by lesions of the cord itself or its membranes, not referring to disease of the bones or cartilages, which more immediately fall under the surgeon's care.

Many of these cases of spinal weakness are slight, and scarcely admitted by the patient, but nevertheless they exist. So far as my observations tend, loss of motion more frequently preponderates over defective sensation; and, when once this is fully developed, the restoration of lost power becomes difficult and doubtful. There is one form of spinal paralysis referred to by Sir Thomas Watson, in which the symptoms yield rapidly and perfectly to treatment. This variety is caused by effusion of serum between the cord and its membranes. It is generally excited by cold and damp, in a previously healthy person, and, if treated actively at the onset, yields quickly and satisfactorily. Of this variety, I have lately seen a well-marked instance. The patient, a middle-aged man in perfect health, took cold, and, within three weeks, became paralysed, dragging his legs, which had considerably lost their natural sensibility. There was distinct tenderness on sharp percussion over the lower dorsal spines. A blister to this spot, with the perchloride of mercury and a stimulating diuretic, removed rapidly the paralysis, and he was walking as well as before in five weeks from the application of the blister. Of far more serious import, unhappily, are the class of paralytic affections to which I would now refer. These are cases, obscure frequently in their origin, for they are essentially latent, and spring from subacute myelitis, very chronic in its progress, and often very unyielding to treatment.

As I have remarked before, I believe that these cases are on the increase, and I am disposed to regard them as one only of the many evils resulting from the present competitive "rush to live" and its inevitable exhaustion, which we may witness so painfully in every walk of life. Two causes may be mentioned as the chief exciters of this paralytic condition: one being an exhaustion of nerve-force from prolonged over-fatigue, giving rise to irregular vaso-motor nerve-influence and impaired nutrition, and the other (to which may perhaps be added a syphilitic taint) being excessive indulgence in venery, than which, though little suspected by the patient, there is no more influential cause existing. In other words, any circumstance inducing an extraordinary demand on the spinal cord, may produce in the predisposed this chronic inflammatory affection. A long and exhausting walk, or prolonged unaccustomed exertion in the erect posture, have been known to produce chronic myelitis. The more severe cases of this affection fall, of course, immediately under the supervision of the medical attendant; but the results of the latent or more chronic form may be detected constantly in the streets, especially of our more busy centres, as indicated by the partial dragging of one leg and the consequent interference with perfect walking.

A delicate-looking patient will complain to us that, after prolonged exertion, and perhaps exposure to cold, he has been seized with pain in the dorsal region of the spine, which has partially subsided on rest, but again returned in a mitigated degree; that he has had a tingling sensation in his feet and legs, which he describes as "going to sleep"; and that latterly he has experienced a disagreeable sensation of tightness round the waist. On questioning, we shall find that the bowels are difficult to move, and that the urine does not flow so readily as has been usual, and that there is a tendency to an involuntary escape of a small quantity from time to time. Such are the features observable in the early stages of an attack originating in cold or prolonged fatigue; but, if we also can obtain a confession of sexual excess (for what is healthy to one is enormously excessive in another), we may have, in addition, intermittent priapism accompanied by diminished sexual power.

Such are the more prominent characteristics of this by no means uncommon and, I believe, increasing disorder; and, as the restoration of spinal nerve-power, when once decidedly impaired, is difficult to accomplish, so does it become all-important to detect the lesion early, and to lose no time in adopting remedial measures. Although I regard the condition of the cord in chronic myelitis as essentially one of impaired nutrition, I am convinced that, if the patient be seen early, the application of a blister over the affected portion of the cord will be found of real service, both by relieving local congestion and acting as a direct nerve stimulant. After this, with a view of further exciting functional activity, the alternate application of cold and hot sponges to the part will sometimes greatly counteract nerve-atony.

Among the more valuable of the nerve-tonics in spinal malnutrition, I would particularise perchloride of mercury, arsenic, and cod-liver oil. These may be supplemented by large doses of the perchloride of iron. In no case should a persevering trial of these medicines be omitted; and, if a syphilitic complication be suspected, large doses of the iodide of potassium will also be demanded. I have frequently prescribed belladonna, ergot, and strychnia in chronic myelitis, when prolonged

and unyielding; but I cannot say that I have been impressed with their value, or witnessed any positively beneficial results from their use.

