found in his bladder. During the day, therefore, he found it easier to micturate sitting on his haunches (a method much in vogue amongst the natives here). Micturition under the best of circumstances was torture. I saw him lying on his side straining prodigiously, groaning in agony, and pressing with his fingers forcibly on the perineum, and the result of all was a thin feeble stream of urine rapidly passing into a few drops, which soon ceased.

There was dribbling in the intervals of micturition, but the bladder was not distended. He sometimes felt a small foreign body move in the fossa navicularis (referred sensation). He never passed blood or stones per urethram, but has often noticed white pieces like "cocoanut scrapings" in his urine—no genital symptoms. This state of things had been going on for ten months.

The patient had undergone twelve months' imprisonment in a Ceylon gaol, from which he was released only three months ago. In gaol he had done hard labour on a diet of rice, coffee, dry fish, and hard bread, and meat. After one month's imprisonment he received lashes. He had hardly been three months in gaol when he noticed the first symptom of his disease, namely, frequency of micturition.

On making a rectal examination, which I had to do under anaesthesia, owing to the severity of pain, I felt the grating of two stones lodged in the region of the prostate, and confirmed this on passing a sound, when I also detected another stone lying loose in the bladder. Prostatitis and deferentitis were present.

Operation.

I performed suprapubic cystotomy and removed three stones—one from the bladder 3.2 cm. long, and two from the prostatic urethra, 2 cm. and 1.4 cm. in their longest diameters respectively. I found the bladder wall very

Stones in prostatic urethra. (Actual size: A, 1.4 cm.; B, 2 cm. by 1.5 cm.)

attenuated. The prostatic stones I reached by passing my finger through the internal meatus, and extracted them with scoop and finger, aided by a finger in the rectum, without very much difficulty. They were situated about $\frac{1}{2}$ in. from the neck of the bladder; the semilunar stone was removed first. These stones were faceted for articulation with each other, and, as will be seen from the diagrams, are not unlike the scaphoid and semilunar bones of the

carpus. The stones were composed of phosphate and calcium carbonate.

I did not keep in a rubber catheter at the time, and regretted it afterwards, as I was only able to do so after dilating the urethra with sounds a couple of days later. I corrected his phosphaturia with urotropin, acid sodium phosphate, and a bitter infusion.

In three weeks the patient left hospital with no unpleasant symptoms and quite cheerful.

Certain points in the case call for remark.

Casper favours the pre-rectal route in the extraction of prostatic stones; I think I was well advised in having adopted the suprapubic approach in this case.

Judging from the contour of the two prostatic stones, their accurate adaptation, and the presence of phosphaturia, I think the conclusion that these stones were formed primarily in the prostatic urethra justifiable. I am inclined to believe that the narrow portion of the bigger stone projected into the membranous urethra, the narrowest portion of the passage; it is significant that this constricted part measures 1.2 cm., the length of the membranous urethra.

The overwork, anxiety, intimidation, and bad food inseparable from the life of a convict seem to have been the causative factors in the production of the phosphaturia and calculi. At any rate, the symptoms began only three months after he went into prison.

Pressure on the perineum was an aid to micturition, serving probably to cause a slight dislodgement of the calculi. The feeling of a foreign body in the fossa navicularis was a referred sensation. Difficulty of micturition when standing was an effect of the action of gravity on the prostatic stones, whilst the sudden blockage to the urinary flow must be attributed to the vesical stone.

Dribbling in the intervals of micturition is attributable to the inability of the prostatic sphincters and the com-

pressor urethrae to act, the latter probably owing to the intrusion of the narrow neck of the lower stone within the membranous urethra. In other words, there was mechanical incontinence of urine.

AN UNUSUAL URINARY DEPOSIT OF CALCIUM CARBONATE.

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A DEPOSIT of calcium carbonate in human urine is of such rare occurrence that I regard this a sufficient reason for bringing the following case before the notice of the profession.

The patient, a man aged 65, was presumably suffering from granular kidney. He had been feeling in excellent

Fig. 1.—Calcium carbonate; high power.

health till this, the first and terminal illness since boyhood. The symptoms began with headache, followed later by sickness and vomiting; he got progressively worse, gradually passed into a comatose state, and died three

Fig. 2.—Calcium carbonate.

weeks after the onset of symptoms. The arterial tension was noted to be high. At no time did the urine contain more than a very small quantity of albumen. The first specimen, examined during the first week of illness, showed

an organic deposit containing a number of granular and hyaline casts, but no crystals of any kind. A second sample, examined two days later, showed no deposit, and no tube casts were found in this or any of the samples thereafter. During the second week of illness the urine became more highly coloured and muddy, and looked simply like a concentrated urine with a deposit of pale urates. Microscopical examination, however, revealed a very large number of crystals, as shown in Figs. 1 and 2. They had a beautifully clear and sharply defined appearance, consisting of a double contoured envelope and a finely striated structure centrally.

Fig. 3.

Dr. Middleton, Senior Visiting Physician to the Glasgow Royal Infirmary, who kindly examined the specimen, said he had never seen such a urinary deposit, but thought it most probably calcium carbonate, though the appearance of some crystals suggested leucin. Mr. Agnew, Lecturer in Chemistry, St. Mungo's College, examined some of the sediment, and reported that it consisted of calcium carbonate. Various books were consulted, and though some of the illustrations of lime crystals were a little like this specimen, none presented the picture shown in Fig. 1.

