Courtesy of Newark Museum

SILK—OLD AND NEW

The young lady on the right is dressed in a real silk dress of a generation ago while her companion on the left wears a dress of modern synthetic materials. They are photographed at the Newark Museum's Miracles of Chemistry exhibit with a chemist who is explaining the process of producing synthetic textile materials.

GENETICS

Chance Big Pears Have Double Chromosome Count

GIANT PEARS, borne as "sports" on big-leaved, big-flowered branches developing on otherwise normal trees, owe their greater size to a doubling of the number of chromosomes, the heredity-carrying structures within the nuclei of their cells. The occurrence of these freak fruits and their explanation were the subject of a report from the department of genetics, Carnegie Institution of Washington, Cold Spring Harbor, N. Y., presented before the meeting of the National Academy of Sciences by Drs. J. L. Cartledge, A. D. Shamel and A. F. Blakeslee.

Dr. Shamel first observed the giant fruits in California and wrote them up in a scientific journal. His associates saw the report, remembered that similar giantism in specimens of jimsonweed was associated with double chromosome count, and obtained specimens of the pear pollen. The pollen grains told the tale; they were double-sized, too, indicating that they contained the double chromosome number.

Science News Letter, April 28, 1934

GENETICS

X-Raying Male Cells Causes Increase in Male Offspring

Experiments With Fruit Fly Cells Also Adds to Knowledge of the Inheritance of Disease

X-RAYS cause more male children to be born—in the case of the little flies that are seen buzzing around bananas.

Dr. John W. Gowen of the Rockefeller Institute for Medical Research's laboratory at Princeton, N. J., reported to the American Philosophical Society an increase in the proportion of males to females as a result of X-ray treatment of the male reproductive cells of the fruit fly, *Drosophila.*

Whether the same results could be obtained with other species, such as man, was not reported. Dr. Gowen, however, was not conducting his observations in the interests of the militarists, nor even with a view to increasing the male population among fruit flies. He was investigating the problem of congenital disease.

Why are some children born defective? What part does constitution play in a person's resistance or susceptibility to disease? What factors are responsible for long life in one individual while another dies at a relatively early age? These are some of the problems on which Dr. Gowen's investigations with the fruit flies are shedding light.

"During development the body, due to its inheritance, may become a mosaic of cells, some normal, some abnormal, and the morbidity and mortality may increase directly with the proportion of defective cells in the mosaic," Dr. Gowen explained.

Four Ways

This is one of four general ways in which the genetic or inherited constitution of an organism may affect the development of a diseased condition. The other three are as follows:

An unbalance in the proportion of genes, or hereditary units, may cause death or greatly reduce the length of life.

Genes normal to a species may by a permanent change in character cause physiological and developmental processes so abnormal that death or lasting disability results.

The segregation of specific genes for susceptibility or resistance to diseases caused by bacteria or viruses may be responsible for immunity, disease or death within the population exposed to disease-causing bacteria.

Starting with these known facts, Dr. Gowen sought information on the total genetic constitution of a single organism. X-ray analysis seemed to him a method for such an investigation. Consequently he exposed *Drosophila* sperm cells to graded doses of X-ray and found four types of change.

Besides the increase in the proportion of males to females, he observed that a large number of the sperm cells die in a prescribed order; that many sex-linked fatal changes are produced; and that a few changes in the character of the genes occur which cause changes in body form.

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PALEONTOLOGY

Archancestral Crocodile Modeled for Museum

See Front Cover

KIPLING, in one of his happiest tales, long ago gave us an authentic and authoritative account of how the nose of the Elephant's Child got that way, from poking it too much into other animals' affairs—specifically into the affair that is the crocodile's snout. It has, however, remained for a Yankee scientist, Barnum Brown of the American Museum of Natural History, to dig up the bones of the Crocodile's Ancestor, and by a technique that combines the knowledge of the anatomist and the skill of the sculptor, to re-clothe them with the similitude of flesh and make this strange beast live again before our eyes.

