observed in the 16-celled stage, originating in the manner described for the Teleostean egg by Whitman. The time of the appearance of that cavity, however, seems to vary somewhat even in different species of the latter.

The striking similarity of the early stages of segmentation in the blastodisk of *Raia* to those observed in the blastodisks of Teleosts is significant, and shows that the pattern of the furrows up to the fourth cleavage, in such an extremely meroblastic (teleplasmic) type of egg, need not necessarily resemble those developed on the blastodisk of the equally extreme type *Aves*, if Coste's figures are correct. The figures of the very early cleavage patterns of the blastodisk of the bird's egg given by Coste cannot, however, be reconciled with the more recent views as to the possibly intimate relation which may subsist between the future axis of the embryo and the first cleavage plane. The detection of the essentially right-angled relation between the first four cleavage planes which segment the blastodisk of *Raia* opens up the question whether such a method of cleavage does not also take place in the blastodisk of the bird's egg. If that is the case, then the subject of the very early stages of cleavage of the *Avian* blastodisk needs reinvestigation.

A continuous series of sections was cut of the Ray's blastodisk, above described, with a Cambridge rocking microtome. In this series it was possible to follow out the cells and furrows shown in the accompanying diagram. This series of sections was prepared by cutting the disk transversely. The hardening of the disk here described was accomplished as it lay upon the subjacent yelk undisturbed. After remaining in that position for twenty-four hours in the acid, the acid was gently poured off, the egg carefully washed, and the disk loosened with the greatest care from the underlying yelk. The changes wrought by the acid in the relative positions of the cleavage furrows were too slight to be noted, as was shown by a careful examination of the surface of the blastodisk both before and after hardening.

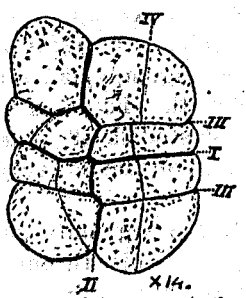

FIG. 1.—Diagram of the cleavage planes in the blastodisk of *Raia erinacea*.

4.—FISH KILLED BY POISONOUS WATER.

By A. H. GLENNAN.

[Letter to J. B. Hamilton, M. D., Surgeon-General of the Marine Hospital Service.]

Large shoals of dead fish have been met with between Egmont Key Light and Charlotte Harbor, off the mainland, and vessels have been several hours in passing through them. A few weeks ago the fishing schooner City of Havana, Capt. John Curry, lost two loads of live

fish, which were killed in sailing through strips of this poisoned water. It is said to be of a reddish color, and distinguishable for some distance from the surrounding water. Capt. Samuel Morgan, a patient in the hospital, informs me that in some of the freshwater creeks fish are caught by placing bags of the bruised bark of the swamp dogwood (*Cornus sericea*) in still water, and that the fish will revive if allowed to remain in it for a short time only. There would appear to be some connection in this, as the mortality seems to appear after considerable rainfall in the swamps and freshwater outlets, and is not due, as has been stated, to submarine volcanic action. I have mentioned the fact to Dr. Joseph Y. Porter, U. S. A., and requested him to take advantage of his proposed visit to Tampa, Fla., this week, to collect samples of the water, should the vessel pass through any of these reddish-colored strips.

KEY WEST, FLA., *October* 28, 1885.

5.—THE MORTALITY OF FISH IN THE GULF OF MEXICO.

By JOHN G. WEBB.

The answer to the question "What kills the fish?" is, in my opinion, that they are killed by noxious and poisonous gases which permeate portions of the Gulf and its bays, and which are derived from underground streams of water that flow into the sea.

First, as to the existence of underground streams of water. Everybody at all familiar with Florida is aware of the existence of enormous springs. Crystal River, in Hernando County, is an illustration. Good-sized coasters, say of 8 or 10 tons, can, I am informed, sail clear up to the spring, which issues from the ground—a river at the start. So with Silver Spring. It is described, for I have not seen it, as an immense volume of water rising in a bowl, deep and clear, and forming the Oklawaha, a river at once. So with a lake near Gainesville. My friend, Mr. F. B. Hogan, of Pine Level, in this county, tells me that, when a boy, his father resided near what is now the lake. He raised corn on the very flats which are now the bottom of this lake. There was then a small stream winding along through this flat and finally emptying into a hole in the ground, where it disappeared. In process of time somebody set up a saw-mill near this hole, propelling his machinery, if I am not mistaken, by power derived from the stream. He allowed the *débris* of his saw-mill to fall into the hole, which became stopped up. Now there is a lake there 18 miles long, and a large town gets its supply of fish from it. If the hole should again become open the lake would undoubtedly be drained.

Some years ago one of the Myaka lakes became nearly dry. It was then discovered that near the center of the lake was a deep hole, and it was furthermore discovered that the tide rose and fell in this hole.