Apart from explaining the observed changes of intensity, some clarification is required for the fact that no interaction has been found between other levels of Hg and Cd which are quite close to each other, *e.g.*, 6^1P_1 of Hg and 6^1S_0 of Cd, 7^3S_1 and 7^1S_0 of Hg and 7^3S_1 and 7^1S_0 of Cd, x^3P of Hg and 8^3P and 8^1P of Cd and so on. The theory of the interaction of atomic energy levels must be better developed for this to be possible. The present work is intended to provide an experimental basis for such a development. The transitions for the various wave-lengths are indicated in the level diagram appended (Fig. 5).

In conclusion it is a pleasure to record our thanks to Prof. A. Venkat Rao Telang, M.A., F.Inst.P., for his encouragement and many facilities afforded to us.

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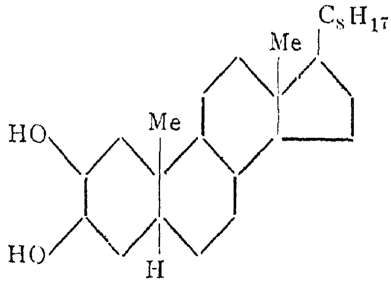
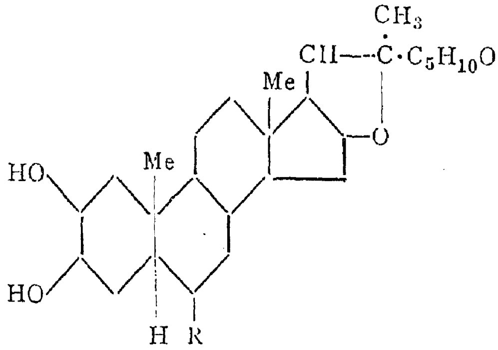
The Configurations of the C_2 and C_3 Hydroxyl Groups in Gitogenin and Digitogenin

It has been previously mentioned[1] in connection with the 2:3-dihydroxycholestanes (I) that the presence of the hydroxyl group at C_2 may not interfere with the digitonin precipitability and that of the four isomers of 2:3-dihydroxycholestanes, two, in which the C_3 hydroxyl groups are of the normal (β-) configuration, should precipitate with digitonin. This is now indirectly confirmed by the recent reports of Noller[2] and of Marker and Rohrman[3] that the 2:3-dihydroxysteroid sapogenins, gitogenin (II, R = H) and digitogenin (II, R = OH) precipitate with digitonin, contrary to what had been previously reported by Tschesche and Hagedorn.[4]

There are four theoretical possibilities of the relative configurations of the C_2 and C_3 hydroxyl groups in these sapogenins corresponding to the four stereoisomeric forms of 2:3-dihydroxycholestane[1] (of which in one the hydroxyl groups are in the *trans* and in the rest



(I)



(II)

in the *cis* positions). Basing on the report of Tschesche and Hagedorn[4] and also the behaviour of the three isomeric 2:3-dihydroxy*trans* decalins,[5] it was suggested[6] that the C_2 and C_3 hydroxyl groups in gitogenin and digitogenin are in transpositions to each other, the C_3 hydroxyl groups being of the *epi* (α-) configuration. Due to the observations of the American authors mentioned above, this suggestion is now revised.

Assuming the precipitation with digitonin to be having the same significance for the steroid sapogenins as for the sterols (Noller[2]), it is to be concluded that C_3 hydroxy group in gitogenin and digitonin is of the β-configuration—*i.e.*, it is *cis* to the C_{10} methyl group. By the other hydroxyl group at C_2, occupying the two possible positions *cis* or *trans* with reference to the C_{10} methyl group, two forms are possible in which the two hydroxyl groups (which are *cis* to each other in both forms) are unsymmetrical or symmetrical respectively about the plane of the carbon atoms 2, 3, 5 and 9. (These two forms correspond to those of B and A respectively of 2:3-dihydroxy*trans*decalin[5].) By analogy with the behaviour of the 2:3-dihydroxy*trans*decalin of form B, we should expect the sapogenins to isomerise to the *trans* form on treatment with acid if these hydroxyl groups possessed the unsymmetrical configuration. Since this has not been observed, it may be concluded that in gitogenin and also in digitogenin the hydroxyl groups at C_3 and C_2 (which are in *cis* positions to each other) are *cis* and *trans* respectively with respect to the C_{10} methyl group.

