ON
GOUTY CONCRETIONS,
WITH A
NEW METHOD OF TREATMENT.

BY ALEXANDER URE, Esq., M.D., A.M.,
MEMBER OF THE ROYAL COLLEGE OF SURGEONS, LONDON.

COMMUNICATED BY SIR BENJAMIN C. BRODIE, BART.

READ JANUARY 26TH, 1841.

It is well known that persons afflicted with gout are liable to the effusion of a white liquid into many of the internal cavities of the body. This liquid consists of serum and urate of soda, with sometimes a little urate of lime. In the course of time, the serous particles become absorbed, leaving a kind of soft clayey residuum, which afterwards becomes hard and friable ; thus forming the so-called tophaceous concretions or chalk-stones.

Gout may be regarded as a specific inflammation which seems to affect the serous and fibrous structures. Accordingly, we find that the above depositions most generally take place in the cavities of joints, in the bursæ mucosæ, in the ligaments, neighbouring aponeuroses and cellular membrane,

and in the periosteum. They have even sometimes been met with between the cutis and cuticle.

A remarkable instance of tophus in the ligaments, tendons, and aponeuroses about a joint, is described by Lobstein,* and another of the same kind by Van der Boon Mesch.†

The effusion from which these concretions are derived, occurs not only during fits of gout, but likewise in the intervals; and as the extremities of the body, particularly the hands and feet, are the principal seat of the disease, it is there that the greatest accumulations take place. They occasionally, however, make their appearance about the articulations of the jaw and spine.‡

It is a remarkable fact, which has been clearly pointed out in Mr. Moore's valuable paper upon gouty concretions, in the first volume of the Transactions of this Society, that, although this process is usually preceded and accompanied by inflammation, yet there is no extravasation of coagulable lymph, no new covering or cyst surrounding the concrete matter,—like pus in an abscess. A circumstance which distinctly proves that the inflammation is not of a phlegmonous character, and that the non-absorption of the deposit is to be ascribed to physical causes.

* *Compte Rendu sur les Travaux Anatomiques*. Strasb. 1824.

† *Eene scheidkunde ontleding van der Iichtkalk in Bydragen tot de natuurkundige Wetenschappen*. Amsterdam, 1826. D. I. No. 2. p. 127.

‡ Otto, *Pathological Anatomy* by South, p. 238.

Gouty tophus is not confined to man ; it occurs also, though more rarely, in animals, when placed in a similar condition, that is, when fed for a length of time upon a highly azotised diet. Aldrovandi, an author of considerable repute in the 17th century, accurately details its effects on birds of prey, especially hawks : "*Quæ quidem nihil aliud est quam tumor durus, ac gypso similis, circa digitorum articulos, estque malum maximi in rapacibus momenti. Impedit enim quo minus prædam captare possint, et incurabile plerumque est, quicquid dicant alii.*"*

Gout stones sometimes attain a very great size. Otto mentions his having seen them larger than a walnut.† Hence they become the source of more or less deformity, inconvenience, and pain. They interfere with the motion of tendons and joints, in some instances giving rise to spontaneous dislocation, in others to complete ankylosis. When bulky, they press and distend the surrounding parts, and not unfrequently produce ulceration of the integuments. Several cases have come within my knowledge, of persons in whom this morbid formation went on unceasingly during a series of years, so as to cripple them in every joint, and wholly unfit them for the duties of their calling.

Since one part of urate of soda requires about 4000 parts of water to dissolve it, it may be reasonably assumed that the refractory nature of the above deposits is due to their very sparing solubility in the fluids with which they come in contact. It

* Ornithologia, vol. i. p. 456.

† Loc. Cit.

therefore occurred to me as a consequence deduced from some researches into the composition of the renal secretion in certain of the lower animals, that some means might be devised to enable us through the medium of the circulation so to modify that secretion in man as to supersede, for a time, the urates altogether.

The graminivorous animals, as the horse and cow, secrete from the kidneys a peculiar acid (the hippuric). It is present in their urine combined with soda. Now, the hippurate of soda, which may be considered the analogue of the basis of gout-stones, is an exceedingly soluble salt, (requiring only two parts of water, at 60° F., to dissolve one,) as are likewise the hippurates of potash, of ammonia, and of lime. Hence it appeared probable that were we to adopt such therapeutic measures as would determine the human kidney to secrete this acid instead of the uric, we should thereby, in all likelihood, controul and prevent the deposition in question.

I ascertained in the course of last summer, by repeated experiments, made first of all upon myself, and afterwards upon individuals labouring under gout, that the above substitution could be perfectly accomplished without the slightest risk of affecting the general health, or of irritating the urinary organs. The substance employed for this purpose was the benzoic acid. If an hour after a meal, a scruple of this acid be taken into the stomach, in the course of a couple of hours subsequently the urine voided, amounting to five or six ounces, will be found, on

adding a small quantity of muriatic acid, to yield a copious precipitate of beautiful rose-pink acicular crystals, which weigh, after being allowed to settle for a day, about fifteen grains. This quantity is by atomic computation equivalent to little more than one-half of the benzoic acid expended, so that the remainder must have made its escape by some other emunctory, probably the skin.

The above crystals, when examined by the microscope, display the characteristic form of the hippuric acid, namely, a four-sided prism, with a dihedral summit, as figured in the annexed wood-cut.*

It may be observed, that no trace whatever of uric acid, or of any of its salts, or of benzoic acid, could be discovered in the above urine.

A nearly analogous result is obtained when benzoate of ammonia or of potash is administered; and, under particular circumstances, the exhibition of one or other will be found preferable to the simple acid; either in the neutral state, or with an excess of base, when there is a disposition to acescence in the *primæ viæ*; apportioning the dose, in every instance, to the condition of the urinary secretion, previously ascertained by analysis.

By this singular interchange of elements, capable

* Benzoic acid crystallizes in hexagonal needles, or in pearly scales, and dissolves in two parts of sulphuric ether, whereas hippuric acid is but very sparingly soluble in that menstruum.

of being effected only by the aid of vital chemistry, we have an organic acid, containing 8 atoms of azote and 10 of carbon, replaced by one containing no less than 18 of carbon and only 2 of azote, and that even in what various eminent pathologists regard as a highly azotised state of the system.

It is obvious that this new plan of treatment, and which does not interfere with other remedial means, must be steadily persevered in for a considerable length of time, ere any adequate benefit can ensue. How far it may be applicable to various forms of calculous disease, connected with the gouty diathesis, remains for future investigation to decide. Most unequivocal proofs have already been afforded me, of its efficacy in correcting and removing certain disordered states of the urine in individuals prone to attacks of gravel.