oxin, folic acid (each 10 γ per ml.), biotin (0·14 γ per ml.). This was the optimum medium, and the development from egg to adult took 7·5 days. The mosquitoes were viable. Obviously 1·2 gm. of the best samples of yeast available did not contain sufficient of the above factors to produce viable adults.

(3) Liver extract and dried yeast (autoclaved) (Trager's medium for *A. ægypti*). Development from egg to adult took 14 days, and the adults were viable. Water extract of the same yeast and liver extract allowed development from egg to adult in 20 days; but the adults which emerged were not viable.

(4) Water, glucose (0·1 per cent), a mixture of salts (0·2 per cent), casein hydrolysate (2 per cent), the above-mentioned vitamin B complex (but with only 7·5 γ biotin per ml.) and ascorbic acid (150 γ per ml.). Although development on this medium was relatively slow (eggs to viable adults in 25 days) it proved to be the most suitable for studying the nutritional requirements of all stages of *Culex molestus*. Thus in the absence of pantothenic acid, all other factors being present, there was no development beyond the first instar; in the absence of thiamin, riboflavin or pyridoxin the larvæ die in the second instar; in the absence of folic acid, the larvæ reach the fourth instar but never pupate. In the absence of niacin, the whole developmental cycle lasts 42 days, and the adults are viable. In the absence of biotin the cycle lasts 36 days, but the adults are not viable. Ascorbic acid is not essential for complete development of viable mosquitoes, but in its absence the cycle is prolonged to 29 days.

It is interesting to note that the viable females raised on sterile media were autogenous and laid eggs in the absence of any kind of nutrition. Full details will be published elsewhere.

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Receptor Organs in Tunicata

NOTHING was known of tunicate receptors before 1899, when Herdman[1], in his description of *Ascidia*, mentioned a few structures that might act as receptors, but gave no proof or details. Lorleberg[2], on the other hand, stated in 1907 that in *Stylopsis* "there is complete lack of sense cells". Hecht[3] could not find any receptor organs besides the tentacles and margins of the siphons. Das[4] showed for the first time definite receptor cells in the test and mantle. He demonstrated red pigmented cells which act as photoreceptors. Besides these, the tentacles and dorsal tubercle have been mentioned by various workers as having definite receptor functions. I have found a new structure in *Ciona*, in the intersiphonal region, which appears like an eye-spot and is definitely a photoreceptor. No mention of this structure is found in the various accounts of *Ciona* given by different authors. This eye-spot can be easily seen when the atrial aperture is wide open. It lies on the wall of the mantle just behind the base of the atrial siphon on its dorsal aspect. It is specially conspicuous in dark-adapted animals.

I have made investigations on the receptor organs and the responses of the ascidians *Ciona*, *Ascidiella*, *Styelopsis* and *Herdmania*, to mechanical stimulation, gravity, light, temperature and osmotic pressure, a complete account of which is being published elsewhere. The main receptors in Tunicata are as follow:

1. *Tangoreceptors:* (*a*) cells scattered in the non-vascular areas of the test, especially the test of the siphons; (*b*) cells covering the ampullæ in the vascular areas of the test; (*c*) marginal cells, specially sensitive to vibrations of water or substratum, of the siphons; (*d*) tentacles. Stimulation of (*a*), (*b*) and (*c*) causes direct reflexes, while stimulation of (*d*) causes a crossed reflex.

2. *Photoreceptors:* (*a*) red pigmented squamous epithelium of the siphonal lining in all tunicates; (*b*) red-pigmented epithelium of the vascular ampullæ in Pyuridæ; (*c*) eye-spot in *Ciona*.

3. *Gusto- and olfacto-receptors:* (*a*) tentacles react to dilute acids, alkalis and different concentrations of sea-water; (*b*) dorsal tubercle—probably both for smell and taste (Metcalf and Hunter[5]).

4. *Rheoreceptors:* margins of the siphons—not only do the siphons bend to face a water-current, but they also bend upwards against gravity.

5. *Thermoreceptors:* the cells lining the siphons are very sensitive to changes in temperature, although the tentacles must also be an aid to the tunicate in registering temperature.

I have also demonstrated that, contrary to what was believed hitherto, Tunicata have positive as well as negative responses.

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Site of Action of D.D.T. and Cause of Death after Acute D.D.T. Poisoning

EXPERIMENTS were carried out with *Periplaneta americana* and *Rana esculenta*, after injection with a D.D.T.-emulsion. Action-potentials from the n. cruralis (= 5th nerve, Pringle) of the second thoracic ganglion of *Periplaneta* were recorded with a special pre-amplifier and a cathode-ray oscillograph. No differences were found between normal and D.D.T.-treated animals in the following preparations: (1) crural nerve only connected with the second leg; (2) crural nerve only connected with the second thoracic ganglion, which was isolated from the other ganglia and from all peripheral nerves. Hence the D.D.T. causes no increase of spontaneous activity of the sense organs of the leg, nor of spontaneous motor-activity from the isolated ganglion. However, when the reflex path was intact (or partly intact—crural nerve connected with second leg and second thoracic ganglion), the action-potentials of D.D.T.-treated animals showed an abnormal increase in frequency.

These facts suggest that the specific action of D.D.T. is a facilitation of synaptic transmission. A direct proof of this assumption can be given with a 'spinal frog', where the homolateral contraction of the m. gastrocnemius was recorded after stimulation of the peripheral stump of the n. ischiadicus, and the contralateral reaction (through the spinal cord) after stimulation of the central stump of the same nerve. It is well known that a contralateral response does not follow one single induction shock; two or even