...ntain

...taking ... W

...of sale before ... extract the eggs.

The fishes vary in size. The extr... of spawning males of C. floridae I have found to be ... 2 inches, and in females 3 to 3.5 inches. As ... the females are some ...

[illegible]

[illegible] I [illegible].

I. [illegible].

[illegible] ova. The [illegible] formed in ovaries which, viewed from without, present the ordinary Y shaped structure common to the Teleosts. These ovaries are two [illegible] situated in the posterior dorsal portion of the body cavity, and are confluent [illegible].

have never b[illegible] [illegible]

[illegible], [illegible] [illegible], [illegible] [illegible]

[illegible] [illegible] [illegible], [illegible] [illegible] [illegible]

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

discovered. [illegible] [illegible] [illegible] [illegible]

[illegible], [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] "[illegible] [illegible]" [illegible] [illegible] [illegible] [illegible].

A. [illegible] [illegible].

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible],

[illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible]

[illegible]. A [illegible] [illegible] [illegible] [illegible] [illegible]

effected [illegible] [illegible] [illegible] [illegible]. The [illegible] [illegible]

to determine the [illegible] [illegible] would be to take a male

immediately after [illegible] [illegible], and through the [illegible]

back of the forward end behind the genital [illegible], [illegible]

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible]. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible]. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

kept [illegible] [illegible] [illegible], [illegible] [illegible] [illegible]

might only [illegible] [illegible] [illegible] [illegible]. [illegible] [illegible]

[illegible] absolute necessity, for [illegible] [illegible] [illegible] [illegible]

stages of [illegible], [illegible] [illegible] [illegible] [illegible]

[illegible] [illegible].

sperms and ova

of [illegible]. [illegible]

[illegible]

[illegible] to sixteen-cell [illegible]. [illegible]

was found [illegible] with [illegible], [illegible]

other [illegible] in which the [illegible] covered one-half [illegible]

[illegible] one-fourth, of the circumference of the [illegible]. [illegible]

[illegible] lots [illegible]

[illegible]

from one [illegible]. This [illegible] of the [illegible]

[illegible]. [illegible],

[illegible] were found [illegible], [illegible]

them were found two [illegible].

It is true that [illegible] of [illegible] different [illegible] different [illegible], but never with differences [illegible] thirty-six hours against about three to five days in the [illegible] cases. From these facts I can [illegible] one conclusion, that at the time of coition both spermatozoa and ova are [illegible] [illegible], and, as the female [illegible] [illegible], [illegible] it and [illegible] in [illegible] fertilize [illegible]. This happens only occasionally, but it seems to me a strong proof of [illegible] at the time of fertilization.

[illegible]

[illegible] were [illegible] to stand for a few minutes and were then placed in clean running sea water. The females were certainly ripe for spawning, and the males were well grown and had not recently borne eggs, so they were presumably fertile. A control experiment was made by putting [illegible] of this lot in running sea water without the addition of sperm. In the others the results were the same. At the end of one and one-half hours, protoplasm could be seen collecting [illegible]. After this [illegible] the [illegible] had [illegible] to the [illegible] and [illegible] was formed. After [illegible] hours [illegible] stalk on a layer of orange-red [illegible]. At the end of five to six hours, the [illegible] was at its prime, but neither then nor at any subsequent time was there any trace of segmentation. [illegible] lost its shiny outlines, [illegible]

[illegible]

V. [illegible].

[illegible]

VI. [illegible].

In [illegible], fertilization is [illegible] the formation of the [illegible]. [illegible] but supplies the stimulus [illegible] many [illegible]. All workers on the Chaetopoda, [illegible], Wilson, and others, so report. Newman and [illegible] found it true for the Cod fish, and [illegible] and Watson for Pleuronectes, though the statement for purple [illegible] also generally not to be [illegible] after impregnation. [illegible] confirms this for the Perch, [illegible] of the Sea-bass, Roccus [illegible], for [illegible] shortly after extrusion. Martin says ("The [illegible]"), "One can emphatically say for almost the first [illegible]

t[illegible]ensive [illegible], sum[illegible] [illegible]
i[illegible] the [illegible]ation of [illegible]",
[illegible] that "if [illegible] these files, [illegible]
and larger size [illegible] is [illegible]".

