, temp.  $100^{\circ}$ . 28th, A. M., pulse 120, temp.  $99^{\circ}$ ; P. M., pulse 112, temp.  $102^{\circ}$ .

She was rather more restless during the night of the 28th, and the next morning complained, for the first time, of headache; the hallucination existed that she had two heads, and she fancied that she suffered pain in the back of one head and in the forehead of the other. She now made more efforts to get out of bed, and had to be forcibly restrained, and at last tied in bed. Although the mild delirium continued, she generally gave a rational reply when addressed; but not always. There was occasional muttering, sometimes connected, but oftener unintelligible. Her skin appeared bluish; the surface circulation was defective and slow; pulse 104, full, but very compressible; respirations 28. She passed urine freely, and the joint trouble became no worse. The tongue was not quite so dry, but sordes were seen on the teeth and gums. There was no cardiac murmur; the first sound was short.

Sherry wine was now directed to be given every three hours. The succeeding day, the 30th of April, the pulse was 118, and had more volume. Her tongue resembled very much the tongue of typhoid fever. Although she had had no opium the preceding night, she slept better than usual. Pupils moderately dilated, and reacted well; there was no conjunctival injection. She lay in a dull, semi-unconscious condition, and although she could still be roused to answer questions, she did so with less alacrity and appropriateness than before. The face was a little flushed, and the expression very dull. Milk-punch was now substituted for the wine, so that she had an ounce of whiskey every three hours. Her feeble condition gradually deepened into coma, and she died four days later. There was little variation from that already mentioned to record in the pulse, respiration, or temperature.

*Autopsy.*—Permission was obtained to examine only the brain. The vessels of the meninges were slightly injected. There was no abnormal effusion in the subarachnoid spaces or ventricles, and no clots in the cerebral vessels were visible to the naked eye. The brain-substance, owing to an accident, was not examined microscopically; judging from the gross characters, no lesion existed.

**CASE XI.** *Acute rheumatism with extraordinarily high temperature of  $110^{\circ}$ ; no cerebral symptoms, nor endocardial or pericardial disease; typhoid condition; recovery.*—Fenelope Y., domestic, single, Irish,

was admitted to the Pennsylvania Hospital on the 20th of January, 1870. A tendency to rheumatism existed in the family, her mother having suffered from repeated attacks. With the exception of the small-pox, which she had at four years of age, and which left her face moderately scarred, she had enjoyed an exceptional health until five days before admission. At this time she was exposed to cold while overheated and perspiring, and was seized with a chill and headache, followed within twenty-four hours by tonsillitis, and pain and swelling in one of her thumbs. During the next few days her knees, ankles, right shoulder, and left wrist became moderately red, painful, and swollen. Fever was present, with thirst, loss of appetite, and constipation. She perspired freely; slept fairly at night; and had no cardiac pain. She was without medical treatment except a dose of salts on the first day.

On the morning after admission her pulse was 120, the respirations 40, and the temperature in the axilla  $105\frac{1}{2}^{\circ}$ . She slept well during the night after taking a Dover's powder. The skin was moist, but she did not sweat profusely. Urine was passed freely; the bowels were opened the day she was admitted; her tongue was coated and pasty. The rheumatism was confined to the left knee and shoulder and right wrist; there was no cardiac murmur, but the first sound was rather short and sharp.

The bromide of ammonium was given in fifteen grain doses every three hours for the first two days, and then increased to twenty grains, repeated at the same interval.

The heart was again examined on the 22d, but no murmur existed. The disease reappeared in the thumb first attacked; she sweated profusely, and seemed very restless and unable to sleep. A transitory diarrhoea troubled her in the afternoon, but it was checked by twenty drops of iudann given during the night, so that she was better on the morning of the 23d, although she seemed weak, and the rheumatism was in about the same state as before. The skin was moist, but not excessively damp, the pulse was 120, the respirations 24, the temperature  $103.5^{\circ}$ . In the evening pulse 104, respirations 24, and temperature  $110^{\circ}$ , two observations confirming this record.

