

that of urine itself. The filtered alcoholic liquid is evaporated, and the residue is treated with water, which leaves undissolved a quantity of brownish-yellow fatty matter. This, after being purified in the manner described by the author, is found to consist principally of a fatty acid, having the properties characteristic of the group to which palmitic and stearic acid belong. The acid is white, crystalline, has a pearly lustre, melts at  $54^{\circ}3$  C., volatilizes unchanged when heated, and is insoluble in water but easily soluble in alcohol and ether. It is soluble in caustic potash and soda-lye, in aqueous ammonia, and in solutions of carbonate of potash and carbonate of soda. The solutions froth on being boiled like ordinary soap and water. The potash compound is obtained from the watery solution in the form of small pearly scales, and from an alcoholic solution in prismatic crystals. The soda-compound separates from a boiling-hot solution on cooling as a thick, white, amorphous soap, a very small quantity of which is sufficient to cause the liquid to gelatinize. The watery solution of either of these compounds gives white curd-like precipitates with salts of barium, calcium, lead, and silver. The quantity of the acid obtained in the author's experiments was too inconsiderable to enable him to determine its composition and atomic weight, and it therefore remains uncertain whether it is identical with any of the known fatty acids or not. The author inclines to the opinion that it is a mixture of stearic and palmitic acid, which according to modern investigations constitute together what was formerly called margaric acid. The author does not venture to assert that it forms a normal constituent of the healthy secretion, though the urine employed in his experiments in no case exhibited anything peculiar. The experiments described do not throw any light on the question how this acid, which belongs to a class of substances almost insoluble in water, comes to be dissolved in a liquid like urine, which is itself usually acid.

#### V. On Oxalurate of Ammonia as a Constituent of Human Urine."

By E. SCHUNCK, F.R.S. Received November 15, 1866.

(Abstract.)

When ordinary healthy urine is passed through animal charcoal in the manner described in the preceding paper, several organic substances are separated and absorbed by the charcoal in addition to the fatty acid there referred to. The liquid obtained by treating the charcoal with boiling alcohol having been evaporated, the residue is treated with water, which leaves the fatty acid undissolved. The filtered liquid yields on evaporation a quantity of crystals, which, after being purified in the manner described by the author, are found to have the properties and composition of oxalurate of ammonia. The watery solution of the substance gives with acids a white crystalline precipitate of oxaluric acid; with nitrate of silver it produces a precipitate which dissolves without change in boiling

water, the solution on cooling depositing white silky needles of oxalurate of silver. The lead compound produced by adding acetate of lead to the watery solution, forms well-defined prismatic crystals. With chloride of calcium the watery solution gives no precipitate, but on adding ammonia and boiling, there is an abundant precipitation of oxalate of lime. By treatment with strong acids the substance is decomposed, yielding oxalic acid and urea. Its composition was found to correspond with the formula  $C_6 H_7 N_3 O_8$ , which is that of oxalurate of ammonia.

The author's experiments were not sufficiently numerous to decide the question whether this salt is a normal constituent of human urine or not. There is no doubt, however, that its presence, whether exceptional or not, affords an easy and satisfactory explanation of a phenomenon which has until now proved very puzzling, viz., the formation of oxalate of lime in urine long after its emission. It is doubtless owing to the decomposition of oxaluric acid, which takes up water and splits up into urea and oxalic acid; the latter then combines with lime, of which there is always a sufficient quantity present to saturate the acid. There can be little doubt also that oxaluric acid is derived in the animal frame, as in the laboratory, from uric acid, the oxidation of which is its only known source.

VI. "On the Structure of the Optic Lobes of the Cuttle-Fish." By J. LOCKHART CLARKE, F.R.S. Received September 26, 1866.

(Abstract.)

The brain of the Cuttle-fish consists of several ganglia closely aggregated around the upper part of the œsophagus. The foremost or pharyngeal ganglion, which is much the smallest, is bilobed and somewhat quadrangular. The next is a large bilobed ganglion which forms the roof of the canal for the œsophagus. Beneath the œsophagus is another large and broad mass, which is connected on each side with the supra-œsophageal masses by bands that complete the œsophageal ring.

From each side of the cephalic masses springs a thick optic peduncle which ends in the optic lobe. Each optic lobe is larger than all the other cerebral masses taken together, and has a striking resemblance in shape to the human kidney. It is completely enveloped in a thick layer of optic nerves disposed in flattened bands which issue from all parts of its substance and proceed to the back of the eye in a fan-like expansion, the upper and lower bands crossing each other in their course. The substance of each lobe consists of two distinct portions, which differ from each other entirely in appearance. The outer portion resembles a very thin rind or shell, is extremely delicate, and very easily torn from the central substance which it encloses. It consists of three concentric layers—an external dark layer, an internal dark layer, and a middle pale and broader layer containing thin and concentric bands of fibres.

The first or outer layer consists of a multitude of nuclei and a few small