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ON SUGARS. BY M. PELIGOT.*

Common Sugar.—On repeating the analysis with all possible care, the author found that the formula long since adopted is that which best agrees with experiment: this formula is $C^{24} H^{22} O^{11}$†.

M. Berzelius found that the compound of sugar with oxide of lead, is $C^{24} H^{20} O^{10}$, 2PbO. On drying this salt at 320° Fahr., M. Peligot obtained $C^{24} H^{18} O^{9}$, 2PbO. Anhydrous sugar will therefore be $C^{24} H^{18} O^{9}$ instead of $C^{24} H^{20} O^{10}$.

The author also obtained a crystallized saccharate of barytes, crystallized by the direct contact of sugar and barytes dissolved in water, and he found the formula to be $C^{24} H^{22} O^{11}$, BaO; he combined sugar with common salt, and found the composition of this body to be $C^{48} H^{42} O^{21}$, Ch^{2} Na.

Sugar of Starch and of Diabetes.—The formula of these and of the grape and honey sugar, M. Peligot found to be $C^{24} H^{28} O^{14}$. He also analysed the compound of diabetic sugar and common salt obtained by Calloud, and found that this curious product is represented by the formula $C^{48} H^{52} O^{26}$, Ch^{2} Na; the compound of sugar of starch and oxide of lead, obtained by the contact of ammoniacal acetate of lead and sugar dissolved in excess, was found to be $C^{48} H^{42} O^{2}$, 6 PbO; the saccharate of barytes from sugar of starch is represented by $C^{48} H^{56} O^{28}$, 3 BaO.

M. Peligot found that common sugar is the only one which combines with the alkalis without suffering change. Sugar of starch and all other known sugars, at first combine with the alkalis, and are gradually destroyed, giving rise to two distinct products, according to the circumstances of the mixture of these bodies.

Lime dissolved in a solution of starch sugar, gradually loses its caustic property, and is saturated by an acid formed by its influence. The salt of lime formed, when rendered neutral, is abundantly precipitated by subacetate of lead. The formula of the insoluble salt is $C^{48} H^{30} O^{15}$, 6 PbO. The disengaged acid could not be conveniently examined: it is not volatile, and forms salts, almost all of which are soluble in water. On heating the solution of starch sugar and an alkali, a more rapid action is observable; the mixture becomes coloured, and a brownish-black acid is formed, having some resemblance to ulmic acid, but it is quite distinct from it. Its composition is represented by the formula $C^{48} H^{20} O^{10}$. It appears to be identical with the acid obtained by M. Suanberg, in treating the acid of catechu with caustic potash, which has the composition represented by the preceding formula; nevertheless differences occur in the analyses, which indicated one per cent. too much hydrogen. This acid is very readily obtained with fused starch sugar, and a concentrated solution of potash; the action is rapid. When the colour has become very intense, water is added, and the acid is precipitated by hydrochloric acid. If it be identical with the japonic acid, this acid is represented by $C^{46} H^{16} O^{8}$. These two acids differ from sugar

* See Prof. Graham's paper, p. 219. of the present number.—EDIT.

† The original atomic weights are preserved.

only in being minus water: for, $C^{48} H^{42} O^{24}$ anhydrous sugar, becomes $C^{48} H^{30} O^{18}$, the first acid, by losing 6 $H^2 O$; then $C^{48} H^{30} O^{15}$ becomes $C^{48} H^{16} O^8$, japonic acid by losing 7 $H^2 O$. Sugar thus loses water successively even in the midst of water. This remarkable transformation is well characterized with starch sugar, and analogous sugars. When the sugar and alkali are not in contact with water, the phænomena of decomposition no longer occur: an alkaline saccharate is obtained in which the sugar possesses its usual properties.

M. Peligot has examined the nature of the action of acids, and particularly that of concentrated sulphuric acid upon sugars. With sulphuric acid and common sugar, a deep colour is produced, and a certain quantity of japonic acid is formed. With sugar of starch, on the contrary, there is no colour; and what is very remarkable is, that this sugar and the acid combine and form sulphosaccharic acid. This is to be saturated with carbonate of barytes, and treated with subacetate of lead: sulphosaccharate of lead is precipitated, the composition of which is $C^{48} H^{40} O^{20} SO^3 + 4 PbO$; but it has not been precisely determined what quantity of water the sulphosaccharic acid contains. This acid when uncombined is not very stable: it does not precipitate barytic salts, and in general forms soluble salts.

The action of heat upon sugars, when properly managed, yields very simple results; at about 410° Fahr., water only is obtained, and a black product remains, which is entirely soluble in water. The author has preserved the name of *caramel* for it. When purified by alcohol a tasteless substance is obtained, which does not ferment. Its composition is very simple, $C^{48} H^{56} O^{18}$; and it differs only from sugar in losing a part of its water. Common and starch sugar, treated in this way, both yield the same substance.

These experiments, it will be seen, greatly modify the present opinions of the atomic weight of sugars, confirming the analyses already made of cane and starch sugar.

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SUCCISTERIN.

MM. Pelletier and Walter, in examining the pyogenous products of amber, have obtained and analysed several substances, among which there is one that they think worthy of being particularly noticed.

It is white, crystalline, scarcely soluble in alcohol or æther, and its colour is rendered intensely blue by sulphuric acid. The analysis which they have performed indicates the formula $C^3 H^1$; it has therefore the same composition as idrialin, and possesses also all its properties. It is well known that idrialin, which was discovered by M. Dumas, has been met with only in a mineral, the site of which is lost, and is found only in a few mineralogical collections. The authors do not assert the identity of idrialin with the substance which they have found in amber. If it be supposed that they are merely isomeric, they propose the name of *succisterin* for the newer compound.—*L'Institut*, Juin, 1838.