

BIOLOGY

Half-Cells Without Nuclei Develop to Many-Celled Stage

Pieces of Sea-Urchin Eggs, Lacking Both Maternal and Paternal Nuclei, Divide and Arrange Selves Into Spheres

ANIMAL life without either father or mother, a discovery that may change fundamental biological concepts, has been shown to be possible by Dr. Ethel Browne Harvey, in experiments at the Marine Biological Laboratory at Woods Hole. Younger development-stages of one genus of sea-urchin have been produced from halves of eggs, from which the maternal nucleus had been excluded and which were never fertilized. (*Science*, Sept. 20)

This is the first known case in which cells have divided, and even the first stages of body-development occurred, without at least the mother-nucleus being present. That the father-nucleus can be dispensed with was demonstrated many years ago by the noted biologist Dr. Jacques Loeb; and that was more than a nine-days-wonder when it was announced.

Dr. Harvey's experiments began with unfertilized eggs of the common sea-urchin called by zoologists *Arbacia*. These she whirled in a centrifuge, developing a force of 10,000 times gravity, until they came in two. The half-eggs containing nuclei she discarded, keeping only the enucleated halves.

Dr. Harvey treated these with concentrated sea water—a pinch of common table salt to a tablespoonful of sea water. Sea water thus concentrated, and a number of other chemicals as well, are known to be able to start parthenogenetic or "fatherless" development. When transferred back to normal sea water, they began to undergo the changes leading up to ordinary cell division, and some of them actually did divide.

The division continued, until in many cases there were aggregates of as many as a hundred un-nucleated cells, forming the hollow spheres characteristic of this stage of embryonic development. An initial bit of un-nucleated maternal protoplasm one eight-hundredth of an inch in diameter had developed into a many-celled organism, the blastula stage of the sea urchin. Stages more advanced than this have not yet been obtained.

Did Have Mother

Strictly speaking, of course, these young animals with no nuclei in their cells did have a mother, for the cytoplasm, or non-nuclear protoplasm, was formed by the mother sea-urchin. However, since it has always been the accepted assumption that

the "essence" of parenthood is in the nucleus, they have certainly been launched into life without the normal dowry given to all known cells of natural occurrence.

It has been a further accepted basic assumption in biology that the cell-protoplasm's activities are in some way "controlled" or "guided" by the nucleus. To find un-nucleated half-cells thus able to manage their own affairs, and even to take the first steps in the complex process of building an organism, may necessitate some revolutionary changes in biology's fundamental concepts.

Science News Letter, October 12, 1935

ARCHAEOLOGY

Mysterious Hand-Written Bible Interests Scholars

DID a devout monk in Egypt, about three hundred years after Christ, have his hand-written Bible buried with him, for Arab treasure hunters to dig up and sell to eager scholars today?

This may be the story back of the mysterious Bible of extreme age and very great importance, that has been coming to light, bit by bit, since 1930.

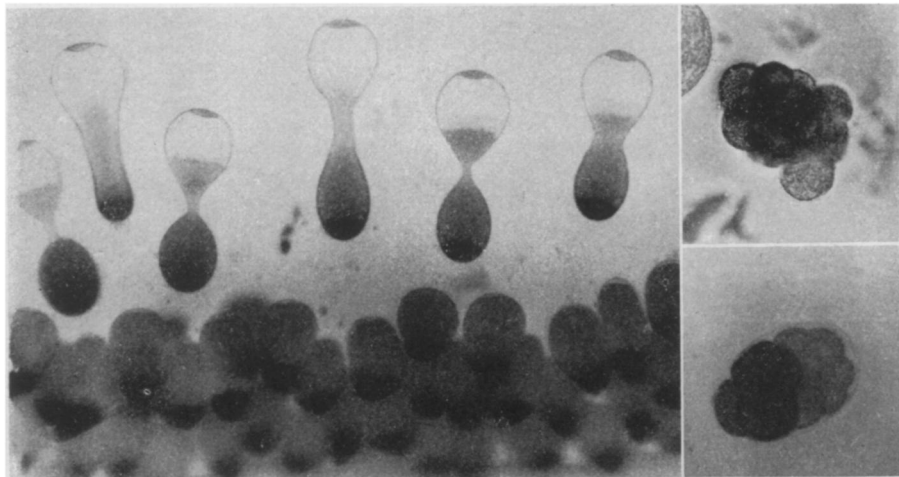
Arab dealers who sold 190 papyrus leaves of this book to A. Chester Beatty, Englishman, five years ago, had nothing to say about the source of the find. Since then, the University of Michigan has acquired more than 30 leaves, in installments, with equal mystery surrounding their past. And now, 46 more leaves have come to Mr. Chester Beatty.

The Bible pages in Greek thus revealed are giving scholars new ideas about the earliest Bible wording—which they are continually seeking—and the order of the books, and most particularly they find their wonderful new treasure a principal authority for the Epistles of St. Paul.

Reports are beginning to appear, giving expert views as to the significance of the "Chester Beatty Biblical Papyri," as the book divided between England and America is called.

A large part of the Epistles of Paul, included in the University of Michigan possessions, have been studied by Prof. H. A. Sanders. The letters of St. Paul are not arranged as in modern Bibles, he reports. The book of Hebrews follows Romans in this Bible used in Egypt long ago. Placing the book of Ephesians before Galatians, instead of after it, is another change in order.

Not knowing the place and circumstances of the discovery of this Bible is a great handicap to scholars who are trying to estimate its age and importance. Different parts of the whole manuscript



MANY-CELLED LIFE WITHOUT NUCLEI

Under a centrifugal pull equivalent to 10,000 times gravity, sea-urchin eggs break in two, the nucleus always remaining in the lighter half. The un-nucleated half, subjected to proper chemical conditions, divides and develops like a normal egg cell, although at a much slower rate. At right: upper picture shows many-celled aggregate resulting from repeated division of one of these half-eggs without a nucleus; lower picture shows corresponding stage reached in about one-fourth the time by a normal, fertilized egg.