Seven patients, labouring under apoplexy, were submitted to observation; they were bled eight times. The results obtained in some of these cases (says M. Andral) were quite unexpected, yet consistent with what had been observed in cerebral congestion. The commonest change in the blood was a diminution of the fibrin with an augmentation of the globules.

The first patient examined, for the purpose of ascertaining the state of the blood, was a woman, fifty-nine years of age, who had been seized with a very violent attack of apoplexy two days before. The quantity of fibrin had fallen to 1.9; but the globules had risen to 175.5; the solid parts of the serum were unchanged (80.3); the fluid was much diminished, being 742.3. We were a good deal surprised at so remarkable an increase of the globules. After the third day, the patient began to come a little to herself; she was now bled a second time, and a considerable change was discovered in the constituents of the blood. The fibrin had increased to 3.5; and the globules, though still in excess, (137.7,) had diminished. In this case the very great difference of proportion between the fibrin and globules, could not have been produced by the mere fact of some blood having been lost in the brain; for the loss of blood could not be abundant enough to cause so great a change, and the facts already cited show that hæmorrhage always causes a diminished quantity of globules, but does not act with the same certainty in diminishing the fibrin. Hence we are forced to ask, whether the want of due proportion between the fibrin and globules, instead of being an effect of the apoplectic attack, may not have given rise to it, the more especially as we know that the blood has a great tendency to escape from its vessels, when deprived of its normal quantity of fibrin.

In the second case, where the attack was not so severe as the preceding one, the patient was bled on the day of attack; the fibrin was 2.2; the globules 135.9.

In the third case, the patient was bled three days after the attack; here, also, was the fibrin diminished (2.6); the globules, on the contrary, were increased to 140.6.

In the fourth and fifth cases, the patients were bled at a much later period of the disease (eight days in one, fifteen in another); the quantity of fibrin was still small, (2.0, 2.1,) but, for the first time, that of the globules also was below the average.

In the sixth case, the fibrin had ascended to 3.2, while the globules, on the contrary, were only 123.4. But this patient had been already bled and leeches; five days had elapsed since the attack, and as the sum of the globules amounted, under these circumstances, and at so late a period, to 123, we may safely conclude that they were much higher at the moment of attack.

From the foregoing facts it is evident that the chief characteristic of apoplexy is a tendency to increase of globules, with diminution of fibrin.

In the seventh case, however, the composition of the blood underwent little or no change; the fibrin, instead of being diminished, was slightly augmented, 3.9; the globules marked 126.5; yet this was a very severe case, and the patient was bled on the second day. This certainly is an exceptional, or rather negative case, but it cannot

destroy the value of the facts which have been mentioned; perhaps the slight augmentation of fibrin may have coincided with a commencement of inflammatory action round the effused clot. In the next section will be noticed those diseases in which the blood globules are spontaneously diminished.

ON HIPPURIC ACID AND ITS TESTS.

By ALEXANDER URE, M.D., A.M.

READ THE 9TH OF JUNE, 1841.

In a paper communicated by me to the Medico-Chirurgical Society in the month of January last, it was pointed out, for the first time, that when a certain portion of benzoic acid, or of a soluble benzoic salt, is introduced into the human stomach, a remarkable change takes place in its passage through the kidney. The urine voided in the course of a couple of hours after its ingestion, amounting usually to five or six ounces, will be found, upon adding a twelfth part of muriatic acid, to yield by-and-bye a copious precipitate of beautiful rose-pink acicular crystals. These, when examined by the microscope, exhibit the form of a four-sided prism, terminated by a dihedral summit. Now this is precisely the crystalline character of an acid peculiar to the urine of the horse, cow, and other graminivorous animals, and to which, for that reason, Liebig has assigned the name of *hippuric*.

By this singular interchange of elements, capable of being effected only by the aid of vital chemistry, we have an organic product, uric acid, containing eight atoms of azote and ten of carbon, replaced by one, hippuric acid, containing no less than eighteen of carbon, and only two of azote! In pursuing the above investigation a step further, it was ascertained that no trace whatever of uric acid or any of its salts could be discovered in the urine in question. In point of fact, it had been wholly superseded by the other acid.

The important circumstance connected with this research, as bearing upon medical practice, is, that the salts which this new acid forms with the ordinary bases occurring in the animal fluids, as soda, ammonia, and potash, are all of easy solubility. Thus hippurate of soda requires about two parts of water, at 60 deg. Fahr. to dissolve it, whereas the corresponding uric salt, which constitutes, as is well known, the gouty concretions or chalk stones, is acknowledged to be nearly as insoluble as uric acid; it requires at least 4000 parts of water to dissolve one. Hippurate of ammonia again is but little less soluble than hippurate of soda, while the urate of ammonia will only dissolve to the amount of 1-480th part. Hippurate of lime, the least soluble of these salts examined by me, requires eighteen parts of water to dissolve one.

The application of the above principle has proved of material benefit in the treatment of certain unhealthy conditions of the urine, occurring in subjects of a calculous or gouty diathesis; since it enables the practitioner to obviate entirely the various depositions resulting from excess of uric acid, the fruitful source of that most distressing

malady, stone in the bladder; as also to control and prevent the formation of the so called taphaceous concretions or chalk-stones, which occasion so much inconvenience, deformity, and pain to individuals labouring under gout.