This great-grandpa of all the 'gators lived some two hundred million years ago in a tropical swamp that has since cooled off and dried up and is now part of the Painted Desert of Arizona. Its fossilized bones, which were recovered

with practically no parts missing, show it to have been much smaller than modern 'gators and crocs—only 32 inches long. Its snout was rather shorter in proportion than a modern alligator's, much shorter than a modern crocodile's. It stood up on its legs in a little more lizard-like fashion, and it did not wear nearly so elaborate a suit of armor as any of its modern descendants.

And it had never heard of the Elephant's Child. There weren't any elephants then.

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EVOLUTION

Man's Use of His Hands Depends on His Legs

MAN OWES his tool-adapted arms and hands partly to his legs. His tree-dwelling ancestors probably had arms proportionately much longer, as tree-dwelling animals today mostly have. But when he dropped out of his arboreal home and began to walk about on the ground, his legs lengthened a good deal and his arms shortened somewhat, until they were of the present advantageous length for using tools and handling things.

This idea was put forth by Dr. Charles B. Davenport of the Carnegie Institution of Washington's Department of Genetics, located at Cold Spring Harbor, N. Y., in an address before the meeting of the National Academy of Sciences.

It is also a great advantage to man that his first ground-dwelling ancestors chose to walk instead of hopping like a kangaroo, even though the latter method of locomotion gets one about much faster. For leaping animals of that type have very much reduced arms, which would be of very much less use as tool-handlers.

Shadowed in Embryo

The ancestral history of man's limbs has its reminiscent shadow in the way they grow, before birth and during infancy. At first, the arms grow a little more rapidly than the legs, but some time before birth the legs overtake and pass the arms. At birth, the upper arm and forearm of a baby are about equal in length, but in later life the upper arm becomes the longer. Similarly, the thigh is at first no longer than the lower leg, but later on considerably surpasses it.

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EVOLUTION

Evolution Now "Experimental Fact"; Species Made to Order

"ORGANIC evolution is no longer an hypothesis. It is an experimental fact; new species have been built while we look on, and in some cases we know how they have been built."

With this challenging dictum, Prof. Edwin G. Conklin of Princeton University concluded the Penrose Memorial Lecture before the meeting of the American Philosophical Society, oldest of American science organizations, founded in 1727 by Benjamin Franklin.

Prof. Conklin's subject was "A Generation's Progress in the Study of Evolution." More progress has been made in the solution of evolution's riddles during the past quarter century than in all previous centuries, he declared.

The most fruitful field for the study of evolution, the speaker stated, has been found in the very heart of the cells. He said:

"Imagine the amazement and incredulity of the naturalists of a former generation who thought of evolution as the transformations of developed organisms under the influence of changing environment, if they could learn that today the great problems of evolution center in the structures and functions of the germ cells! And yet this is strictly and literally true. The germ cells are the only living bonds not only between generations but also between species, and they contain the physical basis not only of heredity but also of evolution.

"In the microscopic chromosomes which are found in the nuclei of all cells, and in the ultra-microscopic inheritance units, or genes, which lie in the chromsomes are found the causes of heredity, mutation, and evolution."

By the manipulation of mutations, or sudden large changes, it has been possible to create actual new species, Dr. Conklin indicated.

"The most important advances of the past twenty years concern the causes of mutations, or inherited variations, which are the building materials of evolution," he said. "Among these causes are changes in the numbers and composition of the chromosomes of the germ cells and changes in the inheritance units or genes which lie in those chromosomes.

"In many plants it has been found that new mutations are caused by an increase or decrease of their chromosomes and in a few instances absolutely new species have been formed which breed true but are sterile with their parent stocks."

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PHYSIOLOGY

Acetyl-Choline May Prevent Benzene Deaths

THE MANY cases of sudden death due to benzene poisoning that occur each year in various industries where benezene is commonly used as a solvent