constants $\nu_e = 43{,}537{\cdot}4$, $\omega_e = 205{\cdot}0$, $x_e\omega_e = 0{\cdot}74$ cm.$^{-1}$. The vibrational constants refer to $^{109}Ag^{81}Br$.

In the spectrum of silver iodide in this region, there appear to be two partly overlapping systems, resulting from transitions from the ground-state to two excited states:

C. $\nu_e = 44{,}717{\cdot}7, \omega_e = 158{\cdot}1, x_e\omega_e = 2{\cdot}3$ (for ^{107}AgI),
D. $\nu_e \sim 46{,}000$, $\omega_e \sim 165$ cm.$^{-1}$.

Thirty bands have been assigned to system $C \leftarrow N$, 17 to $D \leftarrow N$.

The products of dissociation cannot be determined unambiguously; but the most likely products are Ag(^2P) plus halogen (^2P) for all three excited levels.

The relations between the states of the silver halides are summarized below, where k_e is the force-constant in dyne/cm. $\times 10^{-5}$, and ν_e is the system-origin in electron-volts. There seems to be little doubt that the new levels are analogous to the levels *C* and *D* of silver chloride.

State		AgCl	AgBr	AgI
D	ν_e	6·05	—	5·7
	k_e	1·3$_2$	—	0·9$_3$
C	ν_e	5·40	5·40	5·54
	k_e	1·318	1·149	0·85
B	ν_e	3·92	3·88	3·87
	k_e	1·226	0·894	0·521[3]
N	ν_e	0	0	0
	k_e	1·832	1·678	1·453

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The 'Renal Threshold'

According to the definition of Barclay *et al.*[1], the 'renal threshold' can be expressed as a rate of tubular reabsorption per 100 c.c. glomerular filtrate. Thus

$$T = 100\,\frac{Rx}{C}, \qquad (1)$$

where T is 'threshold', Rx is the amount of the 'threshold substance' reabsorbed by the tubules (mgm./min.), and C is clearance of inulin, or mannitol. The same conception of the 'threshold' is also used by Harrison *et al.*[2].

In 1945 I published with Szenes[3] a paper entitled "Aglucosuric Blood Sugar Concentration"[3,4]; this is a calculated blood sugar concentration, above which filtered glucose is not reabsorbed, but passes into the urine. This concentration is thus a dynamic 'threshold'; and the formula can, of course, be used not only in the case of glucose, but also in the case of any other 'threshold substance'.

We deduced the formula of such a threshold substance concentration as follows:

$$Ex = Fx - Rx, \qquad (2)$$

where Ex is excreted substance (mgm./min.), Fx is filtered substance (mgm./min.).

$$\text{But } Ex = \frac{V.Ux}{100};\ Fx = \frac{C.Px}{100};\ Rx = \frac{C.Ax}{100};$$

where V is urine (c.c./min.), Ux is concentration of substance in urine (mgm. per cent), C is clearance of inulin, Px is concentration of substance in blood (mgm. per cent), and Ax is threshold (Szenes and Földi's formula).

$$\text{So } V.Ux = C.Px - C.Ax;\ Ax = Px - \frac{V.Ux}{C};$$

$$\text{but } C = \frac{U.V}{P},$$

where U and P are urinary and plasma inulin concentration (mgm. per cent) respectively.

$$\text{Hence } Ax = Px - \frac{P}{U}\,Ux. \qquad (3)$$

The purpose of the present note is to determine the relation of our formula to Barclay's 'threshold'.

As I have pointed out above, Barclay's formula is:

$$T = 100\,\frac{Rx}{C}.$$

From equation (2):

$$Rx = Fx - Ex.$$

$$\text{Hence } T = \frac{Fx - Ex}{C}\,.\,100 = \frac{C.Px - V.Ux}{C} = Px - \frac{V.Ux}{C} = Px - \frac{P}{U}\,.\,Ux.$$

Thus Barclay's 'threshold' and our formula are identical. This is noteworthy because we have deduced our formula by means of mathematical considerations, while Barclay chose his definition of the threshold because "plasma values are usually expressed to 100 c.c. and . . . 100 c.c. would appear to be fairly close to the more recent determination of the average rate of filtration in man".

From the equations

$$Rx = \frac{C.Ax}{100} \text{ and } Fx = \frac{C.Px}{100},$$

we have

$$\frac{Rx}{Fx} = \frac{Ax}{Px},$$

whence

$$Ax = Px\,.\,\frac{Rx}{Fx}. \qquad (4)$$

This equation shows that the calculated concentration of the threshold substance in the blood is a function of the actual concentration, the rate of tubular reabsorption and glomerular filtration.

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April 12.

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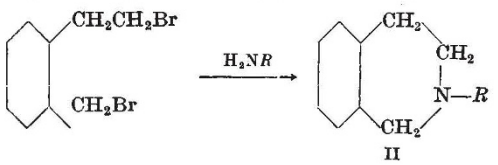
A New Synthesis of 2 : 7-Disubstituted-1 : 2 : 3 : 4-tetrahydro-*iso*-quinolines

It has been shown by Holliman and Mann[1] that *o*-2-bromoethyl-benzyl bromide (I) condenses readily with primary amines to give 2-substituted-1 : 2 : 3 : 4-tetrahydro-*iso*-quinolines (II). Although hitherto



II