it often contains floating masses. The deposits are from fawn colour up to purple; they never appear until the urine has cooled, and disappear by heat. Liquor ammoniæ and liquor potassæ dissolve them. The floating masses disappear by heat, contrary to albumen. When it becomes turbid from a drop of nitric acid, the microscope will show crystals of uric acid. A drop of urine containing urate of ammonia, examined on glass by the microscope, shows an amorphous powder, composed of myriads of minute globules; but add a drop of hydrochloric acid, the muddiness disappears, and crystals of uric acid will be seen, the ammonia having deserted the urate to combine with the acid. The colour of urate of ammonia is always owing to its union with purpurine. It is quite white when pure.

In examining numerous large deposits of urate of ammonia under the microscope, I have always found, on the addition of weak nitric acid, an appearance of globules so like pus, but more coloured, that I cannot avoid mentioning it particularly, for I have never seen it named by any author; and it is so constant in its appearance, that I am led to conclude it depends on some chemical combination of the animal matter of the urea with the nitrogen of the nitric acid.

Urate of soda.—Very rare, except in gouty diathesis, and fever treated by carbonate of soda. Heat does not dissolve the deposit so quickly as it does urate of ammonia.

Uric oxide, xanthic oxide.—Very rare, supposed to have some connexion with the yellow colouring matter of the urine, (hæmaphaein.) It resembles uric acid if noticed inattentively. Colour is salmon or cinnamon tint, not so red as uric acid. The deposit caused by uric oxide is a grey powder to the naked eye, but under the microscope resembles small particles of yellow wax. It is insoluble in solution of carbonate of potass, whereas uric acid is soluble. Ignited in a tube, it does not yield urea, and uric acid does.

Cystine.—This is very rare, and contains 26 parts in 100 of sulphur. This urine looks like diabetic urine, but it is of a very low specific gravity. It smells of sweet briar when fresh, but soon putrefies, and evolves sulphuretted hydrogen. It is usually found in scrofulous habits. Cystine forms a deposit like the pale variety of urate of ammonia; but, unlike that deposit, it is unaffected by heat, and it very slowly dissolves on the addition of nitric or hydrochloric acids. It is soluble in the mineral, and insoluble in the vegetable acids. Soluble in ammonia, the fixed alkalies and their carbonates, but insoluble in carbonate of ammonia. By heating on platinum foil, it burns with a disagreeable odour. An evaporated solution of cystine in ammonia under the microscope, crystallizes in six-sided laminæ very distinct. It requires caution to distinguish this from chloride of sodium in urine, which naturally crystallizes in cubes, but when combined with urea assumes an octahedral shape. The ammoniacal solution stains a white-glass bottle black, from the combination of the sulphur of the cystine with the lead of the glass.

Oxalate of Lime.—This salt was considered very rare in the urine, but Dr. Golding Bird has proved, in his lectures in the *Medical Gazette*, that it is even more common than the earthy phosphates. The urine is acid, has a naturally healthy appearance, the specific gravity from 1.015 to 1.025, generally with some epithelial scales, and always with a large quantity of urea, uric acid, or urates. To discover the oxalate of lime, set aside the chylous urine for many hours in a glass vessel; decant the upper eight-tenths of it; pour a little of the bottom into a watch-glass, warm it, and the oxalate will fall to the bottom; remove the top part of the fluid with a pipette, and under the microscope we find the beautiful transparent octahedral crystals of oxalate of lime; collect and ignite the crystals on platinum foil, oxalic acid is decomposed, and carbonate of lime left, which dissolves in dilute nitric acid, with effervescence. These crystals are unaltered by boiling in acetic acid, or solution of potass. They dissolve without effervescence in nitric acid.

Ammonia, or phosphate of soda, or microscomic salt.—This is usually decomposed by uric acid in the bladder: urate of ammonia is formed, the phosphoric acid being set at liberty, which becomes the source of the natural acidity of the urine. The very small proportion of soda combines with uric acid, forming urate of soda.

Ammonia-phosphate of magnesia, or *triple phosphate*, and the *phosphate of lime*, are nearly insoluble in water, unless it contains a very small proportion of any acid, or hydrochlorate of ammonia; consequently, in healthy urine these earthy phosphates are held in solution by the phosphoric acid. This urine is generally pale, wheylike, plentiful, and of low specific gravity, 1.005 to 1.015. When the urine is alkaline from disease, these salts deposit, and are always white, unless coloured with *blood*. They are soluble in weak hydrochloric acid, and insoluble in ammonia and liquor potassæ. Heat agglomerates the deposit into masses, but produces no other change. By adding a small quantity of ammonia to urine containing any earthy salts, deposits of triple phosphates take place, which, under the microscope, are seen either in minute white triangular prisms, stellæ or acicular prisms, or foliaceous crystals, and are very easily detected. These disappear on adding a drop of any acid. When the urine is alkaline these deposits are abundant.

Phosphate of lime is never found in crystals. It is a very opaque sediment, and a drop examined by the microscope between plates of glass, appears white by reflected, and yellow or brown by transmitted light.

To distinguish the deposits of the triple phosphates from pus and blood, nothing but their appearance under the microscope can be depended upon. From mucus, add hydrochloric acid, which will dissolve the phosphates, but *not* the mucus. From albumen add nitric acid, which dissolves the phosphates, but deposits the albumen.

Carbonate of lime is sometimes met with as a deposit in alkaline urine. It is formed from the decomposition of phosphate of lime by the carbonate of ammonia. To discover it, wash the deposit well with water, which dissolves the carbonate of ammonia, and add any dilute acid, which will dissolve the carbonate of lime with effervescence. Examined by the microscope, they appear beautiful small transparent spheres, like globules of glass, and strongly refract light.

Silicic acid has very rarely been found as a deposit in urine, but it is often used by impostors, which it is necessary to be aware of.

COLOURING MATTERS.

Purpurine.—This is a substance of great consequence to become acquainted with, as its presence always indicates serious functional or organic mischief in some of the organs connected with the portal circulation. It has been considered as the same substance as purpurate of ammonia, or the murexid of Liebig; but Dr. G. Bird has clearly proved it to be a substance *sui generis*. Purpurine is quite soluble in alcohol; purpurate of ammonia is insoluble. It always combines with urate of ammonia, causing that deposit to vary in tint from a mere flesh colour to the deepest carmine, and is often mistaken for blood. To distinguish it, dissolve the purpurine in alcohol, examine the rest under the microscope, and the absence of blood-discs will prove it. Of course, the appearance under the microscope is that of amorphous red urate of ammonia. If a small quantity is suspected, add hydrochloric acid to the warmed urine, and a colour, varying from lilac to purple, will immediately be produced, if purpurine be present. By evaporating urine containing it to a syrup, and digesting it in alcohol, we obtain a purple tincture, which colour is heightened by acids and diminished by alkalies. The specific gravity of urine containing this substance varies from 1.015 to 1.030; it is not altered in colour by boiling; nitric acid added to it often produces a copious deposit of uric acid, often mistaken for albumen.