

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.

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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.

have been said to belong to the second, third, or fourth centuries, from the writing and other small clues that catch an expert's eye.

Current gossip in Egypt says that the papyri were found in a Coptic graveyard, says Prof. Sanders. If true, this would suggest that the graveyard was used by a Coptic monastery. The leaves may have come from a single grave, buried perhaps with the last member who could read Greek. Prof. Sanders doubts that the finders of the manuscript could have opened a series of graves in a Coptic monastery without detection. It seems more likely that the papyri were found in one

grave, and the time when the book was buried is placed in the fourth century—since some parts seem as young as this.

A handwritten Bible of papyrus is not apt to have lasted in use more than a century, Prof. Sanders estimates. So, he figures that the very oldest portions, which happen to be the Numbers and Deuteronomy books, were written out at the end of the second century or in the early part of the third. This would be around 200 A.D. Handwritten as it was, a Bible in those days was assembled book by book, and the result was not the work of a single scribe or a single year.

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PUBLIC HEALTH

Smallpox, Typhus, Relapsing Fevers Epidemic in Ethiopia

DEATH and disease are No. 1 enemies along the lengthening Italian-Ethiopian battle lines. Reports on disease conditions in Addis Ababa as communicated in consular reports to the U. S. Public Health Service read like the index to a medical book.

Epidemics of typhus fever, relapsing fever and smallpox are harassing the Ethiopian capital and surrounding country, according to the latest report. The number of cases or even of deaths in these three epidemics is unknown, as no statistics on sickness, deaths or births are collected. Vaccination against smallpox is not practiced.

Leprosy is very common in Ethiopia. So are venereal diseases, and syphilis is

reported to be more prevalent there than in any other country. It is said that 90 per cent. of the adult population is affected by some venereal disease. Malaria of course is always present. Tuberculosis, grippe, pneumonia, quinsy, asthma and dysentery are other diseases reported prevalent. Practically all the adults in the country have tape-worms.

Cholera and plague are not mentioned in the consular reports, and Ethiopia is out of the yellow fever and sleeping sickness regions. But as one health official put it, if these four diseases are not present in the country, they are about the only ones the Ethiopians do not have.

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recent meeting of New York cereal chemists, the assembled chemists were fed bread that had been kept a week below freezing and also bread baked the previous day and handled in ordinary fashion. The majority voted for the week-old product, for aroma and flavor.

If the tests, now being continued, prove satisfactory, the baking industry seems likely to win a considerable advantage. Shipment of bakery goods to more remote points and better adjustment of supply and demand, with less waste, are possible benefits.

Holland has already tried out this idea of freezing bread to solve a local problem. Bakers in the Netherlands are not permitted to work between eight at night and five in the morning, and fresh bread may not be transported before nine A. M. Bakers reported unhappily that business suffered because people could not get fresh bread for breakfast and for preparing lunches for school children and workers.

To meet this situation, a Rotterdam baking concern, operating chain stores, recently resorted to use of "dry ice" to keep bread, claiming that bread thus preserved for several days cannot be distinguished from bread fresh from the oven.

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PLANT PHYSIOLOGY

Neon Lamps Are Replacing Incandescents in Forcing

NEON lamps, running on the same principle as the red-glowing American street signs, have proved far more satisfactory than the conventional incandescent lamps for use in forcing plants and flowers in the experimental greenhouses of the Agricultural College of Wageningen, The Netherlands. They are more economical, partly because they convert a far greater proportion of the electric current into light and waste less as heat, and partly also because their light is rich in the yellow and red wavelengths that are most stimulating to the action of chlorophyll in the green leaves.

Among the plants so far tested have been cucumbers, strawberries, begonias and a number of other flowers. In some of the experiments an extra supply of carbon dioxide gas was artificially administered.

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CHEMISTRY

Frozen Bread Stays Fresh For Week; Flavor Stays Good

FROZEN bread is the newest idea in the baking industry, and the most promising.

Public demand for fresh bread has kept bakers continuously working on a hand-to-mouth schedule. Now, they are trying something that may keep their product a week.

To hunt for some good way of delaying staleness of bread, the American Association of Cereal Chemists tried effects of both heat and cold.

Stored hot, that is, up toward 150 de-

grees Fahrenheit, bread would become stale more slowly, but flavor and color were "discouraging."

At moderate temperatures, say 50 to 90 degrees, nothing surprising could be expected. Every one knows how bread grows stale in ordinary circumstances.

But effects of freezing surprised the experimenters. The bread became partially stale, according to technical tests of penetration. Yet the aroma and flavor were pronounced as good as, or even better than, in freshly baked bread. At a

Poor handwriting goes with poor spelling, according to Dr. Alice E. Watson of Teachers College, who has surveyed spelling of thousands of high school students.