All writers, [illegible] ('[illegible]) [illegible] ('[illegible]), [illegible] this [illegible] the[illegible] some that of [illegible] [illegible]. [illegible] in which this may take place:

I. By streams from the circumference of the cell. This is the method in most fi[illegible], especially [illegible] [illegible]. [illegible], [illegible], [illegible], and [illegible] others.

II. By streams from the circumference with the help of little "pro[illegible]sions" from the interior of the [illegible] ([illegible] ('[illegible]) and [illegible] ('[illegible]) [illegible]).

III. In all [illegible] from the [illegible], the [illegible] to [illegible] ([illegible], [illegible] ('[illegible])). As best I can determine, the [illegible]. This [illegible] will be further referred to in the section dealing with the peri[illegible].

Intimately connected with the foregoing is the collecting of the oil drops underneath the [illegible]. In [illegible], the oil is in one [illegible] globule generally near the

center of the yolk, but in the Ripsfish many small orange-red globules are imbedded in the periphery of the yolk. When the protoplasm moves up to the animal pole, the oil globules go also and are collected under the yolk at the pole in the "blastodisc". [illegible] of Fundulus not very common among teleosts. It has been reported by Kerr for the Salmonidae, by Wilson ('89) for Serranus, by Wheeler ('97) for Ictalurus, and by Agar ('07) first described in detail in Fundulus by Clark Cox. He says that the [illegible] of the blastodisc is [illegible] the yolk and [illegible] "[illegible]" pole. The surface of the yolk finally [illegible] a layer covering most [illegible] of its outer surface. Kupffer ('06), describing [illegible] in Syngnathus, says, "Mit Fett [illegible] einer [illegible] Protoplasmaschicht, welche [illegible] Kern [illegible] enthält."

The two phenomena [illegible] by Agar, namely, the [illegible] with and in fact [illegible] [illegible] of the [illegible]. As the protoplasm in Fundulus moves to the center of the oil globules from the periphery, the Ripsfish egg becomes "clear", i. e., the yolk, free from these substances becomes [illegible] transparent. A similar [illegible] the egg of Cynoscion, Fig. 5, Pl. I, consists of a mixture

single protoplasmic [illegible] form [illegible] layer of oil droplets embedded in yolk and covering about one-fourth of the egg, the other three-fourths consisting of clear [illegible] yolk. This "cleavage" has been described, essentially as above, by Rusconi ('30), Kowalewski ('[illegible]), and Agassiz and Whitman ('85), for [illegible], [illegible], and [illegible] respectively.

In certain [illegible] [illegible], especially the students of the Salmonidae, have described amoeboid movements of the germ-disc, [illegible] ('[illegible]) has [illegible] in the blastoderm [illegible] to the sixteen-celled stage. [illegible] ('[illegible]) has also figured and described amoeboid movements in the germ of Gasterosteus. These movements seem to assist in freeing the germ of protoplasm, and [illegible] of yolk. The [illegible] of the egg, which prevents [illegible] the "streaming", [illegible] movements. [illegible] however, [illegible] the [illegible]; in one [illegible], I found [illegible] as figured by Henneguy ('8[illegible]) in trout germs hardened in chromic acid.

The oil drops in the Pipefish egg are not numerous enough to make it float, but from their location they maintain the germ in an upright position. [illegible] is [illegible]-

[illegible], [illegible] is bu[illegible] liquid filling [illegible]. [illegible] this rotation [illegible]sists I cannot say, [illegible] until after the closure of the [illegible]. [illegible] (1877) first [illegible] is [illegible]. [illegible] in water [illegible], [illegible] filling [illegible] "Zwischenraum" referred to above. [illegible] liquid filling [illegible] is space in C. [illegible], [illegible] fixing [illegible]. [illegible] [illegible], [illegible].

