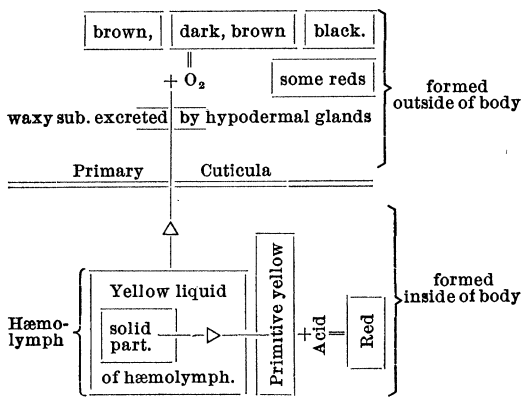
red is the acid differential of the yellow pigment. Acid may come from acid formed by metabolism (uric acid) or secreted by special cells.

Brown, dark brown and black are due to the oxidation of the yellow waxy pigment.

I may express the relation of these pigments in the following diagram:



Notes on mammalian embryology: CHARLES S. MINOT.

The author exhibited drawings, wood engravings made in Germany, and lantern slides illustrating the development of the pig. The work has been done in connection with the preparation of an 'Introduction to Embryology' for the use of students, intended for practical work. It is proposed to study a few of the most typical stages in a series of carefully selected typical sections, and to connect the descriptions of these sections with explanations of the relations of the embryonic organs to the adult anatomy on the one hand, and to the germ layers on the other. The principal engravings are being made by Probst in Brunswick, the author believing that the German method of wood engraving is better adapted to the representation of sections of embryos than are either the 'process' methods, or the American style of wood engraving.

On the spermatogenesis of Peripatus: THOS. H. MONTGOMERY, JR.

The spermatogenesis of *Peripatus balfouri* Sedg. is interesting, first, because it has essentially the type of that of Insects (as distinct from that of Crustacea as known for the Copepoda), and second, because the character of its cells is very favorable for the determination of the stages which occur in the synapsis stage (an anaphase of the last spermatogonic division). The reduction of the number of chromosomes (from 28 to 14) takes place in the early synapsis by a fusion end to end of every two chromosomes, those ends of the chromosomes joining together which are situated nearest that point of the cell where the centrosomes lie. Each resulting bivalent chromosome has the form of a U or V, whereby the bend or angle of the U or V is the point of union of two univalent chromosomes; this point of union is effected by a band of linin which appears to be a remnant of that continuous linin spirem thread present in the preceding prophase of the spermatogonic division. Later the two arms of each bivalent chromosome become longitudinally split. The chromosomes appear to preserve their separateness (indi viduality) during the following rest stage. In the first spermatocytic division each bivalent chromosome becomes transversely split (through the linin band joining its two component univalent chromosomes); in the second spermatocytic division each (now univalent) chromosome becomes longitudinally split. This account serves merely as a brief preliminary note to observations which will be soon published *in extenso*.

Palæmonetes and salinity; an experimental study in evolution: ROSWELL H. JOHNSON and ROBERT W. HALL.

A common shrimp on our Atlantic coast, *Palæmonetes vulgaris*, is provided with small spines on the beak or rostrum. These

spines vary considerably in number on individual specimens, but the *average* number on specimens from salt water from different localities is quite constant, being about thirteen. When this shrimp is found in *brackish water*, however, the averages from different localities vary considerably, and *are always less* than the salt water average. In water which was nearly fresh, we have found the average to be as low as 9.61. Moreover, the decrease in the average seems to be in proportion to the decrease in density. This seems to show that such a character as rostral spinosity may be so correlated with the economy of the animal, that such a factor as salinity may determine it. The experiment of putting the animals from salt water directly into fresh water failed to show that those whose average number of spines was the least, had the greatest resistance capacity. Hence it is suspected that the direct action of environment, and not natural selection, is the method by which the evolution to the brackish-water form is accomplished. This question can be settled only by *rearing* the salt-water form in fresh or brackish water. The decrease in spinosity of the brackish-water form makes it seem probable that our fresh water species, *P. exilipes*, has been derived from *P. vulgaris*. The two species are very similar and, at least in respect to rostral-spinosity, intergrade perfectly; for the averages in *exilipes* are found to vary from 8.53 to 10.11, while *P. vulgaris*, as shown above, may have as low an average as 9.61. Experimentation may also throw light on the question as to whether *P. exilipes* has arisen as a variety in one place, and later spread, or has originated in different places under a common factor of environment—lessened density. In one case where the two forms were found inhabiting the same river (The St. Johns, Fla.), they were separated by a distance of only thirty miles, at most.

Variations and regeneration and Synapta Inhaereus.

The characters of this holothurian as described in systematic works, were subjected to quantitative analysis. The standard deviation, mean, mode and coefficient of variability were determined for 850 variates of the anchor and anchor-plates, 13 variations from the typical anchor and 20 variations from the typical anchor-plate were described. The typical anchor prevailed in 96.6% of the variates and the plate in 61.5%.

The specimens examined from Beaufort and Naples showed only one type, that of the described anchor and three types of plate with an adherence of $95\frac{3}{4}\%$ to the typical form. The specimens from southern waters are therefore least variable while the striking divergence is shown in the northern collections from Long Island, and Woods Holl with 18 types of plates, with 8 types of anchors showing spurs of various kinds, there is shown a tendency toward a place-mode at Lloyds Harbor, Long Island.

In one specimen from Centre Island, Cold Spring Harbor, Long Island, 61 3-7% of the variates belong to another than the type-pattern. Similar variations in the number of tentacles with their relation to the normal symmetry were noted. The mode of distribution of digits is three on the dorsal and ventral sides, respectively.

Nine out of 17 experiments on regeneration of the body and tentacles were successful.

The effect of strychnine on the unfertilized eggs of the sea-urchin: T. H. Morgan.

When the unfertilized eggs of *Arbacia* are placed in sea water containing strychnine they will begin to segment in the course of three or four hours. Strychnine, either as an alkoid or as a sulphate, produces the same effect; the solubility of the latter being nearly a hundred times greater than