

**THE MICROSCOPIC  
STRUCTURE AND  
MODE OF FORMATION  
OF URINARY CALCULI**

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The microscopic structure and mode of formation of urinary calculi by H. Vandyke Carter

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MICROSCOPIC STRUCTURE  
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URINARY CALCULI

BY  
H. VANDYKE CARTEE, M.D. (LOND.)

WITH ILLUSTRATIONS



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1873

165. e. 19.

## PREFACE

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It appeared to the author, when he commenced these researches three or four years ago, at a small station in the Deccan plain of Western India, that a blank existed in medical literature which he might do something to fill up; and opportunity presenting itself in a number of 'stone' cases, it was at once pursued, with valuable aid from others in a free and liberal supply of additional specimens. The author's obligations are due to Dr A. Wright, the present head of the Bombay Medical Department, for ready official assistance, and to Drs Holmsted, Cates, Beatty, Jayakar, Weir, and to Mr Apothecary Conway; also to Messrs Abdool Kurrim, Dorabji, and Ruttonji, for permission to inspect or retain various interesting calculi. After considerable labour the inquiry terminated in results, which were brought to England in May, 1872, but owing to a variety of circumstances, are not till now published in full.

The author is not aware that hitherto a treatise, or,

indeed, any systematically acquired information, on the subject of the minute structure of urinary calculi in man, has been made known; as an earliest essay, therefore, the present memoir will doubtless prove deficient, but the observations it contains have the advantage of being at first-hand, and it need not be regarded as a valid objection to their interest, that the specimens examined were collected in a tropical climate. It is true, as the author long since determined, that calculi removed from natives of India are somewhat peculiar in chemical composition, and some confirmation of his results has lately appeared, as may be learnt from a short article in the 'St George's Hospital Reports,' vol. vi, 1873; but this feature does not affect the main issues here set forth, and the author, anticipating further inquiries in England, would only venture to recommend such patient pursuit of a subject not particularly amenable to investigation, as he has himself found necessary for its satisfactory elucidation.

It is right to add that Dr Beale's standard work on the urine &c. (third edition) was the only book of reference available to the author in India, and that its aid was most valuable; it will be seen that some of Dr Beale's observations respecting forms of the calcic oxalate are confirmed by these later researches.

With reference to the second part of the present

memoir, namely, that treating of the mode of formation of calculi, no pretence is made to novelty so far as concerns the principle sought to be applied, and the facts upon which that principle is based. It is to Mr Rainey that is due, so far as the author knows, the credit of fully demonstrating the existence and character of that widely operating process termed by him 'molecular coalescence,' which the author here only attempts to apply in explanation of the construction of certain calculous ingredients in man; for details recourse should be had to the experimental parts of Mr Rainey's original work, entitled 'On the Formation of Shells &c.,' London, 1858. To Dr W. M. Ord, also of St Thomas's Hospital, is due an extension of these experimental investigations, which has led to results hardly less interesting than theirs with reference to the subject under notice, and the author (who quite recently met with the paper) would strongly advise a reference to Dr Ord's original communication, entitled "On Molecular Coalescence, and on the Influence exercised by Colloids upon the forms of Inorganic Matter," and published in the 'Quarterly Journal of Microscopical Science' (vol. xii, New Series, 1872, p. 219); and he would suggest a careful comparison of his own figures from natural specimens, with those of Dr Ord from results of experiment. When mention is made of a preliminary communication respecting a work of Professor Harting, of the University of Utrecht, published at p. 118 of the same volume, every



source of special information made use of has been enumerated. For the argumentative portion of the present essay the author is alone responsible.

H. V. C.

*June, 1873.*



## PART I

### THE MICROSCOPIC STRUCTURE OF URINARY CALCULI

ABOUT one half the specimens examined were submitted to inspection very soon after their extraction, but I do not know that in them, the internal appearances were in any way different from those observed in calculi, which had been kept for months or years. Copious notes were made of every specimen, which I have preserved; nothing is here stated that has not been seen and carefully scrutinised; and on the other hand, no marked exception was met with to the general results, as now recorded. It was not practicable to add descriptions or figures of the several calculi examined, otherwise this demonstration of their structure would have been more complete; nor is it pretended to have nearly exhausted the subject; on the contrary, there are numerous points well meriting discussion which I have abstained from entering upon in a first essay; such are the probable bases of the uric acid salts, the combinations of the calcium phosphate, and the likely complex composition of some sub-morphous forms, here attributed to calcium oxalate. The polariscope was frequently employed, but as, on