remarks on the influence of opium on these factors, to find that Dr. Ringer has pointed out that a hypodermic injection of morphine is of very great use in some cases of melancholia, and speaks in strong terms of its valuable effects.¹³

In headache, as I have said, opium and morphine act well, though in some patients they cause nausea, or intensify this condition when it is present, and in these cases morphine may have to be given hypodermically, and a hypodermic injection of morphine is recommended by Dr. W. H. Day in the last edition of his work on *Headache*.

With regard to epilepsy, an injection of atropomorphine is advised by Brown-Séquard¹⁴ in cases where there is any warning; and since I noticed the connection of this disease with uric acid,¹⁵ I have several times given acids with the objects of warding off the fits in cases where there was any warning of their approach, and several patients have declared that the fits have been kept off by this means; but there are so many sources of fallacy, that it is not safe to attach any great importance to these statements.

My argument for using an acid was as follows:—An epileptic fit appears to bear the same relation to the excretion of uric acid and mental depression¹⁶ that a headache does, and it is therefore probable that the pulse tension is raised at the time of the fit, though it is difficult or impossible to prove this, as the struggling in the fit tends to remove its signs; if, therefore, there is sufficient warning, one ought to be able, just as in a headache, to diminish or prevent the plus excretion of uric acid, reduce the pulse tension and keep off the fit by giving an acid, and it is interesting to note that atropomorphine has sometimes been found to have this effect, though I suppose the proof that in any given case it has prevented a fit must, as in the case of the acid, rest entirely on the statement of the patient.

With regard to puerperal and uræmic convulsions I stand on less firm ground, but it is certainly an interesting fact that opium, which has been shown to reduce arterial tension, should relieve these convulsions.

If what I have been saying above is correct, and opium reduces pulse tension by its effect on uric acid, we are brought face to face with the question, Are puerperal and uræmic convulsions due to the high tension of uric acid? The answer to this question must depend on the view that is taken of the relation of high arterial tension to nephritis. Is the high tension the result of the nephritis, and only present after the kidney is damaged, or is the high tension present, as contended by the late Dr. Mahomed, for some years before there is any kidney lesion? that is, is it to some extent independent of the condition of the kidney? I have previously pointed out that I am able, by influencing the amount of the uric acid in the circulation, to raise or lower pulse tension at pleasure and to a considerable extent; and I believe that there is little or no difference between the sphygmogram of the high tension thus produced (see Fig. 3), and that of nephritis.

Fig. 3.—May 15th, 1889, 7.30 A.M. Sitting. Pressure, 4 ounces; pulse, 60; tension moderate. Threatening of headache morning after morphine.

Dr. Broadbent, as I have remarked in previous papers, considers that uræmic convulsions are due to high arterial tension affecting the cerebral circulation, and not to a poison acting on the nerve cells; and if this is so, it is obvious that the tension which causes the convulsions must be due to a temporary cause, or a transient exacerbation of tension which is perhaps never quite normal, and it therefore corresponds in every way to the effects of a uric acid storm.

At this point the history of a puerperal convulsion may be of some help to us, for it often comes exactly at a time at which, from our previous knowledge, a uric acid storm might be expected; that is to say, at the end of a time, as I have remarked in a previous paper,¹⁷ of large and active nitrogenous metabolism;

the commencement of parturition with pains, vomiting, and inability to take food soon result in a fall of urea and acidity, and the fall of acidity is the signal for a rush of the previously accumulated uric acid into the blood, and so for a marked rise of tension with mental depression, headache, and, possibly, in some cases convulsions, as its signs and results. Again, in cases spoken of as showing chronic high tension of the pulse, my experience would lead me to believe that there are great variations of tension, which, if the pulse is observed only once and at the same hour each day, may, to a large extent, escape notice, though these fluctuations are the possible cause of important symptoms.

My object, however, in this paper is to point out the effect of opium and morphine on acidity, uric acid, and pulse tension, which are of themselves, I believe, very important, and explain a large part of the known effects of these drugs both in health and disease. And it seems to me that if further investigations confirm the value of morphine in these convulsions, and also my explanation of its mode of action, we have here another point from which light may be thrown on the relation of ordinary epilepsy to the excretion of uric acid.

In conclusion, my position with regard to opium and morphine amounts to this. A large number of drugs—iron, lead, the mineral acids and their salts, antipyrin (?) nitro-glycerin(?)—have one effect in common, namely, that of diminishing the excretion of uric acid in the urine, that is, I believe, driving it out of the blood into the liver, spleen, joints, etc. Exactly contemporaneously with the diminished excretion of uric acid due to any of these drugs comes a fall of pulse tension, and a mental condition of brightness and well-being. Uric acid headache or mental depression, if present, are cured, and in their place come pricking and shooting pains in the joints, most marked in those who have previously suffered with gouty arthritis. On the other hand, an alkali, as soda or potash, while increasing the excretion of uric acid, produces symptoms which are the exact reverse of those above mentioned. As these drugs have no obvious properties in common, I have inferred that the results they produce are due to their action on uric acid, which I have pointed out in previous papers. Opium and morphine, as we have seen, diminish the excretion of uric acid, and at the same time reduce pulse tension, cause mental brightness and well-being, cure a uric acid headache, and cause at the same time pricking and shooting pains in the joints; they, therefore, belong to the iron, lead, and acid group of drugs with which their effects exactly correspond, and as they always cause a marked rise of the acidity of the urine, I conclude that their action on uric acid is the result of their action on acidity.

