unsatisfactory owing to leakage from the site of injection and intolerance to the oil, but with sesame oil the volume could be kept down to 2 c.c., and these adverse effects avoided. 25 mgm. of the substance in olive oil administered to ten ovariectomised rats produced no sign of oestrus, the animals remaining in a state of di-oestrus throughout the experiment. A batch of twenty animals injected with 50 mgm. dissolved in olive oil showed seven full oestrus responses, with three animals just short of the definition (a few leucocytes). In a series of twenty animals injected with 100 mgm. dissolved in sesame oil, a very much better response was obtained, all twenty animals going into oestrus. The oestrus in each case was complete.

In the case of the 50 mgm. dosage, oestrus appeared after 54 hours and terminated 150 hours after injection. In the case of the 100 mgm. in sesame oil, oestrus appeared after 52 hours. At the present moment, it is impossible to state the activity of the material in terms of oestrin since the relatively difficult solubility of the material together with the consequent difficulties of administration and absorption make a comparison impossible. Some form of 'cross-over' method must therefore be evolved. There can be no doubt that a repetition of the standardisation experiments with 50 mgm. dissolved in a small volume of sesame oil would indicate much greater potency than a similar experiment conducted with olive oil as the vehicle.

The observations show that 1-keto-1:2:3:4-tetrahydrophenanthrene is capable when injected into castrated animals of inducing oestrus of an exactly similar type to that obtained by the injection of oestrin. This result is of importance, for 1-keto-1:2:3:4-tetrahydrophenanthrene is the first compound of known chemical constitution found to have definite oestrus-exciting activity and furthermore, its molecular structure has many points of resemblance to the structure suggested for ketohydroxy-oestrin. There is thus provided the first step in the task of defining the molecular conditions necessary for this type of physiological activity, and there are grounds for hoping that substances of a much higher order of activity will be found before very long.

The observation⁴ that oestrogenic properties of a low order are possessed by suitable extracts of such a variety of materials as peat, brown coal, lignite, coal tar and petroleum is of interest, but in view of the fact that many such materials are known to contain carcinogenic constituents, the clinical use of such extracts without very stringent refinement is scarcely to be entertained.

We have also examined 4-keto-1:2:3:4-tetrahydrophenanthrene (iii) and 3-hydroxyphenanthrene; these gave no oestrus response when injected in doses of 50 mgm.

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¹ *Z. physiol. Chem.*, **208**, 129; 1932.

² *J. Soc. Chem. Ind.*, **51**, 277 T; 1932.

³ *J. Physiol.*, **68**, 348; 1930.

⁴ Schering-Kahlbaum: Fr. Pat., 710,857.

A New Unsaturated Derivative of Glucuronic Acid

Cox, Hirst and Reynolds¹ in investigating Szent-Györgyi's hexuronic acid, have suggested that this acid may have the following structures:

It will be noted that the second (enol) structure has a double bond. The acid reduces neutral silver nitrate, Fehling's solution, iodine and neutral permanganate², and yields a trimethyl ether and a triacetyl derivative.

In the course of recent work on glucuronic acid compounds of animal origin, we have methylated glucurone (the lactone of glucuronic acid) with silver oxide and methyl iodide, and obtained two crystalline methylated derivatives (see Pryde and Williams³), which were at first thought to be stereo-isomeric trimethyl glucuronates. Further investigation has shown that only one of these compounds was trimethyl glucurone ($\text{C}_9\text{H}_{14}\text{O}_6$, m.p. $131^\circ\text{--}132^\circ$, $[\alpha]_{\text{D}}^{20} +197.5^\circ$ in water). The second crystalline compound was found to decolorise rapidly permanganate and bromine water, and analysis showed it to contain two hydrogen atoms less than trimethyl glucurone. It has been called trimethyl glucuralone ($\text{C}_9\text{H}_{12}\text{O}_6$, m.p. 88° , $[\alpha]_{\text{D}}^{20} +110.8^\circ$ in water), on analogy with the glucals since we regard it as possessing a 1:2 unsaturated linkage⁴ as follows:

Its formation is ascribed to the mild oxidising action of silver oxide during the course of the methylation procedure, further oxidation being, no doubt, prevented by the substituent methoxyl groups. The suggested structure affords certain analogies to the enolic formula now ascribed to adrenal hexuronic acid, in that our substance would appear to be an unsaturated derivative of an aldo-uronic acid having (as the lactone) three free hydroxyl groups.

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¹ *NATURE*, **130**, 888, Dec. 10, 1932.

² *Ibid.*, **129**, 576, April 16, 1932.

³ *Ibid.*, **128**, 187, Aug. 1, 1931, and *Jour. Soc. Chem. Ind.*, **50**, 959 1931.

⁴ R. T. Williams, Thesis, Univ. of Wales, April, 1932.

Mechanism of γ -Excitation by β -Disintegration

Up to the present, we have no system of relativistic quantum theory, and speculations about the process of emission of nuclear electrons may be permitted. In the recent work of Heisenberg, the stability of the nuclei relative to electron emission is treated on the basis of the energy balance conditions in such transformations. I propose to try