The next day the first sound of the heart seemed abnormally dull, like that of typhoid fever, and was very short and indistinct; the second sound was accentuated, there was no murmur. Pulse of moderate volume, but very compressible, and the beats were not all of the same fullness. She perspired freely during the night, and, as she was restless, an opium suppository was given. She had only two alvine evacuations in the preceding twenty-four hours, she passed water freely; but the tongue was coated and dryish. She had less headache than on admission, had not had any cerebral symptoms, and the joint affection had again disappeared from the thumb, but the left wrist and knee were still quite painful. In the evening the pulse was 98, respiration 32, and the temperature  $103.5^{\circ}$ , a fall thus of six and a half degrees from the preceding evening.

The previous treatment was continued, to which was added sixteen ounces of beef-tea daily, but no stimulant was given. She was also directed to take eight grains of quinia daily.

On the 25th it was reported that, although she was not restless, she had not been able to sleep during the preceding night. She had no accession of rheumatism, nor much pain, and the affected joints were better. There was an entire absence of any cerebral symptoms or mental disorder. The skin was moist, the kidneys acted well, the bowels were constipated rather than loose, but the tongue remained dry and brownish,

and looked like the tongue of typhoid fever. Pulse 92, respirations 36, temperature 103.5°.

The next morning the pulse fell to 88, the respirations became 40, and the temperature 100°. But this rose again in the evening to 106°, with the pulse and respirations of about the same frequency as in the morning.

The joint affection had very much improved on the 27th; the temperature was 105°, with a pulse of 86. and 40 respirations to the minute; these were about the same in the evening, but the temperature had fallen one degree.

The dull first sound of the heart which was before noticed was again markedly observed on the 28th, but neither murmur nor increased percussion dulness was present. The rheumatism still continued to improve, except that she complained of pain in the right shoulder. The tongue was coated, but not dry; she passed water freely. A. M., pulse 72, resp. 40, and temp. 100.5°; P. M., pulse 76, resp. 36, and temp. 100°. Slept poorly during the night, and the right shoulder seemed very painful. From this time, however, the articular affection steadily improved, and the temperature did not again go above 101½°. The typhoid condition gradually disappeared during the ensuing twelve days, at which time the temperature was 98°, her expression was much brighter, and her tongue was cleaning. She had then been taking acetate of potassium for nine days (grs. xxx every three hours at first, and subsequently every four hours), which kept the urine alkaline; the bromide had been discontinued, and in truth it had not been, since the 25th, given excepting occasionally; she was well nourished, and at times small quantities of stimulus were added to the food.

During the last week she had a slight attack of pericarditis with a moderate amount of effusion, which soon disappeared. She now convalesced, and excepting a modification of the first heart-sound, which remained indistinct, no signs of disease existed.

For the *morbid anatomy* of the affection I must refer to the autopsies in the individual cases. I will only point out that not in one was there any marked congestion of the brain; in truth, the brain is either mentioned as being normal and firm, as in Cases II. and IV., or as pale and anæmic, as in Cases III. and VII., or without lesion save a slight injection of the vessels of the membrane, as in Case X. The brain lesion, or rather the state of the vessels, in Cases III. and IV., is most interesting; and so is the acute degenerative disease of the kidneys in Cases I. and II. I believe that both these morbid states will be found more frequently if they are closely looked for, and invite the attention of observers to these points. Some of the kidneys in the *post-mortem* inspections here detailed were not examined with the care that, having noticed the changes, I should now bestow on them.

In none of the autopsies did I meet with meningitis. But I am far from wishing to assert that such cannot happen. I find, indeed, in the literature of medicine, some cases which seem undoubted, such as the one of Ollivier and Ranvier in the *Gazette Méd. de Paris*, 1866, and some of the cases quoted by Giustrac in the eighth volume of his *Pathologie Interne*. Sir Thomas Watson speaks of having examined a case of a female patient, who, dying after symptoms of cerebral inflammation, supervening upon

acute rheumatism, was found to present unequivocal pus smeared over the hemispheres of the brain, and refers to similar cases reported by Fyfe and by Fuller; while Niemeyer mentions a dissertation of Flamm, which I have not been able to obtain, containing some instances where post-mortem examination showed the presence of inflammatory disease of the meninges. We are, therefore, bound to conclude that meningitis may occur in acute rheumatism. But I believe it is a very rare lesion; and what is called rheumatic meningitis is generally not meningitis at all, but cerebral rheumatism with an absence of meningeal lesions.