[illegible] earliest [illegible] of [illegible] were [illegible] four to five hours after the [illegible] placed in the [illegible], [illegible] I [illegible] ions [illegible]. [illegible], [illegible] to [illegible] to [illegible] classic paper of Agassiz and [illegible] on Ctenolabrus, or to the more recent memoir of [illegible] on the Brook Trout. Since, I preserved [illegible] intervals of from five to twenty-five hours, I have sections which show the progressive degeneration of the [illegible]. So far as I know, this has never been shown [illegible] of

Fig. 1 [illegible]

[illegible] "Eisen Huileux", yolk sphere, and [illegible]. The [illegible] is from a central section of a germ [illegible] five hours old. The [illegible] of protoplasm is not yet [illegible]. As [illegible] off [illegible] four- [illegible]-cells [illegible], [illegible] ei [illegible]. [illegible] four [illegible] occurrence is [illegible] of unfertilized [illegible].

Strickert [illegible], [illegible] [illegible] [illegible] [illegible], i. e., a [illegible] of cells, [illegible] [illegible] protoplasm. The figures [illegible] "E"

m[illegible] or vel[illegible] [illegible], [illegible] on [illegible] which is very inconclusive. Thereupon [illegible], I [illegible] surface views of [illegible] these structures, [illegible] year, a subsequent [illegible] similar [illegible] of the film. These "show a [illegible] of the [illegible] formative film, a sort of irregular asymmetrical cleavage". After twenty-five hours, "portions of the discus proligerus were pinched off and appeared as projecting buds" This reported [illegible] that unfertilized [illegible] from [illegible] after lying in water four weeks formed hillocks on the surface of [illegible] in [illegible] fluid drops under the surface [illegible]. [illegible] figures. [illegible].

As to the further [illegible] of the blastodisc in [illegible] unfertilized eggs of the [illegible], I can only say that it flattens out and finally disappears. Fig. [illegible], Pl. II, is a central section through a blastodisc twenty-six and one-half hours old, which shows this flattening. Figure [illegible] of the same plate shows a blastodisc taken from a lot of eggs in the incubation stage (40-46 hours). It is [illegible] its lower surface is comparatively free from yolk. The contrast is evidently due to the fact that one [illegible] lying free in the sea water, while the other [illegible] more favor-

[illegible] is [illegible]. [illegible] interest to note [illegible] with in the pouch with embryos of all stages, [illegible] "[illegible]". Ranson [illegible] fertiliz[illegible] [illegible] days. [illegible], his [illegible] gives four [illegible] [illegible] [illegible] [illegible] [illegible] spheres. The [illegible] in some cases [illegible] inclusions, and in [illegible] are [illegible] free [illegible].

II. [illegible].

[illegible] description [illegible] segmentation of the [illegible] of Siphostoma floridae, I wish to say that this is [illegible] irregular. [illegible] irregular-ities [illegible] as early as the two-celled stage and become very marked when eight cells are formed. The egg under consider-ation equals and perhaps exceeds that of the Salmon family in abnormality of cell division. The surface [illegible] were [illegible] drawn from the [illegible] alcohol or xylol, the [illegible] impossible [illegible] *in situ*

[illegible] Wit[illegible] drawn [illegible] 160 [illegible] surface views were [illegible] the [illegible] two [illegible] two [illegible]

[illegible]

This is [illegible] the [illegible] 1. If, in [illegible] the [illegible] of the [illegible] the [illegible] of the [illegible] the [illegible] the latter [illegible] See Fig [illegible] Fig. [illegible] Cuttle. [illegible] (species [illegible] fro[illegible] on of [illegible] cles, [illegible] the [illegible] shape [illegible] under[illegible]

[illegible] off from the yolk, the crossbands [illegible] as in the parents, to the flesh, composed of [illegible] fibres. [illegible] several vertebrae of the fish, which [illegible] were formerly filled with oil. Brook (1884) describes in the herring a glandular mass [illegible] this (?) of the like function.

