

**ILLUSTRATIONS OF THE
CONSTITUENTS OF
URINE, URINARY
DEPOSITS, AND CALCULI**

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Illustrations of the Constituents of Urine, Urinary Deposits, and Calculi by Lionel S. Beale

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OF
THE CONSTITUENTS OF
URINE URINARY DEPOSITS, AND
CALCULI.

BY

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PROFESSOR OF PATHOLOGY AND CHEMICAL AND MORBID ANATOMY TO KING'S COLLEGE,
LONDON, HONORABLE FELLOW OF KING'S COLLEGE.

37 Lithographic Plates, containing upwards of 170 separate Figures, carefully copied
from Keiser and drawn to a Scale.



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THE USE OF THE MICROSCOPE IN CLINICAL MEDICINE, ILLUSTRATED.

NOTICE TO SUBSCRIBERS.

THE Author proposes to issue further numbers of this work from time to time, as he meets with specimens suitable for illustrations. In future, the execution of the illustrations will be superior to the first two parts, and at least equal to the illustrations of Sputum, the Kidney, and Epithelium, in the present number. Where necessary, coloured plates will be introduced. Each part will contain from four to eight octavo plates, with descriptive letter-press, and two or three will be issued in the course of the year. The price of each part will be 2s. 6d.

Part IV will be published as soon as possible; but, from the nature of the subjects to be illustrated, a longer time must elapse than heretofore, as it is difficult to meet with specimens adapted for illustration.

The Author hopes still to receive the co-operation of friends in procuring specimens, and he desires to thank many for very valuable help.

The subjects to be illustrated in future parts are—Vomit, Sputum, Discharges from the Alimentary Canal, Saliva, Bile, Animal and Vegetable Parasites, &c.

A new title page is furnished with the present part, for the convenience of those who may desire to have the CONSTITUENTS OF THE URINE, URINARY DEPOSITS, and CALCULI, bound at once.

* * The binder is requested to insert Plates XXIII and XXIV, with the explanations, after Plate XXII.

The plate of the Kidney is to face the title page.

ANATOMY OF THE KIDNEY.

IN order to obtain an accurate idea of the manner in which casts are formed, and to understand the morbid changes taking place in disease, it is necessary to be acquainted with the minute anatomy of the Kidney, and it has been thought desirable that this drawing should be added to the plates of Urinary Deposits.

There can be no doubt that, in most cases where blood comes from the kidney, it escapes from the vessels of the Malpighian tuft.

Casts are, for the most part, formed in the convoluted portion of the uriniferous tubes, and from the microscopical characters of the casts found in the Urine, we are, in many cases, able to form an accurate idea of the changes taking place in the Kidney at the time of its formation.

There is reason to believe that some of the largest casts are moulds of the straight portion of the tube, and there can be little doubt that such casts as that marked *b*, plate XVI, are formed originally at one part of the uriniferous tube, while new material is afterwards deposited upon it. Its length and straightness render it certain that this deposition must have taken place in the straight portion of the tube, for the contortions of the tubes in the convoluted portion are far too numerous to permit of the formation of such a cast.

The frontispiece illustrates the anatomy of the Kidney. The portion represented extends from below *g* in the medullary portion to the external surface of the cortex, as shown in the accompanying woodcut, fig. 1, which is a drawing of a Kidney, in which the arteries

had been injected, divided longitudinally a little on one side of the centre. The woodcut is of the natural size.

The drawing in the frontispiece is divided into three parts, in order to avoid the confusion which would result from endeavouring to represent, on so small a scale, all the structures as they really exist in nature.

Fig. 1.



a. Cortical portion. b. Medullary portion. c. Pelvis of Kidney. d. Infundibulum
 e. Opening of another Infundibulum into Pelvis. f. Calyx. g. Pyramid. h. Papilla.
 i. Adipose tissue. k. Large veins divided in making the section. Small arteries
 are also seen cut across in different parts of the section, the largest being situated between
 the cortex and medullary portion of the organ.

On the left are represented the uriniferous tubes, with Malpighian bodies, the *vessels* not being shown. Next, towards the right, are seen arteries with their tufts. At the lower part, the efferent vessel of a tuft is observed to divide into a number of straight branches, which pass to the medullary portion of the Kidney.

On the right, the capillary vessels of the cortex and pyramids are seen. To form an idea of the real condition, the reader must imagine all these structures, which are represented separately, in close relation to each other.

The relative size and relation of the parts has been carefully preserved. If reference be made to the explanation below, it is hoped that the drawing will be understood.

EXPLANATION OF THE PLATE.

Fig. 1. Part of the cortex, with the commencement of the medullary portion of the Kidney, magnified 15 diameters.

- a. Branches of artery.
- b. Afferent vessels of tuft.
- c. Malpighian tufts.
- d. Efferent vessel of tufts.
- e. Network of capillaries, into which the blood, after having traversed the capillary loops of the tuft, is carried.
- f. Small radicles of renal vein, by which the blood is returned to the large trunks.
- g. Long and almost straight vessels (*vasa recta*), into which the efferent vessel of those tufts situated at the bases of the pyramids, divides. These straight vessels may be traced for some distance towards the apex of the cone.
- h. Veins in the same situation, which return the blood to the large venous trunk, *i*.
- k. Capillary network in the pyramids.
- l. Portion of the capillary network of the cortex, where the meshes are elongated, corresponding to the direct course which many of the uriniferous tubes take, at regular intervals, in the cortex.
- m. Network of other parts of the cortex, in which this arrangement is not observed.
- n. Malpighian bodies not injected.
- o. Convoluted portion of uriniferous tube.
- p. Tubes having a direct course towards the cones, situated at regular intervals through the cortex. At *l* would be situated another parcel, and at *q* a third. The arteries pass in the intervals between these, as represented.
- q. One of the tubes isolated. I have never been able to demonstrate the branches represented, in the human subject, but from their existence in some of the lower animals it is probable that a similar arrangement may be found in the higher. The branches *r* must therefore be considered merely diagrammatic.
- r. Branches continuous with the convoluted portion.
- s. Wavy portion of uriniferous tube, at the commencement of the cones.
- t. Capsule of Kidney.
- u. Uriniferous tube, with Malpighian tuft and capillary vessels complete.
- v. Capillary network, with fragments of uriniferous tubes, from