Having said this much of the morbid anatomy, and having described at some length the clinical features of cerebral rheumatism, I may add a few words as to its *nature*. That the disease is not a metastasis I think the cases in this paper fully attest. I believe that, leaving out the exceptional instances of real rheumatic meningitis, the true pathology of the cerebral disorder is to be sought in the action of the rheumatic poison on the brain, whether it does so directly or indirectly, through the changed composition of the blood, or by both concurring. To these elements is often added an altered condition of the finer vessels of the brain. In other words, the rheumatic poison may fasten upon the lining coat of these as it does upon the endocardium, and, favoured by the altered condition of the blood, lead to plugging, as was so distinctly found in Case IV., and as was beginning in Case III. Occasionally it may be an embolus washed from the heart into the cerebral vessels that occasions the circulatory disorder, but more usually it is a thrombus there formed; and if in any case there be not actual obstruction, there is still circulation of altered blood, which, moreover, is apt to be still more vitiated by the impaired action of the kidneys—itsself another expression of the rheumatic poison seizing upon an internal organ. The common condition of the brain-tissue in cerebral rheumatism is that of nutrition interfered with, and of anæmia; and where rheumatic endocarditis and pericarditis coexist, this may show itself all the more quickly. Where the rheumatic poison, directly or through the altered blood, acts on the nerve centres regulating temperature, hyperpyrexia results, but I have already stated my conviction that the importance of this as explaining cerebral rheumatism has been greatly over-stated.

From these remarks it may be seen that I accord little weight to a view of cerebral rheumatism that has been both strongly held and vehemently attacked, that it is due to the action of certain drugs, especially of quinia. In tracing out indeed the recorded cases, I find it equally arising under the use of nitrate of potassium, of blood-letting, and of iron; I notice it in several of my cases which were treated with bromides; I see it coming on with and coming on without treatment, and the inference therefore is, that as it arises on such opposite therapeutic plans no drug is responsible; though of course it is evident that with certain symptoms arising some drugs had better be avoided or discontinued. Nor can I believe

that the nervous temperament of some patients, to which Trousseau eloquently assigns it, acts as anything more than a predisposing cause.

In an early part of this paper, I alluded to the fact that cerebral rheumatism is so much more common some years than others. The explanation of that fact is to be sought I think in some peculiarity of the rheumatic poison which makes it fix more readily on the brain, as we sometimes see by way of exception the typhus fever poison attacking the intestine, or influenza producing a catarrh of the mucous membrane of the bowel, rather than of that of the respiratory tract. I have thought of seeing if atmospheric changes might determine this peculiarity in the case of rheumatism, and with the assistance of Dr. Woodbury have examined into the daily barometric and thermometric records kept at the Hospital while the patients were there under observation. We found nothing however that could establish a law, though the brain symptoms were, with a falling barometer and rising temperature, observed to grow worse. This was strikingly witnessed in Cases III., IV., VIII., and X.

With reference to the *diagnosis* it is always of the greatest importance to try to find out as nearly as we can the exact form of the cerebral disorder before us; and, as in this paper, we have made out several forms clinically, however closely related we have found them to be pathologically, I shall endeavour to indicate, as far as I believe the facts warrant, the distinguishing traits.

The cases occurring suddenly, formerly described as apoplectic, are, I think, mostly œmic, and a careful examination of the urine, which, after the instances discussed in this paper, it seems now almost superfluous to insist upon as always incumbent in cerebral rheumatism, will go far to clearing them up. Moreover, the temperature of these cases is not as a rule a high one.

Another form of the suddenly-developed malady is that due to an embolus washed into the brain from the heart. Here belong the cases where, after slight signs of mental disturbance, hemiplegia is rapidly developed, and cardiac disease is found.

The cases of which delirium is a prominent feature it may be very difficult to tell apart. Where we have a hysterical form of delirium, protracted, with tremor, with or without local palsies, with temperature which may be high or not, but which is generally not high, the chances are that we have plugging of the cerebral arteries from rheumatism affecting them, and not from disease of the heart.

