row of large cells lying in the wall of the body and extending along the mid-dorsal line from the base of the stalk to the vicinity of the arms. A second but not invariable characteristic is the presence of one or more flask-shaped organs attached to the wall of the body near the basal end of the stomach and projecting slightly forward. The third characteristic is a modification of the epithelial wall of the vestibule shown by those individuals which have developing larvæ, and consisting in part of irregular, tongue-shaped projections, whose free ends may be invaginated and filled with a yolk-like material. This substance may float out into the vestibule. The modified epithelium, as well as this yolk-like substance, forms a source of food for the developing larvæ.

*Pleurivalent Spermatids and Giant Spermatozoa and their Relation to the Centrosome Question.* F. C. PAULMIER. (Presented by E. B. Wilson.)

AMONG the spermatids in *Anasa tristis* occasionally occur those whose nuclei are double or quadruple the usual size, the cell body being correspondingly enlarged. While otherwise normal, the double ones have two centrosomes and two axial filaments.

These giant spermatids are due, the double ones to the non-completion of the second spermatocyte division, the quadruple ones to the non-completion of both divisions.

In the normal univalent spermatid the single centrosome persistent throughout the period of spermatocyte growth and division apparently disappears and comes into view later upon the other side of the nucleus. Is this disappearence real or only apparent?

In the bivalent spermatids the two centrosomes of the second division apparently disappear and two reappear at a later stage in the Nebenkern. In the quadrivalent ones the four centrosomes of the first division (the original two having divided early in preparation for the second division) apparently disappear, and later four appear in the Nebenkern.

This fact that the same number of centrosomes which disappear —namely, two or four—always reappear seems to prove that the disappearance is only apparent and indicates that the centrosome persists in some form, perhaps hidden by the chromatin.

*The Maturation of the Egg under Different Conditions.* A. D. MEAD.

THE behavior of the Chætopterus ovum when subjected to different conditions shows that many of the phenomena of maturation and karyokinesis, which usually appear to be correlated with one another, are in reality independent.

When the egg is allowed to remain unfertilized in normal sea-water the maturation proceeds only as far as the metaphase of the first spindle. When, however, the egg is (*a*) fertilized with one spermatozoon, (*b*) fertilized with several spermatozoa, or (*c*) placed unfertilized in a solution of potassium chloride, the polar globules are extruded in a perfectly regular and uniform manner, and certain characteristic changes in the contour of the egg take place in all.

Although these phenomena are the same, the appearance of the greater part of the cytoplasm of the egg is widely different in the various cases. To illustrate: The formation of the second polar globule, the reconstitution of the egg-nucleus and its migration toward the egg center, occurs in the same manner whether (*a*) the egg contains a sperm-nucleus and one huge sperm-amphiaster, whether (*b*) it contains a number of sperm-nuclei and sperm-amphiasters, or whether (*c*) it contains no sperm-nucleus or radiation in the cytoplasm.

*Some Activities of the Polar Bodies in Cerebratulus.* E. A. ANDREWS.

It is well known that some one-celled animals form 'filose pseudopodia,' that is, temporary, fine threads of flowing sensitive protoplasm. These serve for locomotion, taking-in of food, tactile organ, etc., *i. e.*, for relation with environment.

A recent statement that the cells and polar bodies in sea-urchin and starfish eggs put forth similar threads and so establish amongst themselves temporary living connections led the speaker to examine other animals. Filose phenomena were seen in the living eggs of an Annelid, a Gasteropod and a Lamellibranch, while preserved vertebrate material indicated their presence there also.

In the large Nemertian worm, *Cerebratulus lacteus* Verrill, the filose activities of the polar bodies are less difficult to see than those described in Echinoderms, and differ characteristically from them. Diagrams made from a series of camera drawings covering several hours' continuous observation showed that the polar bodies are very active in change of shape and in filose protrusions.

Each polar body has its special habit of action. In each there is a progressive specialization of activity. The polar bodies look not unlike Radiolarians, and when the second becomes of a spindle shape, with stars of filaments at its poles, it suggests the amphiaster stage in karyokinetic cell-division. This resemblance, so far as the star-like groups of filaments are concerned, is not superficial, if we accept* the statement that the astral rays in the starfish egg are often delicate, filose extensions of the contractile protoplasm between vesicles of an emulsion that makes up the egg; for then the internal stars and external stars are both expressions of the same contractile power and filose habit of protoplasm. Thus the filose powers of protoplasm are shown to us through various striæ, filaments, rays and threads within cells, as well as through those hitherto unsuspected, delicate, flowing, thread-like, pseudopodial extensions external to, and amongst, the cells of Metazoan masses.

* The Living Substance: As Such and as Organism. G. F. Andrews. Ginn & Co. 1897.

*The Effect of Salt Solutions on Unfertilized Eggs of Arbacia.* T. H. Morgan.

If unfertilized eggs of Arbacia are put into sea water, to which 1.5 per cent. sodium chloride has been added and left there from one to three hours, they will, when returned to ordinary sea water, begin to segment after about half an hour. The division is sometimes into two parts, oftener into more than two parts, and does not in any way resemble the normal cleavage. These eggs continue to divide for at least twelve hours, but do not develop into embryos.

Sections show that the female pronucleus persists in the egg in the salt solution from two to four hours. After that time the nuclear wall disappears and the chromosomes are set free in the cytoplasm, usually in the form of a dense cluster. During the time that the eggs are in the salt solution the artificial astrospheres that have been described for fertilized eggs appear. When the eggs were returned to ordinary sea water the chromosomes separate and probably divide. The rays of the artificial astrospheres that come in contact with the chromosomes thicken and become less granular. The chromosomes now begin to migrate towards the centers of the surrounding astrospheres. Later the chromosomes form resting nuclei, two or more. Around these nuclei as centers the protoplasm begins to constrict, forming the cleavage spheres seen from the surface. Half an hour later the nuclei again resolve themselves into chromosomes and a new division, etc., succeed.

The artificial astrospheres slowly fade