There remain yet two other measures which must not be overlooked as valuable auxiliaries in the treatment of this affection. The one is the persevering, but not exhausting, use of the galvanic current. The use of this agent, if limited to alternate days, will often be seen to materially assist in restoring lost power to the weakened limbs.

Another suggestion of importance is to carefully ensure warmth to the debilitated nerve-structures. This may be best accomplished over the cord, by wearing a protecting unstimulating plaster, than which nothing is perhaps better than belladonna. At the same time, the limbs should be carefully enveloped in flannel drawers and worsted stockings; and all exhausting procedures on the part of the patient must be absolutely and unconditionally forbidden.

An interesting case of functional ataxy, or interference with perfect co-ordination in the movement of the lower limbs, has recently come under my notice. The patient, a young woman, who was suckling her fourth child (she having borne them very rapidly), was attacked with intermittent hæmoptysis, and for this condition I was requested to examine her chest. The lungs were healthy, but she was anæmic and weak, with an excess of impoverished milk in her breasts. She was directed at once to wean her infant; and steel and quinine with ammonia were prescribed. She improved under this plan, but she now complained of inability, when walking, of keeping her limbs under control. At the same time, she was attacked with what she termed rheumatism in the right humeral and scapular region, but which, although not amounting to hyperæsthesia, was clearly traceable to nerve-irritation. She was at once put upon cod-liver oil, and full doses of perchloride of iron, when these (to her, alarming) symptoms gradually subsided. This case was simply functional, depending upon an exhausted state of the spinal cord, so far as the ataxic symptoms were concerned, and not (as would have been pronounced but a few years back) upon a congestive or inflammatory condition of that structure, and was treated accordingly. The neuralgic disturbance of the shoulder depended probably rather either upon a temporary congestion of the meninges of the upper part of the cord, or upon a similar condition limited to the covering of the nerve-trunk itself, the result of malnutrition.

In similar cases we must not lose sight of the fact, as has been shown by Sir William Gull, Dr. Wilks, M. Charcôt, and others, that arthritic affections are not an uncommon accompaniment of meningeal or myelitic diseases of the spine. In all cases of nervous affections, correct treatment can alone be based upon correct diagnosis. Hence the very great importance of advancing our present knowledge, especially by collective information, as suggested at the commencement of this paper. There is a wide and but partially explored field before us, which will amply repay minute and precise investigation.

The deposits in the nerve-structures as the result of syphilis are becoming better understood; but to be able to demonstrate, which we cannot do at present, the subtle changes in the texture of the brain, spinal cord, or nerve-filament, under the influence of hereditary transmission, or even in a case of hysteria, would prove an enormous advance in nerve-pathology. I feel persuaded that the more the nervous origin of disease is admitted, the more surely shall we find ourselves steering in the right direction.

[To be continued.]

THE ETIOLOGY OF PYREXIA.

By CHARLES MACLEAN, M.B., Applecross.

I THINK I need offer no excuse for bringing under the notice of the profession the undermentioned facts; for, considering how important it is that we should ascertain what is the true pathology of fever, any contribution towards that object, however small, must receive a welcome. I had hoped that these or similar experiments might be undertaken by abler hands; but, as they were not forthcoming, I decided on making them myself, the subject being full of interest. I leave the facts to speak for themselves, only observing here that, being purely experimental, they bear out all that I have said in my paper on Fever (BRITISH MEDICAL JOURNAL for June 7th and July 5th), which was based on almost entirely clinical observation.

I made the first set of experiments in order to ascertain the effect on temperature of bromide of potassium and chloral respectively. The temperature was in every case rectal. The second set of experiments was to observe the effects of these same medicines on the capillaries.

1. *Temperature.*—Normal temperature of a kitten (mean of three times a day), 99.8 deg. Fahr.; next day, after bromide of potassium, 99.3 deg. Same kitten, on another occasion, after chloral, 100.3 deg.

