BIOLOGY

Link to Man's Heredity

Forerunners for man's heredity, chemical changes in water, and chemicals producing smell, are reported by Gloria Ball from the American Institute of Biological Sciences meeting.

➤ A POSSIBLE missing link in the evolution of heredity mechanisms has been found and photographed in simple yeast cells by a University of Chicago scientist, Dr. Balaji Mundkur.

In these cells Dr. Mundkur found cords that may be the forerunners of the chromosomes through which man and other animals pass on characteristics from generation to generation.

Speaking before the Genetics Society of America, meeting with the American Institute of Biological Sciences in Stillwater, Okla., Dr. Mundkur reported that although yeast cells have no conventional chromosomes, they do have "chromosomal substance or faintly staining submicroscopic basophile cords."

The cords are dotted with darker-staining particles of DNA protein, a heredity-carrying chemical. Outside the nucleus, in the cytoplasm, there are densely staining particles of RNA protein. DNA is deoxyribonucleic acid and RNA is ribonucleic acid.

To see these structures, Dr. Mundkur had to use ultra-rapid freeze-drying and a staining technique aimed at selective disclosure of DNA protein and RNA protein. Then he could photograph the heart of the yeast cells with an electron microscope.

In the resting yeast cell, Dr. Mundkur explained, the cords somewhat resembled what would be seen if a fisherman's net were wadded up in a ball and cut through the middle.

In the budding yeast cell, however, the cords in the dividing nucleus straighten out and appear as faint streamers from the mother to the bud cell.

Through a conventional light microscope this organization is not visible—DNA protein in the nucleus appears as a homogeneous mass. But with an electron microscope, the submicroscopic cords could be measured and were found to be about 700 angstroms wide. An angstrom is about four-billionths of an inch.

The DNA protein particles were about 50 to 80 angstroms in diameter, and RNA protein particles in the cytoplasm were about 100 angstroms in diameter.

The particles were identified as RNA protein and DNA protein by putting yeast cells to an enzyme test.

Dr. Mundkur said, "I prefer not to call the submicroscopic cords 'chromosomes' because they have none of the characteristics of conventional chromosomes."

The nucleus, he said, is "either a degenerative or primitive form." He plans further studies at the University of Connecticut at Storrs to make an evolutionary reconstruction of the different nuclear patterns.

• Science News Letter, 78:163 September 10, 1960

TIRE COLOR-WHEEL—Colored sidewall tires may find wide applicaton in the future. Scientists at Esso Research and Engineering Co., Linden, N. J., are developing special butyl synthetic rubber blends for sidewalls, white and multi-colored, that will be resistant to ozone cracking, easy to clean and will retain color. The discs will be exposed to actual road conditions and then checked for durability and ease of cleaning.

Chameleon-Like Ditches

➤ MUDDY ROADSIDE DITCHES may all look alike, but each has an individual character that changes chemically and biologically from hour to hour.

Dip a piece of litmus paper in a water-filled ditch at dawn and the paper turns pink. Try again at three in the afternoon and it may come out gray-green or blue.

The reason for the change was reported by Dr. Stuart S. Bamforth of Tulane University, New Orleans, La., to the American Institute of Biological Sciences meeting in Stillwater, Okla. In the morning, water in a typical ditch, like soda pop in a bottle, contains extra carbon dioxide which makes it acidic and turns the litmus pink, he explained.

This situation exists because nighttime activity of microscopic animals and decaying matter have used up much of the oxygen and released carbon dioxide and phosphate, an essential nutrient for plants, into the water.

As the sun comes up there are many animal forms in the water. Green plants start making food, using up the carbon dioxide and phosphate and releasing oxygen again. The acidity of the water decreases and by three or four in the afternoon, when plant activity is at its peak and animal forms have been reduced, the litmus paper will show a more alkaline reaction.

During a year-long study of daily changes in shallow aquatic habitats—ditches, edges of swamps, streams and ponds no more than two or three feet deep—Dr. Bamforth also found that the rate and extent of chemical changes from hour to hour give some indication as to the balance of plant and animal life in the pool. The more plants in the water, the greater the daily chemical changes. When animals dominate, there is little change.

There are also local differences within a single ditch, Dr. Bamforth pointed out. Changes at one end may proceed rapidly during the day, while the other end, perhaps only 50 feet away, changes quite slowly.

One important conclusion from the study, Dr. Bamforth emphasized, is that comparison of two shallow habitats may have more meaning if daily changes are compared.

• Science News Letter, 78:163 September 10, 1960

Use Chemical For Smell

➤ APPLES, BEANS, TOBACCO and avocados may not smell like roses but they do use the same chemical, l-quinate, that goes into making roses smell good.

Dr. L. H. Weinstein, Dr. C. A Porter and H. J. Laurencot, all of the Boyce Thompson Institute for Plant Research, Inc.,