By judicious exhibition of the benzoic acid, or, according to particular circumstances of a benzoic salt, that is to say, apportioning the dose to the state of the renal secretion, best previously ascertained by analysis, we can fulfil the desired indication with unerring precision, and that, as shown in the above paper, without any risk of affecting the general health, or of irritating the urinary organs.

It is to be kept in mind that this plan of treatment by no means precludes the adoption of other suitable remedial measures. Of course certain rules of diet must be observed, which there is no necessity for referring to here. It would be equally irrelevant to occupy your time with the details of cases, several of which have lately come under my notice, and go to corroborate the statements above made.

As benzoic acid is apt to irritate the fauces, unless administered in a liquid state, and as it needs a large quantity of water to dissolve it, it will be found expedient to give it along with phosphate or biborate of soda; since they enhance its solubility without abating its specific power. Thus, four parts, by weight, of the former, or one part and a half of the latter salt, will enable a comparatively small proportion of distilled water to take up one of the acid. This difficulty, as is obvious, does not apply to the benzoate of ammonia or of potash.

Phosphate of soda not only serves to hold benzoic acid, but likewise hippuric acid, in solution; and this is a point of some consequence, seeing that any excess of the latter acid, accidentally present in the urine, will remain dissolved by means of the neutral phosphate of soda, or the triple phosphate of soda and ammonia (microcosmic salt) naturally existing in that secretion. These phosphates, however, produce a very different effect upon the uric acid, inasmuch as they promptly convert it into urate of soda, by depriving the salt of one-half of its base, and thereby transforming it into biphosphate. This fact, which recently presented itself to me in the course of some experiments, and which has not been heretofore noticed by any chemical authority, seems to furnish a simple and rational explanation of the mode of formation of urate of soda, the basis of chalk-stones. Hence, whenever the oxidizing process of the kidney is proceeding with such energy as to supply a superabundance of soluble phosphates on the one hand, and of uric acid on the other, there must inevitably result an excess of urate of soda.

Having premised the above observations with the mere view of pointing out what appears to cast some new light upon the importance of benzoic acid and its compounds, as therapeutical agents in virtue of their power of generating hippuric acid, it has appeared to me proper to indicate the distinguishing features of these two acids, as some objections have been started touching the difficulty of discriminating the one from the other. For convenience sake, the leading peculiarities have been arranged in collateral order, as follows:—

BENZOIC ACID

Crystallizes in hexagonal needles, or in white, diaphanous, pearly, flexible laminae.

Is soluble in two parts of ether.

Is not changed by dilute nitric acid.

Heated with three times its weight of hydrate of lime generates simply benzoate.

BENZOATE OF AMMONIA,

On being exposed to a strong heat, melts and flies off in benzoic acid fumes, without leaving any appreciable residuum.

BENZOATE OF POTASH

Burns without emitting any particular aromatic odour.

HIPPURIC ACID*

Crystallizes in four-sided prisms with dihedral summits.

Is very sparingly soluble in ether.

Treated with dilute nitric acid, and evaporated to dryness, produces, on the addition of ammonia, a beautiful purple colour.

Heated with three times its weight of hydrate of lime disengages a quantity of ammonia.

HIPPURATE OF AMMONIA,

Exposed to heat, melts and assumes a rose-red colour, forming a reddish acid; which being dissolved in water and evaporated, affords red crystals, resembling hippuric acid in their properties.

HIPPURATE OF POTASH,

Heated so as to undergo decomposition, exhales the odour of bitter almonds.

On the whole, sulphuric ether furnishes the readiest test for distinguishing these two acids, from the easy solubility of the one, and the difficult solubility of the other in that menstruum.—*Pharmac. Transactions*, No. I.

* The verifications were all made with hippuric acid derived from the human subject.

GENERAL ELECTION.

DEPUTATIONS of medical men have waited on Mr. Sheil, the member for Dungarvon; Mr. J. O'Connell, member for Kilkenny; and on Colonel Damer, member for Portarlington. The honourable members all declared themselves highly favourable to medical reform.—*Dub. Med. Press*.

ROYAL COLLEGE OF SURGEONS IN LONDON.

List of Gentlemen admitted Members on Friday, July 9, 1841.—John William Griffith, Thomas Brugis Flower, Henry Cox Goodlake, Peter Leigh, Charles Osmond Woodford, Thomas Osburne, John Oliver Taylor, Henry Charles Stewart, William Lane, William Moorhead, Thomas Stack.

Printed by THOMAS ISOTSON, of 105, St. Martin's Lane, in the Parish of St. Martin in the Fields, and GEORGE JOSIAH PALMER, of 20, Regent Square, in the Parish of St. Pancras, at their Office, No. 3, Savoy-street, Strand, in the Precinct of the Savoy; and published by JOHN WILLIAMS RUMSEY, at his Residence, No. 6, Wellington-street, Strand, in the Precinct of the Savoy.—Friday, July 16, 1841.