Where we have delirium fitful, with great prostration, dry tongue, high temperature as a rule, it is probably cerebral rheumatism without marked lesion, excepting anæmia of the brain. These cases may or may not coexist with disease of the heart. Sometimes the symptoms are so truly typhoid that we ask ourselves whether such cases ought to be classed with cerebral rheumatism; would it not be better to regard them as "typhoid rheumatism," and to view the cerebral symptoms in the same



light as we do those of the low fevers? Probably it would, but as it is a question if it be not the rheumatic poison acting on the nerve centres as well as on the blood that gives rise to them, and as the cerebral symptoms are very marked, we must for the present still regard the disturbance as a form of cerebral rheumatism.

Now how can we distinguish true rheumatic meningitis? Most authors speak of absence of headache and of vomiting as being the distinguishing signs of the malady. This is incorrect, and is based on the supposition that all cases of cerebral rheumatism are of this character, and hence on the confounding of the different types. On the contrary, I believe the symptoms mentioned, with usually a moderately high temperature, active delirium, irregular or slow pulse, to be diagnostic. They were present in one marked instance of the malady I saw in coarsaltation; and I have carefully analyzed such of the cases on record in which the *post-mortem* results or the observations seem to be undoubted, and for the most part find them. In some, moreover, there existed strabismus, one-sided dilatation of the pupil, palsies of some of the cranial nerves or local spasms, and in a few hemiplegia.

In looking farther at the diagnosis of cerebral rheumatism, we must not forget that the cardiac lesions may produce head symptoms. But unless the cardiac lesions be great the head symptoms are slight, and when these are severe we have to strike the balance carefully between the morbid manifestations to determine whether the cerebral disorder be purely secondary, or whether it be due to coexisting rheumatic trouble of the brain. In individual instances that may be very difficult, perhaps impossible. Generally it is not. If we have high temperature present, it is certain that the brain symptoms are not purely due to the heart disorder.

Lastly, in reviewing the diagnosis of cerebral rheumatism we must bear in mind that occasionally the signs of nervous disturbance precede the articular trouble. One marked case came under my observation in a child, and the meaning of the cerebral symptoms was explained by the swelling of the joints. Handfield Jones, in the *Medical Times and Gazette*, Nov. 1871, relates an instance of severe cerebral symptoms and fever of the typhoid type, ending fatally, which proved to be rheumatic; and an instance is reported in the same journal, for 1864, in which there was, as the first marked symptom, Bell's palsy; subsequently the left arm and leg became paralyzed, and about the beginning of the tenth week the joints became inflamed, and the further progress of the case was one of ordinary acute rheumatism; the paralysis gradually disappeared. Trousseau, in his clinical lectures, mentions an extraordinary case in a young girl in which paraplegia existed first, then hemiplegia and amaurosis, which passed away as the rheumatic joint showed itself. And cases of chorea, too, may thus appear in advance of the rheumatic fever. But this is very unusual; unusual even is it during its height, as happened in the case related in the *Medical Times and Gazette*, for 1863, occurring on

the thirteenth day of the attack, and preceded by occasional delirium. Chorea when it arises is commonly a sequence of the acute malady, not its precursor or attendant.

The *prognosis* in cases at all marked is always a grave, and generally an unfavourable one; especially so in those presenting evidence of kidney change, or in which the temperature is very high and the fever of a typhoid kind. The palsies that happen are not as serious as might be supposed. They are usually transitory and end in recovery.

In determining the *treatment* we ought to lay great stress on what we can ascertain to be the exact cause of the disturbance. Rheumatic meningitis is best treated by leeching, by the bromides, by active purgation, by the alkalies, the iodides; but in the majority of instances of rheumatism of the brain, as we have cerebral anæmia, these remedies are either forbidden, or are not available. Opium and chloral may be employed for the delirium and restlessness; quinia in tonic doses, food, stimulants for the relief of the typhoid symptoms; while in all cases we should pay the strictest attention to the action of the skin and of the kidneys. Moreover the cardiac symptoms must be closely watched, and the action of the heart sustained, and this is often best done by digitalis. Where we can, the treatment for the rheumatic symptoms must be continued, and in a form that shall not be depressant; hence I do not think the bromides ought as a rule to be employed, which I did for a time, until I understood the meaning of the cerebral symptoms better. Where there is any sign of retrocession from the joints—which, however, is the rare exception—we may imitate the treatment of Davies, and blister them. In one case he cites, in which there was delirium, as soon as the blistered joints began to discharge freely the patient recovered. I have said nothing thus far about the cold-water treatment. My cases were mostly under observation before this began to attract attention in rheumatism, and, as I have shown, many of them had no high temperature. I think, indeed, that it is to these this treatment ought to be confined. But the subject is too wide a one to handle here, and I must refer those who wish to analyze the results obtained to the able papers of Wilson Fox,<sup>1</sup> of Hermann Weber,<sup>2</sup> of Southey,<sup>3</sup> of Kelly,<sup>4</sup> and of Greenhow,<sup>5</sup> and to a clinical lecture by Dr. Henry Thompson.<sup>6</sup>