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December 28, 1939.

1 Ganapathi, *Curr. Sci.*, 1939, 8, 360.
2 Noller, *J. Amer. Chem. Soc.*, 1939, **61**, 2717.
3 Marker and Rohrman, *Ibid.*, 1939, **61**, 2724.
4 *Ber.*, 1935, **68**, 2248.
5 Ganapathi, *Ber.*, 1939, **72**, 1381.
6 Ref. 1 footnote.

Elasticity of Organo-Gels in Relation to Hysteresis in Sorption

EXPERIMENTS on hysteresis in the sorption of vapours on organic natural colloids are few in the literature. Rao, B. S.,[6] and co-workers have expressed the view that rice is essentially a colloidal system having the characteristics of a gel. This view can be extended to all other grains and plant materials. The unique colloidal behaviour of the rice grain[7] of losing the hysteresis loop initially exhibited by it, when the cereal is subjected to successive sorptions and desorptions of water vapour has already been presented. This behaviour has revealed the rôle of elasticity of the swollen grain on hysteresis in sorption. This principle receives further striking confirmation by the results obtained by conducting a series of sorptions and desorptions of water vapour, on the calcium salt of gum arabic, presented in this paper.

Calcium arabate was prepared according to the method described by Briggs.[2] Gum arabic (5% solution of Merck's C.P. Quality) was precipitated by ethyl alcohol from an acid solution containing hydrochloric acid (0·1 N.). It was reprecipitated and partially dried in vacuum to remove the alcohol. In order to remove the electrolytes, an aqueous solution of this gum was subjected to hot dialysis, till the dialysate showed no change in conductivity. The method developed by Bernhart[1] and co-workers was adapted for hot dialysis. The dialysed solution was just neutralised with the requisite amount of calcium hydroxide. The solution was evaporated on a water-bath till thin flakes of calcium arabate were obtained. The flakes were powdered and activated at 60° C. in vacuum for half an hour. The activated calcium arbate was degassed in the sorption tube for five hours in vacuum and a series of sorptions and desorptions of water vapour at 30° C. were conducted with the aid of a McBain-Bakr quartz fibre spring balance.[5] The results are shown in Fig. 1.

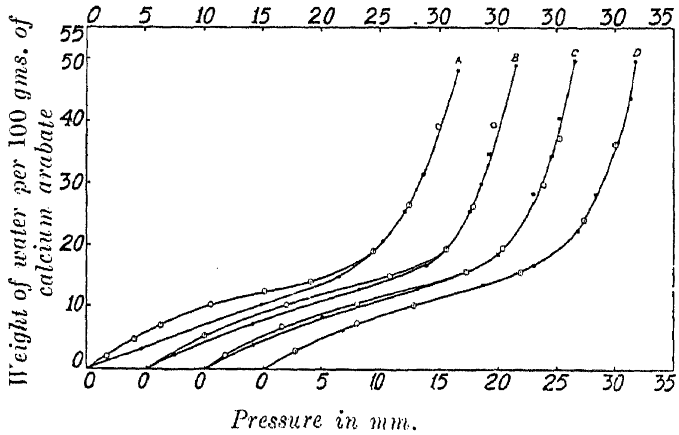

FIG. 1

A First sorption	•—•—•	and desorption	o—o—o
B Second ,,	,,	,,	,,
C Third ,,	,,	,,	,,
D Fourth ,,	,,	,,	,,

A period of about a fortnight was necessary for completing each cycle of sorption and desorption. In the first cycle of sorption and desorption, calcium arbate exhibits a hysteresis loop which dwindles away in the subsequent cycles and completely disappears in the fourth cycle, the sorption and the desorption curves