of the injections or for six months thereafter, were any changes noted in the coat color that could be attributed to thyroxin.

2. To 1 albino and 5 chocolate mice, forming one litter from a chocolate mother and weighing about 3 gms. each, thyroxin was administered as follows:

June 24	.005 mgm. each		
28	.006	" "	
30	.006	" "	
July 2	.012	" "	
5	.016	" "	Hair clipped from rump area.
9	.020	" "	
10	.024	" "	
14	.030	" "	
16	.030	" "	
19	.030	" "	
21	.030	" "	
23	.030	" "	1 chocolate died.
26	.036	" "	1 chocolate died.
28	.036	" "	1 chocolate died.
30	.036	" "	
Aug. 2	.040	" "	
6	.050	" "	
9	.060	" "	Injections discontinued.

As in the case of the adults just considered, thyroxin produced no apparent effect on coat color of either chocolate or albino during or after the series of injections.

3. To 5 dilute black-hooded rats, of the same litter, weighing about 15 gms. each, with eyes unopened, hooded pattern visible, hair very short except for a few long hairs, thyroxin was given as follows:

April 24	.05 mgm. each		
30	.05	" "	Hair well out. Pattern marked.
May 6	.05	" "	
12	.05	" "	
7	.05	" "	Injections discontinued.

Results as in the preceding cases.

4. To 5 dilute black-hooded rats, weighing about 6 gms. each, and naked, thyroxin was given as follows:

June 24	.008 mgm. each		
28	.010	" "	
30	.010	" "	
July 2	.014	" "	2 dead
5	.018	" "	1 dead
9	.024	" "	
10	.026	" "	
14	.034	" "	
16	.040	" "	
19	.040	" "	
21	.044	" "	
23	.050	" "	
26	.050	" "	
28	.050	" "	
30	.050	" "	Injections discontinued.

Results as in preceding cases.

This failure of the mice and rats to respond to thyroxin indicates a marked difference between the mechanisms involved in feather and hair pigmentation in the birds and mammals observed. Large amoebid melanophores play a peculiar and conspicuous rôle in the development and distribution of feather melanin, a process that appears to have no counterpart in the developing hair. It is unlikely, however, that this or any other such histological difference is of fundamental importance in this connection. The simplest assumption to account for the observed facts is that these unresponsive varieties do not possess the factors essential, with or without thyroxin, to a deepening of their coat color beyond its typical limit. Dilute chocolate and dilute black do not appear merely as less intense color varieties of chocolate and black respectively, but differ from the latter in the absence of factor or factors necessary to the production of their characteristic coloring. The result of the physiological test with thyroxin thus accords with the well-known facts of their genetic behavior and current conceptions of their genetic constitution.

HARRY BEAL TORREY

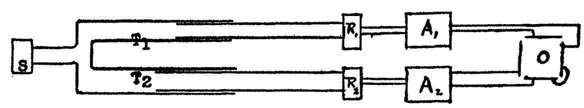
ON THE VELOCITY OF SOUND

THE velocity of sound as a function of tube diameter has received consideration from time to time. Helmholtz, in 1863, proposed, without demonstration, the following as the governing relative,

$$V = V_0\left(1 - \frac{c}{d\sqrt{n}}\right)$$

where V_0 is the velocity in free air at 0° C., d is the diameter of the tube, n the frequency and c a constant. Later Rayleigh derived this relation from certain dynamical considerations but the experimental support for it has been meager and not satisfactory, due to lack of sufficient accuracy in velocity measurements.

Some years ago, Wold carried out some measurements by a method illustrated in the figure. Soundwaves from a tuning-fork or diaphragm at S travel down tubes T_1 and T_2 of variable length. The waves



are picked up by receivers R_1 and R_2 of the condenser transmitter type. The outputs are amplified by six stage amplifiers A_1 and A_2 and impressed on the orthogonal pairs of plates of a low voltage Braun oscillograph tube. The Lissajous figure resulting can be brought to a straight line by adjustment of one of the tubes. If now one tube is gradually changed in length through one wave-length, the figure will pass through its elliptical cycle back to a straight line. This method of finding wave-length has shown itself capable of a surprisingly high degree of accuracy.

Recently, we have repeated the work with refinements as to frequency and temperature control and corrections for humidity. The attempt has been made to reach an accuracy of one part in ten thousand, but this has not been attained as yet, probably due to the effects of reflected components of the waves within the system. These have been greatly reduced but not entirely eliminated. The results thus far obtained, using brass tubing, seem to confirm Helmholtz's relation and are best represented by the following:

$$V = 331.4 \left(1 - \frac{4.45}{d\ n^{.53}}\right) \frac{\text{meters}}{\text{sec}}$$

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WATER TRANSLOCATION IN YOUNG FRUITS[1]

IMMATURE succulent fruits are essentially masses of meristematic tissue, although most of the protoplasts contain well-defined vacuoles. Their cells are everywhere in contact with neighboring cells, without interruptions by intercellular spaces. Almost universally these cell walls contain pectic (or related) substances which possess marked imbibitory properties. The purpose of this note is to emphasize a consequence of these conditions which is generally overlooked, namely, the importance of these hydrophilic layers in the translocation of water through the tissues. Our observations make it apparent that imbibed liquid passes over the surfaces of these cells, as well as through them by osmosis. The fibrovascular bundles furnish channels by which water and dissolved substances may enter the fruit, but the majority of the cells are at some distance from the ultimate divisions of the bundles. Liquids such as those found in young fruits will not readily diffuse through protoplasts, but they will pass through the pectose layers by imbibition.[2]

The tissues of the young fruits which we have examined are composed of parenchyma cells without intercellular spaces. Unchanged cellulose is found in the walls of these cells, especially in the peripheral regions, though in the deeper lying layers the cell walls frequently do not show the cellulose reaction. When sections of fresh material are treated with ruthenium oxychloride solution the cell walls become deep pink, thereby giving evidence of pectose. The reaction is particularly strong in sections of the mesocarp of lemons, the endocarp of walnuts, the exocarp of apples, and the pericarp of tomatoes and of *Carissa grandiflora*. The thick walls of these cells may be readily seen in sections of fresh material if a proper mounting solution is used, but it is necessary to use a liquid which does not mix with water. We have used xylol. If the sections are in contact with an excess of water the colloidal layers swell to such an extent that their boundaries are indistinct. If they are mounted in 95 per cent. alcohol the water may be so completely removed from the colloidal layers that their true thickness is not seen.

The rate of water movement in these fruits seems fairly rapid[3] and the fluctuations in size are in large measure dependent upon the amount of water held by the colloidal matter of the fruit. The distribution of water between the protoplast and its bounding wall doubtless is an expression of the equilibrium between the imbibitional power of the wall and the osmotic attraction exerted by the contents of the protoplast. When cell walls of wilted and turgid fruits are examined in xylol those of the wilted fruits show a marked decrease in thickness.

It is well known that the tissues of these and other immature fruits are rich enough in pectose to be valuable for the preparation of jellies and jams, but we wish to call attention to the occurrence of these hydrophilic layers in the cell walls, and to emphasize their importance as paths for the translocation of water.

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