Same, after a large dose of chloral, 100.8 deg. Same, after a large dose of bromide of potassium, 98.6 deg. Normal temperature of a grown cat, taken as before, 102.2 deg.; next day, after chloral, 103.3 deg. To three kittens, of the same age as the above-mentioned one, and whose normal temperature was the same, I gave chloral; and their temperatures, from an hour to two hours after administration, were respectively 98, 98.2, 98.3 deg. Fahr.

11. *Size of Capillaries.*—The capillary vessels of a frog's foot were normally 1-1200th of an inch in diameter; same frog, the day after taking bromide of potassium, capillaries 1-2000th of an inch. Second frog, an hour after taking chloral, capillaries 1-1500th of an inch; the same frog, next day, capillaries 1-800th of an inch.

It appears from these experiments, then, that a dose of bromide of potassium lowered the temperature of the twenty-four hours from half a degree to more than a degree; whilst chloral raised it from half a degree to a degree; primarily, it reduced it more than a degree. But, if I select those readings of the temperature corresponding to the period after ingestion at which I observed in the frog's foot the maximum contraction and maximum dilatation of the vessels after bromide of potassium and chloral respectively, I find that the difference in temperature is even still more marked; the rise after chloral in the case of the cat being upwards of two degrees—a regular miniature fever; and the fall after the bromide being fully a degree and a half. Now, the microscope showed that the diameter of the capillaries was greatly diminished after the administration of bromide of potassium, and much increased after chloral; the first effect of the chloral, however, being to contract the vessels and cause the blood to move in an oscillating and interrupted manner. I would remark, with regard to the action of the bromide, one peculiar result as seen under the microscope: the blood-corpuscles, being about 1-1600th of an inch in diameter (of breadth) when they arrived at the capillaries, often halted for a moment, considering, as it were, the altered state of affairs. They soon, however, adapted themselves to circumstances, and went through with a push—being quite out of shape, however, in the passage, with a diameter often less than 1-2000th of an inch. Indeed, after repeating the dose of the bromide, I could see some capillaries from the 1-2500th to 1-3000th of an inch in diameter, and the corpuscles still going through them, but greatly elongated, appearing like worms running about. This fact shows what has been doubted by physiologists, that the blood-corpuscles can and do penetrate through capillaries considerably smaller than themselves.

I took a dose of chloral myself on two occasions, not, however, in connexion with this subject. The next day, I noticed nothing unusual until I exerted myself a good deal, and then it was that a feeling of heat and languor came on, as if the vessels were able to resist a moderate pressure for some time, but, when the heart's action was greatly and suddenly increased by exertion, the walls of the minute arteries, weakened by the chloral, yielded to the pressure, and the capillaries were inundated.

I cannot but think that it is contrary to fact to say that in pyrexia there is contraction of the vessels of the skin and lungs, as one theory of fever supposes; the first look of a patient with enteric fever having always conveyed to me the idea of distension of the surface, and the stethoscope equally revealing a congested state of the air-passages. Indeed, I could generally tell in this manner whether the temperature would be greater or less, before using the thermometer.

With reference to the experiments of Naunyn and Quincke alluded to by Dr. Burdon Sanderson at the annual meeting, I would remark that he (Dr. Sanderson) seems to take it for granted that division of the spinal cord in the neck is necessarily followed at once by paralysis of the vaso-motor nerves. Now, with all the deference due to so great an authority as Dr. Sanderson, I have to say that, after dividing the cord in the cervical region, for at least forty-eight hours, during which time I had it under observation, there was no dilatation of the vessels whatever; the only effect the operation had on the vessels being to cause some contraction, which lasted nearly thirty hours. The animal met with an accident which caused its death at the end of two days. Division of the cord, in fact, did not influence the vaso-motor power much more than the reflex in the frog; the animal in other respects being to all appearances dead. Of course, the effect would be different in the higher animals, but different only in degree. Now, what effect it did produce in the frog was contraction of the capillaries; so in man, whose organic functions are more immediately under the controlling influence of the brain, there would be still more contraction, in the first instance, following such an operation; and the result would be lowering of the temperature, according to the experiments made. It is highly probable that this contraction, caused by the irritation of the nerves by the operation, would give place before death to paralysis and dilatation, and, therefore, elevation of temperature. Hence, strange as it may seem, the results obtained by Naunyn and Quincke on the one

hand, and by Rosenthal on the other, may possibly have both been correct, depending on the time after the operation at which the observations were taken. The inquiry is full of interest.