In concluding this paper I must again refer to the value of stimulants in many of the cases, and looking back my regret is that I sometimes did not employ them more freely. What may at times be gained by them, even under the most unpromising circumstances, this case proves.

<sup>1</sup> London Hospital Reports, 1864.

<sup>2</sup> Treatment of Hyperpyrexia by means of External Application of Cold, 1871.

<sup>3</sup> Clinical Society's Transactions, vol. i.

<sup>4</sup> The Practitioner, vol. ix.

<sup>5</sup> Clinical Society's Transactions, vol. vi.

<sup>6</sup> Medical Times and Gaz., 1873, vol. i.

**CASE XII.**—*Cerebral rheumatism with marked delirium and stupor; coma; apparent death; recovery under inhalations of ammonia and stimulants.*—Mary W., Irish domestic, single, age 21; with the exception of acute rheumatism, when nine years old, her health had always been very good. Although she suffered, during this seizure, from cardiac pain and dyspnoea, she recovered, she believes, perfectly from it with the exception of a slight stiffness of one of her ankles which lasted nearly two years.

She had a subsequent attack about four months before admission, which only affected one knee and lasted but four days.

The acute rheumatism, for which she was admitted into the hospital Jan 7th, 1870, began in one knee about one week previous, without assignable cause or being preceded by a chill. The disease involved most of the larger joints in succession, during the first week, and was accompanied by considerable cardiac pain, with fever and anorexia. She was under medical treatment before coming to the hospital.

When admitted her pulse was 126 and not very strong; skin hot, tongue coated; bowels constipated, and she had much thirst; breathing oppressed, 36 in the minute, but no cough. There was some pain in the cardiac region which was increased by deep inspiration. A soft systolic murmur was audible at the left apex. The articular affection was limited to the wrists, which were red and very sensitive, and the right knee, which was swollen but not discoloured.

Bromide of ammonium grs. xx every three hours, with n Dover's powder at night, was ordered. Dry cups were applied to the back of the chest, and great relief was obtained from poultices over the cardiac region.

The urine examined the next morning was found to be of pale straw colour and slightly cloudy; specific gravity 1007; it contained no albumen.

During the succeeding week the joint affection gradually subsided, and there was but little change in her condition worth noting, except that she slept poorly, perspired more freely, and the systolic cardiac murmur became more defined and lost some of its softness.

On the 13th it was noted that she was slightly delirious at times during the day; noisily so at night. The respiration continued frequent, 32, but there were no new developments. The tongue remained coated, she took nourishment well; the bowels were opened daily. She slept better, but was still delirious at times, chiefly at night.

A week later the cardiac murmur became harsher, and the action of the heart more tumultuous. The restlessness and mental aberration continued, and were a great deal worse on the nights when the opiate was suspended. She appeared very ill, but still answered questions intelligently. Respiration 50, pulse 120.

A blister was now applied to the cardiac region, and tincture of digitalis, ten drops thrice daily, added to the former treatment, and she was well nourished.

The next day, January 20th, the cardiac impulse was quite distinct near the apex, but the heart's action was not so forcible. The area of dulness was not enlarged; there was no pericardial friction, but the heart seemed to be losing power, although its action was never fluttering or irregular. The face was somewhat cyanotic, and she was now nearly comatose after being delirious all night. The pupils were very small and reacted sluggishly. Pulmonary resonance anteriorly remained clear, but there was some dulness with harsh breathing at lower part posteriorly, particularly on the left side, and the temperature in the axilla was 106°. There had been no sudden

retrocession of the joint trouble, which, however, had by this time gradually disappeared, to a great extent. The urine was acid and contained a small amount of albumen; the secretion had been very free until the 20th, when it became somewhat less so.

