

moth nurseries are insects that are half male and half female, called "gynandromorphs" by scientists. Others are not sharply divided into male and female halves, but have male and female markings and form-characters scattered in a "mosaic" pattern over their bodies.

If unmated female moths are kept isolated, about ten per cent. of them are still able to lay fertile eggs, though the proportion of these is very low when compared with the eggs from mated females, and they take much longer to hatch than do normally produced eggs. However, the resulting offspring are of both sexes and apparently quite normal in every respect.

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## GENETICS

## Injected Sex Hormones Influence Glands of Embryos

**M**ALE SEX glands of unhatched chicks were caused to develop decidedly female characters by injecting the female sex hormone substances theelin and theelol through the eggshells, in experiments reported before the meeting of the Genetics Society of America. The research was carried on by Dr. B. H. Willier of the University of Rochester and Drs. T. F. Gallagher and F. C. Koch of the University of Chicago.

The theelin and theelol were injected in rather heavy quantities. From day to day, eggs were removed from the incubator, opened, and the developing embryos dissected. The ovaries of the chicks that would have grown up to be hens were not affected. Neither were the left sex glands of the chicks that might have been roosters. But the right sex glands developed, surrounding their characteristic male tissues, other tissues just as characteristically female. The glands were half-way turned into ovaries. Even their general shape was changed in a female direction.

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## SEISMOLOGY

## Earthquake Strikes Baffin Bay Region

**B**AFFIN Bay was rocked by an earthquake on Aug. 22, reports from St. Louis University indicate.

Calculation of the epicenter shows the point on the earth's surface directly above the shock was in latitude 73.7 degrees north and longitude 64.2 west. The time when the quake occurred beneath the surface was at 20 hours 30 minutes and 43 seconds Greenwich standard time.

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## GENETICS

# Genes Have Double Function: Vital as Well as Hereditary

## Genetics Conference at Woods Hole Brings Out Many New Facts and Viewpoints on Nature and Activities of Units

**G**ENES, the invisible units of heredity, do double duty. They determine the expression of the body's thousands of characters, such as color of hair or eyes, and they also serve a general purpose in merely keeping you alive. If every gene needed for every special purpose were not also present in every cell, even in places where it is not needed, you would not be alive at all.

This double function of genes was brought out in discussion by Dr. M. Demerec of the Carnegie Institution of Washington, speaking at the meeting of the Genetics Society of America, held at Woods Hole, Mass.

Every cell in the body contains exactly the same set of genes as every other set. The cells in your toes have the same hair-color genes as the cells on the top of your head. But just because you have

no hair on your toes is no indication that those particular genes are lacking there. If they were not present the cells themselves would not exist. There would not be any toes. There would not even be any *you*. And so for all the rest of the genes everywhere.

The discussion was conducted in an endeavor to find out more about the working of genes—how they operate to make our hair blond or brunette, our eyes blue or brown, our legs long or short, our dispositions placid or vehement. Genetics thus met embryology.

Genes act like enzymes, which are chemical agents that change things without themselves being changed. The digestive ferment pepsin is an example of an enzyme.

But genes are not enzymes, chemically speaking, most of the speakers contended. They are much more complex in their makeup and they increase and multiply themselves, which ordinary enzymes are unable to do. It is considered more likely that they create special enzymes and work through them to produce their effects on body development.

Dr. Calvin Bridges of the Carnegie Institution of Washington displayed

## ARCHAEOLOGY

## Assyrian Sculpture in Boston Shows Pollination of Date

**P**OLLINATING date trees by hand, to insure a good crop, was practised many centuries ago by the ancient Assyrians. So important was the process in the food economy of the land that it came to have a very high religious significance, as is strongly brought out by a newly acquired sculptured panel just placed on display at the Museum of Fine Arts at Boston, Mass.

The great stone panel, which used to adorn the walls of Ashur-nasir-pal IV, king of Assyria from 885 to 860 B.C., shows a winged god holding a bucket in one hand, while with the other he thrusts the cone of the male date tree among the flowers of a female tree, thus pollinating them.

Among the ancient Assyrians as among the modern Arabs of the same land, the date palm was literally a tree of life, for its fruit was used, not as a delicacy, but as a staple food like bread. It was therefore not beneath the dignity even of a god to insure its abundant yield.

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DIVINITY AS TREE TENDER

microscope slides showing the interior of cell nuclei, in illustration of the way in which genes not only reproduce themselves but also may produce entirely new genes. Dr. Bridges has suggested that evolution began with a single gene, and that this, by multiplication and changes in its chemical nature, eventually gave rise to the thousands of diverse genes found in the most advanced animals and plants. These changes may have come

about through the impact of radium rays or other active forces of nature.