REPORTS

OF

MEDICAL AND SURGICAL PRACTICE IN THE HOSPITALS OF GREAT BRITAIN.

BRISTOL GENERAL HOSPITAL.

REMOVAL OF GREATER PART OF BOTH SUPERIOR MAXILLÆ SIMULTANEOUSLY FOR MALIGNANT DISEASE: RECOVERY.*

(Under the care of NELSON C. DOBSON, F.R.C.S., Surgeon to the Hospital.)

I HAVE been induced to bring the following case before the notice of the Association, because I believe it to present several points of interest, independent of the extent of the disease, and the formidable nature of the operation undertaken for its relief. These various points I will briefly mention after I have described the case.

Sarah Meredith, aged 52, was sent to me from Brynmawr in Wales by my friend, Mr. Meadows, and was admitted into the General Hospital under my care, November 15th, 1872, suffering from extensive disease of both upper jaws. The great difficulty which she had in speaking, in consequence of the encroachment of the disease on her hard palate, and her imperfect knowledge of the English language, rendered it next to impossible to get much information from her as to the history of the case. She was accompanied by no friends, and Mr. Meadows could not assist me with the history, as she only applied to him a few days before he sent her to the hospital. However, it was ascertained that she was a widow, and had had five children, all of whom were dead. She had always had good health before the present disease commenced, which was about six months ago. At that time, she stated, her gums pained her a good deal, for which she applied to a chemist, who gave her some "hot burning lotion" which produced greater irritation, and shortly after its use she noticed the gums began to swell and ulcerate in patches. She was not certain whereabouts in her mouth she first noticed the ulceration; but, as far as I could make out from her, it seemed to have begun immediately behind the two central incisor teeth of the upper jaw. There is no family history of cancer. This is all the information I could gain from her, except that the disease had rapidly increased during the last month.

Her condition before the operation was this. On looking into the mouth, there were three or four large patches of punched out ulcerations extending from the alveolar ridge to the anterior margin of the soft palate. The alveolar process was edentulous, though a patch or two of ulceration seemed to indicate the position of an old tooth-stump, which, however, I could not find. The alveolar ridge was considerably expanded, and projected from between the lips; so that, when the jaws were closed, the mass overhung the teeth of the lower jaw. This expansion and projection of the process was such that the upper lip was tightly stretched over it, and very thin in consequence of such stretching. The cartilaginous part of the nose was pushed up and flattened. The anterior part of the palatine process and the alveolar ridge of both superior maxillæ had the appearance of a fine warty ulceration; and this induced me and all who saw it to believe the disease to be epithelioma. On elevating the upper lip, the portion of alveolar ridge beneath it was found to be nearly uniformly distended, and having here and there over its surface pale looking nodules, with scattered patches of vessels, but no ulceration. The lips were perfectly free from disease. There was no glandular enlargement discoverable anywhere. She suffered considerable pain, swallowed with difficulty, and her articulation was exceedingly indistinct, whilst her general appearance, with flattened nose, expanded and protruding alveolar process, presented a hideous sight, which was increased by the wan and care-worn expression of those features which still remained. The disease appeared to have invaded nearly equally both superior maxillary bones, the right being, perhaps, a little the more implicated, and to have attacked chiefly the palate processes of these bones, as well as the horizontal plate of the palate bones, and, to a slight extent, the soft palate itself. I could detect no expansion of the antra; no projection into the orbits, and none into the nasal cavities. The chief encroachment of the disease was into the mouth, so far as could be ascertained before the operation. This, then, being the state

* Read before the Bath and Bristol Branch.