All other treatment was suspended, and she was put upon carbonate of ammonium every hour, and as much whiskey as she could be made to take, but she swallowed with great difficulty; an injection of beef-tea and whiskey (3ij of each) was ordered to be given every two hours until she reacted, when the proportion of whiskey was to be decreased. Small blisters were directed to be applied behind the ears. The temperature, which at noon was  $106^{\circ}$ , fell to  $103\frac{1}{2}^{\circ}$  at 8 P. M. But during part of the middle of the day she was so prostrate as to make it seem cruel to continue any treatment. Once she appeared to be dead, and it was only by making her inhale ammonia, and then pouring immediately some stimulus into her throat, that she could be made to swallow; this was done for hours.

On the succeeding day the joints were all limber and free from pain, and the skin was moist. The pupils were more dilated, and she was in a state of muttering delirium, and was tossing about and constantly moving her arms; she recognized an attendant at times. A sphygmogram showed an abrupt, rather high, very slightly oblique ascent; a rounded summit; an abrupt, slightly oblique descent; and a marked and wide undulation before the next ascent.

During the preceding twenty-four hours she had taken ten grains of carbonate of ammonium every hour, also an injection of beef-tea and whiskey every two hours, all of which she retained except the first one.

During the night she had half an ounce of whiskey every hour. The tongue was dry, brownish, and coated; the bowels were opened by the first injection but not afterwards. No irregularity was noticed in the action of the heart, and there was now a little more volume and precision to the beat; the murmur was still marked, however, and was systolic; slight dulness still existed at the lowest portion of the left lung.

The treatment of the previous day was continued except the injections. The blisters were to be kept open. She was ordered a turpentine and oil enema to insure a full evacuation of the bowels, to be followed by a suppository containing ten grains of assafoetida, to be exhibited every three hours.

The pulse was 116, respirations 50, and the temperature  $103\frac{1}{2}^{\circ}$ .

The next day, Jan. 22d, A. M., pulse 108, respirations 48, temperature  $102^{\circ}$ . P. M., pulse 114, respirations 64, and temperature  $102\frac{1}{2}^{\circ}$ . She now passed water freely, and the bowels were well moved by the injection. She slept better the past night, but was still restless and irritable. Tongue dry and scaly; skin moist; the urine acid. The mind was much more conscious, and she was not so restless, although she moaned and complained at times.

The treatment, except the enemata, was continued, to which quinia sulphate, grs. viij daily, was added. She was now taking ten grains of carbonate of ammonium and half an ounce of whiskey every two hours.

On the 23d she was out as well as the day before, and had passed a restless night. Pulse 86, respirations 64, temperature  $104^{\circ}$  in the morning. The cardiac murmur persisted, but could not be analyzed on account of the frequent intermissions that occurred; the pulse was feeble. There were no signs of the joint trouble; the skin was moist, the tongue had a thick, whitish coat; the bowels were open. Her mind wandered very much, but she obeyed directions. The pulsation in the carotids was quite

marked, and was stronger in the left than in the right one. The stimulant was now increased again to one ounce every hour. There was no paralysis; the skin was moist; the urine acid.

The next day, Jan. 24th, A. M., pulse 96, respirations 60, temperature 102°; P. M., pulse 98, respirations 52, temperature 102°. The pupils were rather large; the tongue dry and brownish. The carbonate of ammonium was reduced to grs. x each third hour, and she was ordered oil of turpentine fifteen drops, with three grains of sulphate of quinine alternately on the intervening hours.

On the 25th, pulse not so irregular; she had slept better, and was not so restless. The pupils were of moderate size, and sluggish. Pulse 112, resp. 40, temp. 102°.

26th, A. M., pulse 124, resp. 52, temp. 104°; P. M., pulse 132, resp. 40, temp. 105°. The urine passed was of a dark straw colour, faintly acid, specific gravity 1022, it was slightly albuminous, and contained pale granular casts. The face was quite flushed, the tongue was still coated but moist, and the pulse was weak.