Dr. Charles B. Davenport of the Carnegie Institution of Washington showed a number of large-scale charts of living cells, showing changes in material lying directly on the outside of the nuclei. These, he suggested, indicate how the genes determine the course of bodily development.

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#### AGRONOMY

## Plants' "Uplifting" Tendencies Affect Character of Soil

**P**LANTS, constantly sucking upward the water that trickles and oozes downward through the ground, profoundly affect the character of the soil in which they grow, Sir E. John Russell, director of the Rothamsted Experimental Station at Harpenden, England, told fellow-agronomists at the Amsterdam meeting of the Sixth International Botanical Congress.

In the eastern part of England the water drainage through cultivated soils is only about one-half that through uncultivated soils, he said. The whole nature of the soil is affected, and the marked differences between feebly and strongly leached-out soils turn very largely on the intensity of action of plant roots in removing the soil water.

"Associated with this removal of water is also a transfer of mineral substances and nitrates from the subsoil to the aerial parts of the plant," Sir John continued. "Calcium, potassium and silica in particular are lifted in quantity to the leaves and stems: when the plants die they fall back on the surface of the soil. The details vary with individual plants, and in the end striking differences may result.

"The general result is, however, that this process counteracts the washing down by the rainfall, and it confers upon the soils of mild humid countries one of their characteristic properties that the upper layer tends to be richer in calcium and potassium and to be more nearly neutral, than the lower layers. These characters are of profound ecological significance and react greatly upon the vegetation."

The plant roots evolve considerable amounts of carbonic acid, the speaker pointed out. This evolution of carbon dioxide is of special importance in dry regions where soils tend to be alkaline, for it offers the possibility of reducing the alkalinity and so profoundly changing the vegetation. Experiments are being

tried in various regions to find crops which by evolving large amounts of carbon dioxide from their roots, can be used for the reclamation of alkali soils.

Plants also exercise marked influence on each other through their roots, Sir John declared. The legumes, or plants of the pea-bean-clover family, not only obtain nitrogen for their own needs through the activities of the bacteria that live in their root nodules, but also excrete it and make it available for other plants.

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#### GENETICS

## Effects of X-Raying Show In Later Generations

**X**-RAYING plants to produce hereditary changes in their offspring is not limited in its effects to what happens in the immediate outcome. An X-rayed plant may produce offspring with new peculiarities, such as changed leaf-size or flower-color, which will duly appear in subsequent generations. But these generations may also begin to produce other changes, even without being X-rayed themselves.

Changes of this character, and an explanation for them, were described before the meeting of the Sixth International Botanical Congress, by Prof. T. H. Goodspeed of the University of California, one of the pioneers in the field of X-ray genetics. While the details of the process are highly technical, the essential fact underlying the three types of cellular change he described is a state of instability, of continuing change, induced in the chromosomes by the first impact of the X-ray bombardment. In effect, the X-rays having cracked the shell, all sorts of things may continue to pop out for a long time to come.

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#### FORESTRY

## Forest Fire Renders Soil More Liable to Erosion

**S**OIL conservation and forest conservation, two national problems of which the American public is now most acutely aware, meet and intensify each other when fire sweeps a forest. Not only does a treasure in timber vanish upward in smoke, but an even greater treasure, the forest soil itself, vanishes downward through erosion.

How bad the erosional after-effects of forest fire can be is related by Charles A. Connaughton of the U. S. Forest Service (*Journal of Forestry*, August). Mr. Connaughton studied well over three thousand test plots in burnt-over forest land, comprising both cut-over areas and virgin timber.

In general, the more severe the fire, the more severe also was the subsequent erosion. On the steeper lands, lightly burned areas, on which the fire took only the top layer of the forest floor litter showed relatively little erosion. Only about ten per cent. of such plots were eroded. But when the fire had been really severe, as high as 80 per cent. of the plots showed erosion.

### Less Damage in Virgin Timber

Fire brings more erosional damage to cutover land than to virgin timber, the studies showed. While the worst damage on the steepest land was not greatly different in the two classes, there was a wide spread between post-fire erosion in cutover and virgin sites where the fires had brought only partial destruction, leaving the living trees and most of the underbrush still able to hold the soil with the myriad fingers of their roots. Taking a sweeping average of Mr. Connaughton's figures, a fire short of complete destruction in virgin timber is followed by only about half as much soil erosion as a fire of the same grade in the second growth on cutover land.

Of course, where soil is eroded away from a burnt-over forest site, it is difficult to make trees grow there again—impossible, if the erosion is severe enough to lay bare the underlying rock. But the damage is apt to be felt by people who never see or think about the forests. Hundreds of miles away, the freshets that gush through the erosion gullies accumulate as floods in the greater rivers, piling out of their banks to wreak destruction, and leaving behind them, on lowland farms and industrial areas, burdens of silt that should still be up in the hills, growing trees.

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