

slide, and resting the other upon the needle, then inclining the needle gradually, until it is horizontal. All superfluous moisture around the glass cover must be carefully removed with a cloth, or with blotting paper. The slide is then ready to be placed under the microscope.

A quarter-inch object glass will be sufficient for the recognition of nearly all the sediments that occur. The tube of the microscope must be moved down until the object glass is about a quarter of an inch distant from the slide; the light from the mirror is now thrown upon the slide at a point immediately under the object glass; the observer should then look through the microscope, placing the instrument with the coarse adjuster in the focus which suits his own eyesight.

Sediments are either organized or unorganized. To the latter belong uric acid, urates, oxalate of lime, phosphates, cystin, &c. To the former, pus, blood, mucus and epithelium, renal casts, fungi, and spermatozoa.

UNORGANISED SEDIMENTS.—*Uric Acid.*—Uric acid is only met with as a deposit in very acid urine, and is usually accompanied by a considerable sediment of urates. Owing to its peculiar color, varying from a yellow to a brownish red, it can at once be recognised by the naked eye, never being deposited from the urine in colorless crystals.

When the sediment is examined under the microscope, the crystals are at once known to be uric acid, by their reddish brown color, all other crystalline deposits being transparent and colorless. If, indeed, the student is in doubt as to the nature of a crystal, he will never be very wrong, if he judge it to be uric acid when there is a slight tinge of brown visible. The crystals, themselves, have numerous forms; they occur very commonly in rhomboidal, or long oval, plates with acute angles; these crystals are often united so as to form rosettes, or they may be rectangular, barrel shaped, or in hexagonal plates, with two parallel sides longer than the other four.

If the student be not quite sure of their nature, he should add to the specimen under the microscope, a little liquor potassæ or liquor sodæ, which will dissolve uric acid, if present; when dissolved by the alkali, it can be reprecipitated in hexagonal plates by the addition of hydrochloric or acetic acid.

Very small traces may also be detected by means of the murexid test; a small portion of the suspected sediment is placed in a porcelain dish, and a drop of nitric acid let fall upon it; the dish is then gently heated over a lamp until all the nitric acid is driven off, when, if uric acid be present, a beautiful red staining is seen; after cooling, a drop of caustic ammonia should be allowed to roll over the reddened spot, which then becomes purple; if liquor potassæ be used instead of ammonia, the color will be violet. The test does not, however, distinguish uric acid from its salts.

Usually the uric acid is not free when the urine is voided, but it is precipitated by the increase of acidity which always occurs shortly after emission. This is especially the case in the urine of diabetes,

where the whole of the uric acid present may be set free from this cause.

Clinical Import. The presence of free uric acid is no proof that uric acid is being excreted in excess; the only inference to be made, is that the urine is extremely acid. But if free uric acid shows itself immediately after the urine has been passed, it is not improbable that a deposit may be taking place in the pelvis of the kidney, or the bladder; a condition of considerable danger, since it may lay the foundation of a calculus; uric acid, and urate, calculi being the most frequent of all urinary concretions.

URATES.—This deposit is the most frequent and least important of all the urinary sediments. Any febrile condition will lead to this deposit; even a greater amount of perspiration than usual, will be followed by urine that becomes turbid on cooling, as a result of a diminished secretion of water, merely. Urine containing an excess of urates is never turbid when fresh passed; it is only when the urine has cooled, that the peculiar muddiness is observed. If the urine be gently warmed, the turbidity immediately disappears. The urates differ in color considerably, according to the amount of coloring matter in the urine, varying from white to pink or red. In young children the 'milky' urine, which alarms mothers, is due to a deposit of peculiarly white urates.

In the urine, uric acid is found combined with three bases; with soda, with ammonia, and with lime. The urate of soda is the most frequent of the three, and is usually seen under the microscope as an amorphous deposit; sometimes it forms round dark bodies with short spikes projecting from them. The urate of ammonia is rarer, and occurs in beautiful globular forms with spikes closely resembling the urate of soda, but of greater length. The urate of lime is very rare, and forms only an amorphous sediment. If any doubt be entertained as to the nature of these salts, it is necessary to add a drop of hydrochloric or strong acetic acid to the specimen, when crystals of uric acid will immediately be formed. These crystals are again dissolved by caustic soda or potash. If further evidence be required, the murexid test with nitric acid and ammonia may be applied.

OXALATE OF LIME.—Oxalate of lime occurs as a urinary sediment in colorless octahedral crystals, having the so-called 'envelope' appearance which, when once seen, can hardly be mistaken for anything else. This deposit also occurs in colorless dumbbells.

Oxalate of lime is insoluble in acetic acid; by this it is distinguished from the phosphates; it is colorless and insoluble in alkalis, and thus differs from uric acid. It is, however, soluble in the mineral acids, as, for example, in hydrochloric acid.

Clinical Import. After urates, oxalate of lime is the most common unorganized urinary sediment; it is often seen in the urine of patients convalescent from acute diseases; and many writers state that it may always be found when there is lessened oxidation, as in bronchitis. The occasional presence of a few crystals of oxalate of lime is not of much import-