On the 27th, the evening temperature was 104°. The mind was becoming clearer, and although she still wandered at times, she was not so restless, and her general strength was evidently improved.

Upon examining the heart a double pericardial friction sound, like the puffing of a locomotive, and of moderate intensity, was heard. During the preceding twelve days it had been noticed that no alteration had occurred, which was synchronous with the second sound, but the irregular action of the heart, by making the observations uncertain, prevented a previous record. There was little, if any, increase of cardiac percussion dulness, but the impulse near the apex seemed somewhat more fluttering than before, and the murmur was fainter. The friction was best perceived at the left base, and extended over toward the right.

The stimulant, of which she had been taking fʒxxiv daily, was reduced to fʒxviii, and the turpentine was discontinued. The quinine was increased to grs. xv daily. The carbonate of ammonium, grs. x, was directed to be given every four hours, and thirty grains of acetate of potassium every three hours. A small blister was ordered to be applied to the cardiac region, to be followed by poultices.

On the 28th, some pericardial effusion was noticed and the apex beat was less distinct; the pulse was 104, and was more irregular than the preceding day; the tongue was again dry and brownish.

The stimulus was again increased to an ounce every hour. There was some pain in the wrist, but it was transitory. The murmur at the apex was faint. The urine, which was passed freely, was acid, and contained no trace of albumen and some pale epithelial casts.

The case now passed from observation in transferring the ward, and no further notes were taken until three weeks later, February 20, when it was recorded that the girl had steadily improved and her urine had become free from albumen and casts. The same general treatment had been continued. She was discharged two weeks later (March 6th). She said that she felt as well as ever, she had no joint trouble, and her general appearance was excellent.

With this case I shall end the paper. I have endeavoured to make it a faithful clinical study of a comparatively rare, but most interesting complaint, and I venture to indulge the hope that the analysis to which the question has been subjected will at least have succeeded in clearing the

path of some of the obstacles for future observers. In the recognition of the various forms of the malady; in the attempt to trace them to a definite pathological condition, and to discriminate them at the bedside; in the proofs afforded of an often coexisting kidney trouble, and of the fallacious nature of the supposed metastasis; in the examinations of the temperatures and the evidence adduced that these are far from invariably high, and thus that high temperature in cerebral rheumatism is not the one point on which everything hinges; in these and some other matters I trust to have aided, however imperfectly, in the elucidation of the nature and manifestations of cerebral rheumatism.

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ART. II.—*Description of a Form of Puerperal Fever which occurred at the Philadelphia Hospital, characterized by Diphtheritic Deposits on Wounds of the Genital Passages and by other Peculiar Phenomena.* By JOHN S. PARRY, M.D., one of the Attending Accoucheurs to the Philadelphia Hospital, Vice-President of the Obstetrical Society of Philadelphia, etc. etc.

DURING the ten years from 1860 to 1870, the Philadelphia Hospital enjoyed a complete immunity from any form of metritis, with the single exception of the year 1865, when there were three cases and two deaths from puerperal peritonitis. During the five succeeding years the condition of the department was all that could be desired, and the mortality of child-bed was 1 in 132.5, the deaths all being due to unpreventable diseases.

The four years which have followed have been marked by no such happy results. Early in 1870 it became apparent that there was some unhealthy influence in the wards, and on February 7, of that year, puerperal fever made its appearance in a patient of my colleague, Dr. Girvin. It soon proved fatal, and from that time until July 1, 1874, the hospital has not been free from the disease except at short intervals.

The history of the epidemic may be divided into two periods. The first extends from January 1, 1870, to June 1, 1871, when the wards were abandoned, and for three months the patients were delivered in a temporary hospital erected in an adjoining field. This was occupied until September 1, 1871, when the second period may be said to have commenced, and which comprises the interval between the 1st of September, 1871, and the 1st of July, 1874.

During the first period 262 women were delivered in the ward, of whom 14 died, a mortality of 1 in 20.15. Of the deaths 2 were caused by puerperal convulsions, 1 by mania complicated with pneumonia, and 11 by metritis, or 1 in every 23.81 of the women delivered died from a disease