With regard to convulsions, I have pointed out the relation of some cases of epilepsy to the excretion of uric acid.¹⁸ I have now shown that morphine, probably by acting on uric acid, relieves or removes high tension pulse, mental depression, and headache.

It has been noticed that morphine is of much use in certain uræmic and puerperal convulsions which are generally accompanied by a high tension pulse. I now suggest that its curative action in these troubles is also due to its effect on uric acid, and that further investigation may show that these convulsions, like some of those in ordinary epilepsy, have a more important relation to the excretion of uric acid and its effects on pulse tension than has hitherto been suspected.

CASE OF CEREBRAL TUMOUR SUCCESSFULLY REMOVED BY TREPHINING.

Read in the Section of Surgery at the Annual Meeting of the British Medical Association, held in Leeds, August, 1889.

By RUSHTON PARKER, B.S., F.R.C.S.,

Professor of Surgery in University College, Liverpool; Surgeon to the Liverpool Royal Infirmary.

THIS case occurred in the practice of Dr. Austin Williams, of Liverpool, and was attended also by my colleague, Dr. Glynn, both of whom were present at the operation. The patient is a big, strong man, aged 38. The symptoms observed—long-standing headaches, and latterly mental dulness, followed by almost total paralysis of the left arm and distinct weakness of the left leg—pointed clearly to the probability of an intra-cranial growth of some kind; but the administration of iodide of potassium for three

¹³ *Handbook of Therapeutics*, ed. xii, p. 497.

¹⁴ *Quain's Dictionary of Medicine*, p. 450.

¹⁵ *Neurologisches Centralblatt*, March 1st, 1888.

¹⁶ *Neurologisches Centralblatt*, March 1st, 1888, p. 4 of paper.

¹⁷ *JOURNAL*, February 9th, 1889.

¹⁸ *Neurologisches Centralblatt*, loc. cit.

weeks not having relieved the symptoms, which had, on the contrary, become worse, the state of the case becoming urgent, the operation was performed on February 23rd, 1889.

Dr. Glynn looked for but found no optic neuritis. There could have been no difficulty in localising the tumour in the right Rolandic area by ordinary methods of estimation and measurement outside the head, but any such process was rendered unnecessary by the existence of a puffy swelling of the scalp in front of the right parietal eminence. What this might have to do with the tumour supposed to be inside was quite unknown, for it appeared to be, as it proved, entirely outside, and not attended with perforation, or, in fact, any but the most trifling alteration of the bone. But, situated in the region which must have been chosen, it was accepted as the guide, exposed in the middle of the flap turned down, and found to consist of pericranium, thickened and softened, though retaining its textural continuity, and at the end of the operation was dissected away. The skull was opened with a one-and-a-half-inch trephine, and a rounded tumour the size of a walnut, with a bit of adherent dura mater, was shelled out by breaking through the surrounding brain with the fingers.¹ The flap was attached with very few sutures, and held down by antiseptic padding and a close bandage. In consequence of the rather profuse discharge of serum on the third day, drainage-tubes were then introduced. There later followed pulsation over the hole and suppuration in their track, with increasing uneasiness and a return of paralysis that had almost gone, until by the nineteenth day matters were truly critical. Then, under chloroform, the almost healed flap was turned down again, and found, in the main, healthily united to the brain beneath. This, however, being oedematous and prominent, was sliced off level with the bone, revealing sinuses lined with puriform lymph, which was scraped away and the wound packed. No more bad symptoms of any kind were met with again, and the patient's immediate safety became quickly established. A large fungus, however, resulted, and showed no disposition to subside spontaneously, but was reduced by force on the thirty-second day, and the skin-flap laid down on it, and kept down by a plug of coins folded up in antiseptic gauze under a sheet of tin plate. Six days later the fungus was replaced by a chasm lined with granulating brain. Eventually satisfactory healing occurred, with gradual restoration of the patient's strength, which had become much reduced before the second operation, and remained low while the fungus lasted.

Total paralysis of the arm and much of the leg followed each operation, and lasted a day on the first, but ten days on the second occasion. Gradual improvement in this respect has continued up to the present time. He sat up daily after the thirty-sixth day, but was not soundly healed till the eightieth, by which time he could walk by himself in rather a staggering way. With the arm he was then still rather lame, and could not find or seize objects while his eyes were shut, or distinguish, for instance, a tall hat from a spectacle-case when holding them; but all this slowly improved, and at the end of five months he could turn over the leaves of a book singly pretty well when his eyes were open, though fumbling a good deal when his eyes were shut.