This glandular mass [illegible] in the [illegible] - a similar [illegible] (Fig. 1, [illegible]) [illegible] in the Chub [illegible] four days. Hertwig (1878) says that the formation of the terminal disc in the Herring takes place in two hours, in the Trout from seven to nine hours. The time, however, varies with the kind of fish, the temperature, the quality of the water. In the Rabbit I have found that the [illegible] in from four to six hours. It is noteworthy that in each of the blastodiscs [illegible] were studied, however, the [illegible] hours. Hertwig counts [illegible] Herring [illegible] after the formation of the first furrow.

Two-Celled Stage.

As in Teleosts generally, the first [illegible] slightly before the appearance of the first furrow, and, as

result, the axis is somewhat longer than the other. This is shown in Fig. , Pl. I., the normal two-cell stage, in which the blastomeres are equal. In Fig. , however, we have an irregular segmentation, the one cell from the other being only about one-half as large. This type quite frequently occurs.

Fig. , Pl. II., shows a four-cell stage in which the cells are of unequal size. The next division takes place in the plane of the equator, in which the primary cells are divided. The next division forms , but it does not always take place. In the line of division, the protoplasm of the forming cells forms a very delicate network of radiating fibrils which are transversely by a plane of cleavage. Herbst (, Pl. ,) observed a similar structure in the cells of a four-cell stage in Echinus. He says an indistinct star is seen by oil immersion lenses vertically from the center of groove toward the base. Boveri (, Pl. ,) gives a figure of a two-cell stage very like Fig. , Pl. I., and says that the fine lines divide the two cells in each of which a clear protoplasm which is traversed by very fine lines parallel to each other and perpendicular to the median line and that these fine lines lose themselves in the surrounding protoplasm. This

('38a, Figs. 7,8) illustrates und[illegible] s[illegible]s.

[illegible] section [illegible] Walls, [illegible] I[illegible] of vesicles [illegible] of the blastoderm. [illegible] of cleavage are, as far as known, first fully described for the rat by Bellhaner in 1907. Huxley ('32, J.S., Figs. 7, 8, 9, 10) [illegible]

[illegible] XVII, [illegible] Stenbergs, [illegible] §

[illegible] Tuxedo [illegible] Stenbergs [illegible]

[illegible] . [illegible] , [illegible] S. [illegible] germ [illegible] [illegible] .

Four-celled Stage.

[illegible] is shown [illegible] four-[illegible]. The second furrow is horizontal and crosses the first approximately at right angles. Thus there is formed a four-celled symmetrical blastoderm. Sections of this would in no wise differ from those for two-celled stages, save in the plane a--b where the beginnings of the segmentation cavity and the periblast would be found. Such a section is not [illegible].

[illegible], Pl. I, a [illegible], shows slight inequalities in the size of its blastomeres. These irregularities [illegible] as Fig. [illegible], Pl. I. [illegible], Pl. II. [illegible] horizontal section [illegible] as Fig. [illegible], Pl. I. [illegible] separation [illegible] is an artefact. Of special interest are the segmentation cavity in

the center and the [illegible] of [illegible] which consists [illegible] this [illegible].

[illegible]

It [illegible] many [illegible] investigator. [illegible] first [illegible] two, [illegible] sixteen [illegible] com-parison of [illegible] con-for[illegible] is [illegible] first [illegible] examination of [illegible] is [illegible] reserv-[illegible]. [illegible] is [illegible] [illegible].

In Fig. [illegible], Pl. I., [illegible] Teleost [illegible] in form [illegible] nearly parallel to the first and perpendicular to the second plane of segmentation dividing such a form as Fig. [illegible], Pl. I. into eight blastomeres. In this blastoderm, [illegible] and others of this and the next stage, [illegible] is noticeable.