For some days this sediment continued to be present, and then was gradually replaced by one consisting chiefly of crystals as shown in Fig. 3. Among these, however, were always to be found a few circular ones, and also a few uric acid crystals. The very finely striated appearance in this second form was very clearly shown, and gave the impression that these crystals were simply the first form minus the double contour. They were clearly of the same chemical composition, possibly in a different phase of formation. Of this interesting and unusual deposit I offer no explanation.

The patient's diet latterly consisted of nothing but milk, and the only drugs he had during his illness were the alkalis, a few doses of erythrol-tetranitrite, and hypodermic injections of pilocarpine, and these latter I do not think offer an explanation.

A NEW CELL PROLIFERANT: ITS CLINICAL APPLICATION IN THE TREATMENT OF ULCERS.

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THE inquiry of which the following is a short preliminary account originated in a somewhat accidental way when I was seeking for information concerning cell proliferants.

COMFREY.

My attention had been directed to the fact that from time immemorial the symphytum, or common comfrey, had been much recommended by the ancient writers in medicine as a vulnerary and as a dressing for sores and ulcers of various kinds. From the days of Saxon leechdom* (c. 1000) to the end of the seventeenth century there were few authors who did not refer to it, and it was sometimes spoken of as being the "chief vulnerary herbal." I can find no reference to comfrey in any books on materia medica or therapeutics of relatively recent date; Pereira, for instance, does not refer to it, and it was never an official remedy so far as I can discover. To this day, however, it has a traditional reputation among country folk, both in England and in Ireland, as a

domestic herbaceous "simple" for applying to sores, and I was much interested during the past summer, when visiting a farm at Tarvin in Cheshire, to find that its owner always keeps a bed of comfrey growing in order that he may provide the villagers with it when occasion arises.

I was a good deal impressed by the old accounts of this ancient remedy, and in particular with the description of one case, which led me to think that it might be quite worth while to investigate the qualities of comfrey and to discover whether it, or any of its constituent principles, had any influence upon cell growth; and as a result of researches carried out in collaboration with Dr. Titherley and Mr. Coppin, of the Chemical Department of the University of Liverpool, I shall presently show that it contains a body which may have some important clinical applications.

Through the kindness of Professor Harvey Gibson I was provided with a large quantity of the root, some of which was handed over to Dr. Titherley and Mr. Coppin, and while they were making a careful chemical analysis of it, which took a considerable time, I proceeded to dress the only ulcer which was then available to me with a strong infusion made from the powdered root. This case was an exceedingly unpromising one, because it was a "rodent" of about two years' duration, not a simple ulcer. It was a stroke of good fortune, however, that this case was the first to be experimented upon, because having resisted all kinds of previous treatment, the marked epithelial growth which took place upon it seemed more likely to be the result of a specific action of the application than would have been the case in an ordinary varicose ulcer for instance. It was a very large ulcer (measuring 4 in. by 3 in.), involving the skin and deeper structures over the upper thorax, and it was slowly spreading, more especially by its upper margin, which was high and undermined; the other margins were less raised. The base was irregular, and there was some sero-purulent discharge. After being dressed with the mucilaginous infusion for about a week the surface cleaned, and a distinct growth of epithelium could be seen taking place from some of the marginal points. Later on the upper margin flattened somewhat on its inner aspect, the undermining vanished, and after growing here and breaking down there for a time the epithelium became stronger and closed in to a considerable extent.

By this time Dr. Titherley reported to me that he had obtained a definite, so far unidentified, crystalline body from the root, and he was able to give me sufficient to experiment with. Since it was very sparingly soluble in water, quite a large amount of solution was made, which was now used as a dressing for the ulcer instead of the infusion. With this application the skinning-over process in the course of a month was all but completed.

I do not propose at this point to proceed with clinical results. Several other experiments were made, however, all of them confirming the suggestion that the symphytum root contained a principle which might be useful as a cell proliferant. It therefore behoved us to investigate its chemistry before studying its practical utility.

In his preliminary examination Dr. Titherley established the facts that the root contained:

1. Gums.
2. Sugars, including a reducing sugar.
3. Resins.
4. A protocathechuic derivative or derivatives.
5. A substance giving an intense yellow solution with sodium hydrate (not investigated further).
6. A crystalline solid, very rich in nitrogen and melting at 226° C.

Since from clinical observations this latter body appeared to be the physiologically active constituent of the root, Mr. Coppin was asked to devote his attention to its investigation. His methods of extracting it will be fully published at a later date; but Dr. Titherley and he found that the root contained about 0.8 per cent. of it, and by estimating its carbon, hydrogen, and nitrogen contents he showed that it possessed the same empirical formula as allantoin, which it greatly resembled in its chemical properties.

ALLANTOIN.

Some allantoin was now prepared from uric acid, and the product from the root was proved conclusively to be an identical substance by chemical methods. For example,

* Dr. Edward E. Nicholson (Neuilly) furnished references.