A great benefit owned by him is the total loss of headaches and the dazed feeling and manner that preceded operation. He expresses himself as quite restored to mental vigour and comfort. All traces of paralysis have long left the face, while the strength of the affected limbs has improved with each month, and the tactile discrimination and muscular sense of the arm are now completely restored.

A review of all the circumstances convinces me that the case is one of gumma, and a former medical attendant has since informed me that he treated him, six years ago, with iodide of potassium for a periosteal swelling of the sternum, which got well. The puffy swelling of the pericranium; the thickened, adherent, puckered, and depressed dura mater; and other anatomical features to be mentioned, favour this pathological view, which is supported, I believe, by the absence of optic neuritis as a clinical symptom. Good microscopical slides were kindly made by Mr. W. T. Thomas and by Dr. Glynn; those of the latter including some by a process of Weigert, showing nerve axis cylinders ramifying in the tumour, and proving its infiltrating character. The tumour showed the form of two convolutions on its surface, slightly paler than natural, somewhat prominent and hard (hard enough to prevent, in the trephine hole, pulsation of the exposed brain until the tumour was removed). When cut into it was very like a firm sarcoma—show-

¹ After section of dura mater all round the adhesion, which proved inseparable.

ing microscopically, however, no structure of sarcoma or of any proper tumour, but accumulations of round-cells and free nuclei around the vessels and in a fibrillar basis, alternating with patches of recognisable brain substance containing cortical cells, and with hazy fibrinous areas, indicating caseation. To the naked eye, however, no suggestion of caseation occurred.

On the question of injury, there is no certain history; but I am informed that there has been ample opportunity, the patient having in former years been severely knocked about in accidents of various kinds.

CONSECUTIVE SERIES OF CASES OF ABDOMINAL SECTION.

Read in the Section of Surgery at the Annual Meeting of the British Medical Association, held in Leeds, August, 1889.

By A. W. MAYO ROBSON, F.R.C.S.,

Honorary Surgeon, Leeds General Infirmary; Honorary Consulting Surgeon, Batley Hospital; Lecturer on Practical Surgery in the Yorkshire College of the Victoria University.

My excuse for bringing forward the appended series of cases is, that in these times of specialism and special hospitals, it is necessary that general surgeons, if they wish to retain the name, should prove that they also can perform abdominal sections safely, even in an ordinary hospital.

My cases, which extend over a period of five years, have not been selected in any way, and whenever a patient has been brought suffering from abdominal symptoms, statistics have not been considered, but an operation has been undertaken whenever such was indicated.

Many cases properly coming under abdominal surgery, such as lumbar nephrectomy and nephrotomy, lumbar colotomy, suprapubic cystotomy, typhilitic abscess, etc., where the general peritoneal cavity has not been opened, have not been included in the above list. Knowing how fallible diagnosis is, even with the utmost care, I am guided by the rule, "when in doubt, operate;" since I know that with ordinary skill a simple exploratory operation is not attended with serious risk, even if it be found that further treatment cannot be followed out, and I have more than once completed successfully the removal of a tumour which I commenced as an exploratory operation.

In giving the statistics of my ovariectomies (60 cases with 2 deaths and with 55 consecutive recoveries) I have separated the large tumours from the so-called diseased appendages; not because operation in the latter class of cases is simpler, for as a rule it is attended with very much greater difficulty; but because of the views held by different surgeons on the oft-discussed question of the advisability of operating on them. I do not understand how anyone can doubt the wisdom and justifiability of performing a radical operation in these cases of pyosalpinx, hydrosalpinx, and adherent and diseased ovaries, and thus restoring the patient from a state of invalidism and constant danger to one of health; and fortunately it can be done with slight risk; for instance, in the twenty-nine cases here reported, all the patients recovered.

The ovarian tumours were many of them very formidable cases with multiple adhesions, and some of the tumours were of enormous size, for instance in one case, No. 7, 84 pints of fluid were contained in the cyst. The ages of the patients varied from 15 to 68 years. The two deaths were probably unavoidable, one from intestinal obstruction a week after the operation, the other from exhaustion after the removal of a huge suppurating multilocular tumour adherent to all the surrounding viscera. If, however, another case of intestinal obstruction after ovariectomy comes under my notice, I shall not hesitate to reopen the abdomen and try to remove the cause.

The deaths in the list of operations for myoma ought not to, and I believe would not, happen again in my practice; one occurred from hæmorrhage due to the imperfection of a Koeberlé's *serre-naud* which the nurse screwed to its utmost in my absence without arresting the bleeding; one from peritonitis after the removal of the appendages, owing to the insanitary condition of the room in which the patient was placed; and another from distension, which I should now quickly remedy by the administration of an aperient, as advised by Mr. Lawson Tait. This I regularly adopt in case of vomiting and distension, by giving a seidlitz powder every few hours, until purging occurs or flatus passes freely. The use of a sedative is very rarely required and is avoided if possible.