[illegible] Pl. I., [illegible] itself, [illegible] Pl. I. [illegible] there is a little space [illegible] just a short distance [illegible] will extend clear across, [illegible] segmentation cavity (s.c.). [illegible] the [illegible] is [illegible] This, however, is not [illegible] either [illegible] Fig. 4, Pl. I., [illegible] I regret that I have not been able to find such a section. The outer periblast (o.p.) never shows the periblastic ridge figured by Wilson ('91) for Serranus. Fig. [illegible], Pl. III., is through the plane a--b of Fig. [illegible], Pl. III., a normal [illegible] stage, but it will show the state of things in the plane c--d through Fig. 7, Pl. II. In this part of the [illegible] blastoderm of this stage, the central cells are separated from the periblast (c.p.) by a large segmentation cavity, which extends for a [illegible] the [illegible] cells, an

[illegible]

Fig. [illegible], [illegible] axis of [illegible] similar [illegible]. [illegible] cells are [illegible] segmentation cavity (s.c.) roofs over [illegible] (y.) [illegible]. [illegible] extent [illegible] yolk [illegible] es as [illegible] next stage. All [illegible] of their origin is that they have been left [illegible] cells were cut off the [illegible]. Structures similar [illegible] this were [illegible] sections at [illegible]. So far as I know, these protoplasmic [illegible] figured [illegible] before.

The periblast never comes away [illegible] from the yolk, but is so [illegible] with fragments of this [illegible], that it has in all cases [illegible] practically, the general course of the [illegible] followed.

Fig. [illegible], Pl. [illegible], shows a type of [illegible] far more common in the Pipefish than the preceding. In this the plane of the third furrow [illegible]

[illegible] is [illegible] two [illegible] cells [illegible] cell is at the [illegible] of the blastoderm. In order not to multiply figures there is given only one drawing of sections from such blastoderms. Fig. [illegible], Pl. III, is a section through such a structure as Fig. [illegible], Pl. I, but [illegible]. The [illegible] cell is very much smaller than any of the other cells. [illegible] is completely cut out of the protoplasm that is [illegible] the [illegible] cells. [illegible] section [illegible] cells are [illegible].

After the [illegible] of the blastoderm, [illegible] and [illegible] the [illegible] left very [illegible] is [illegible] the [illegible] section of this [illegible] cell, or at any [illegible] section through [illegible], as in Fig. [illegible], Pl. [illegible], [illegible]

Sixteen-Cells Stage.

Intermediate between the eight and sixteen-celled stages, are found many blastoderms with twelve, fourteen, and fifteen cells. These are in fact more numerous than those with exactly sixteen cells.

[illegible] sixteen-celled stages that [illegible], but they do not have the [illegible] structure [illegible] shown for [illegible] and for [illegible]. These blastoderms have [illegible] each of the cells in Figs. [illegible] [illegible]

[illegible]

in two [illegible] ... [illegible] sectional [illegible] in the [illegible], is shown in [illegible], and makes clear its [illegible], [illegible] the two [illegible]-ly placed [illegible] cells, [illegible] each [illegible] (*c*. [illegible] [illegible].

[illegible] 13 [illegible] Six [illegible] seven [illegible] approximate [illegible] ... [illegible] shown [illegible] ... [illegible] ... [illegible] in two [illegible]-ion walls.

[illegible] blastoderm [illegible] shown [illegible] 23, [illegible] I. [illegible] descendant of a blastoderm like Fig. 1[illegible] on the same plate. [illegible] description of it is needed, beyond calling attention to the fact that the five upper cells are cut out by an equatorial furrow. This is seen by referring to Fig. [illegible], which is a ventral view of the same blastoderm. [illegible] only five of the vertical furrows seen from above cut [illegible] the way through. The

[illegible] se [illegible] similar [illegible] whole [illegible] g. [illegible] ke[illegible] [illegible]

[illegible] considered [illegible] suf- ficiently [illegible] majority, [illegible] are like figures [illegible], and [illegible], Pl. [illegible]. In this connec- tion, Hertwig's [illegible] reference [illegible] found [illegible] since [illegible] [illegible] is very- [illegible]

[illegible]

[illegible]. For this [illegible] '91, [illegible]. [illegible]-15).

Agassiz [illegible] equatorial furrow [illegible] from [illegible], [illegible] horizontal division [illegible] sixteen-cell [illegible] is [illegible] first equatorial [illegible]. [illegible] latter [illegible] ('91), [illegible]. [illegible] ('[illegible]), Pl. [illegible], Fig. [illegible] Ctenolabrus [illegible], [illegible]. In Fistularia, [illegible] ('[illegible], [illegible]), Figs. [illegible] sixteen-cell stage, [illegible] cells [illegible], [illegible] the next division [illegible] central [illegible] from the [illegible] from sixteen peripheral cells. [illegible] equatorial division. Wilson ('91, p. 215) agrees with [illegible] in all points. [illegible] ('[illegible]), in [illegible], [illegible] division [illegible] stage, [illegible] earlier.

The fish. Ins[illegible] Figs. [illegible], [illegible], [illegible], Pl. I., [illegible] 1. [illegible] version [illegible] of [illegible] essentially like [illegible] of Amphibia.

Thirty-two-celled Stage.

Normal types of this stage, as shown in [illegible], Pl. I., are [illegible] thirty-[illegible] cells of [illegible], and are not [illegible] in [illegible]. [illegible] is [illegible] representative of forms like [illegible], which [illegible] normal, is not very different from Wilson's figures of the same stage in Cerianthus (Figs. [illegible]). No section of this stage [illegible]. Its internal structure will [illegible] Fig. [illegible], 44, Pl. II., a sixteen-cell [illegible]. The two central cells will have [illegible] horizontally, the two [illegible] by [illegible] surface [illegible] two interior cells. (Compare Wilson's [illegible].)

[illegible], Pl. I., is [illegible] stage, and [illegible] others. [illegible] serves to show the inequalities in the size of the [illegible]. [illegible] fifteen [illegible] above, [illegible] retain [illegible] form [illegible]. [illegible] the right the section cuts [illegible] of a sixth cell. The

segmentation cavity (s.c.) is nearly filled with cells. In the lower level, several have been cut off from the central peripheral (c.p.), from which it is separated by a cell wall so delicate that, on oil immersion only, will detect it. It is likely the peripheral further divides, as the yolky nucleus may [illegible].

Fig. 2, Pl. I., is a much older, with the most [illegible] layer of large cells. In the segmentation cavity cells are in three layers, the middle one [illegible] simply marked off from the first three. As the little difference in level between the two upper ones [illegible] noticed as a symmetry [illegible] is. The [illegible] is the [illegible] resulting from [illegible] the second set of [illegible] Fig. 2.

A central section through Fig. 3 of the [illegible] is shown in fig. 3, Pl. III. The peripheral cells form a [illegible] with the largest part slightly to one side, and enclose a segmentation cavity which is almost filled with cells. The two smaller cells have been cut off from the peripheral ones, the larger probably from one of its fellows. The periblast (c.p.) is thick and yolky. A more pronounced large-celled type is Fig. 4, Pl. I. The segmentation cavity is somewhat eccentric, and, as in the preceding, the two [illegible] over-

[illegible] (s.r.). contains [illegible] of proto-plasm from a peculiarly separate region on the left.

Fig. [illegible], Pl. I., is [illegible] x is slightly eccentric [illegible] somewhat longer [illegible]. Fig. [illegible], Pl. [illegible], is a cen-tral section through a similar but slightly older [illegible]. The [illegible] cells [illegible] from the outer [illegible] (s.r.). [illegible] a column of [illegible], from which [illegible] [illegible] of protoplasm [illegible] it [illegible]

Fig. 33 shows a structure by no means [illegible] in the [illegible] of Siphostoma. It is a thirty-two-celled stage in which no [illegible] has yet been formed. The cells are in two lay-ers, the long cell on the upper right is [illegible] to di-vide, and underneath the whole is a thick layer of protoplasm in which three vertical cell walls extend [illegible] lost. Later the [illegible]

[illegible] cells [illegible] original [illegible] [illegible] S.C. [illegible] Fig. [illegible] figures [illegible]

Fig. [illegible], Pl. [illegible], [illegible] four-teen in [illegible] occasionally [illegible] of from sixteen to sixty-four cells, and especially [illegible] twenty [illegible] micro-meter, five [illegible] the figure. [illegible] is shown by the fact [illegible] [illegible] of which [illegible] to [illegible] Fig. [illegible], Pl. III., [illegible]

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last

if a fine thread.

form

Fycle

[illegible] cells.

Artificial [illegible]

[illegible] varying [illegible]

[illegible] then, [illegible]

[illegible] The size of [illegible] cells serves [illegible].

[illegible] the sixty-four-[illegible]

[illegible] cells, [illegible]

[illegible] derive [illegible] precede [illegible]

[illegible] division, [illegible]

[illegible] are [illegible] and [illegible]

[illegible] cell there are [illegible] vacuoles.

The high-[illegible] type of this [illegible] is [illegible],

[illegible] periblast [illegible]

[illegible]

Stage of One-hundred-twenty-eight Surface Cells.

The normal gently arched type is represented in Fig. [illegible], a nearly central section of a blastoderm of this stage. The central periblast (c.p.) is here thick and fairly well delimited from the yolk below. Of especial interest are the cells in the act of being cut out of it into the segmentation cavity. Very noticeable is the presence of vacuoles (v.) in this

[illegible] ...ness in [illegible].

A [illegible] is shown [illegible]. [illegible] is [illegible] closer approximation of cells to the periphery, the inner row being a derivative of the outer, while in the center the cells are more scattering.

Fig. [illegible] is from a blastoderm intermediate between those from which Figs. [illegible], Pl. IV., were [illegible]. N[illegible] in sections [illegible]. [illegible] of the outer cells show a tendency to [illegible] smaller than the interior [illegible]. [illegible] are nucleated, and in one a [illegible] which is [illegible] downward. [illegible] the periblast has cells resting [illegible] in the blastoderm is there any evidence [illegible].

[illegible]

[illegible]

[illegible] similar to [illegible] [illegible], [illegible] [illegible]

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[illegible]

[illegible]

[illegible] sis. [illegible] blast and are either being cut out of or added to this lay- er. The close juxtaposition of these cells to nuclei in

the periblast [illegible] former conclusion.

The second [illegible] is represented in Fig. [illegible], which, [illegible] size, is from a [illegible]. The periblast is [illegible], thus [illegible] the [illegible] periblast [illegible]. [illegible]

[illegible]

[illegible]

[illegible] as any in the instruments.

To better illustrate [illegible] so characteristic of [illegible] t [illegible], [illegible]

section of Fig. 4.

Fig. 5 is a horizontal section through the epidermis of the same specimen as in Fig. 4. It shows the loose arrangement of the interior cells, with the chromatophore cells or the _mesenchyme_.

[illegible], in [illegible] sections.

[illegible].

[illegible] fi[illegible]

[illegible]

[illegible] "[illegible]", [illegible] free from [illegible].

[illegible]

Fig. [illegible]

[illegible] peri-blast is reduced to the thickness of [illegible], and in neighboring sections nuclei [illegible] in it. In the right outer periblast two tripolar spindles are found. These have been noticed occasionally in other sections.

Fig. [illegible] is the typical teleost late lens-shaped blastoder[illegible]. It closely resembles Rusari's ('[illegible]) Fig. [illegible]

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