

## BIOLOGY

# Virus Genes Identified

Many genes of a microscopic virus have been identified by a California scientist, an important achievement toward the understanding of embryonic development.

► THE ELUSIVE genes of a microscopic virus have been identified by a California scientist in search of life's secrets.

No one has yet succeeded in pinpointing the position of all of the tiny hereditary units in an organism or identifying their exact use, but Dr. Robert S. Edgar of the California Institute of Technology at Pasadena believes he has nearly done it on T4D, a tiny virus which often lives in man.

The human cell, he told the American Institute of Biological Sciences in Corvallis, Ore., could have as many as 50,000 genes while T4D has only 100. Still, a special method of making the viruses mutant or different from normal is the only way known to permit mapping of the gene system.

T4D looks somewhat like a tadpole with a six-sided head. The various parts, including the tail, are developed under genetic control. Understanding how a gene regulates the formation of a virus head, for example, may help explain how similar structures are produced in many and other animals.

It is known that a number of serious de-

formities in humans are caused by some abnormality in a gene.

Dr. Edgar's description of genetic mapping closely follows an announcement that a virus had been created in two U.S. laboratories from chemicals, completely outside a living cell.

There is yet no simple method of coaxing genes to reveal the secrets of how they direct the life-building process, Dr. Edgar said. Trying to match each gene with a characteristic is a knotty problem.

Making a particular gene mutate or change its function can show what it would do normally, Dr. Edgar found. He causes mutations with chemicals and then selects only those changes that are "temperature sensitive," or will develop only at a certain temperature.

Through painstaking studies, Dr. Edgar has pinned down about half of the 100 genes in the T4D virus and determined their roles. He hopes to identify the rest soon.

He has found, however, that certain groups of genes have special functions. Four genes, for example, work together to make up the virus head. Only one masterminds the production of a special protein, while the other three put the head together.

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## Pears From Own Roots

► A TRUE BARTLETT pear growing on its own roots, a type of fruit tree rarely seen, can now be mass produced, according to University of California scientists.

Such a tree has no graft union where the trunk meets the roots. Since Bartlett wood is resistant to pear decline, the plant disease that has devastated Pacific Coast pear orchards in recent years, these trees are not likely to be affected.

Hudson T. Hartmann, of the University's department of pomology at Davis, told the American Society for Horticultural Science in Corvallis, Ore., that he and two other U. C. pomologists, William H. Griggs and Carl J. Hansen, produced the all-Bartlett pear trees by growing roots on Bartlett cuttings.

Bartlett trees have been propagated by grafting them onto seedling pear trees. A true Bartlett cannot be produced from its own seed, since the genetic character of the seedling is different from its parent.

The Davis pomologists produced roots on dormant, hardwood Bartlett cuttings by soaking them in a solution of a growth hormone (indolebutyric acid), packing them in moist peat moss and keeping the lower ends warm while the upper ends were exposed to normal winter temperatures.

This combination was successful although previous efforts, without the strict temperature controls, failed. After a few weeks, just

as the roots gave evidence of sprouting, the cuttings were carefully transplanted to the ground. Almost half of the cuttings planted produced vigorous young trees, large enough to plant in the orchard within a year.

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## Bacteria Stay in Clothes

► SOAP or detergents and hot water fail to rid laundry of disease-causing bacteria, scientists revealed in Corvallis, Ore.

Ear infections, skin sores and respiratory and stomach ailments were among the illnesses reported by families laundering their clothes with small amounts of infectious bacteria attached by U.S. Department of Agriculture experts. Even "sanitizing" with disinfectants did not destroy all bacteria, although it reduced their numbers.

Tests were made by attaching swatches of fabric containing only 50 bacteria per square inch to clothing just before laundering. At the end of the cycle as many as 21,000 bacteria were found in the same area, indicating that the organisms were multiplying during laundering.

Nine families volunteered to be "guinea pigs" in the laundering tests, Dr. Ethel McNeil reported to the American Institute of Biological Sciences. All of the families were infected by one or more of the bacteria species used in the tests.

Occasionally three of the most common bacteria were isolated from rinse water even when ammonia or phenolic disinfectants were used, although greatly reduced in number. None of these were recovered from the fabric following the use of chlorine bleach. This bleach cannot be used on all fabrics, however, she noted.

More than 1,500 colonies of bacteria were examined during the disinfection evaluation of home laundering products and techniques.

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## Heart, Blood Flow Link

► HEART DEFECTS may be related to the way blood pulses through a body.

Dr. Oscar C. Jaffee of the University of Buffalo demonstrated to the American Society of Zoologists in Corvallis, Ore., how the mechanical action of the blood stream appears to determine position of the septum, or thin wall, separating chambers of a frog's heart. Motion pictures showed the incomplete heart structure of frog larvae, or tadpoles, up to one month of age, when the blood is circulating through still-developing veins and arteries.

By experimentally changing the flow pattern of parallel blood streams at this early stage of development, Dr. Jaffee showed, the position of the septum can be shifted. The septum is formed of a jelly-like, non-cellular material. As the tadpole heart develops, streams of blood spiral and fuse, flowing into the right and left sides of the atrium, or heart chamber. At about the same time, the septum develops, separating the two streams and creating two chambers or auricles, found in adult frog hearts.

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**FLYING SQUIRREL**—The flying squirrel is shown in full daytime flight with its gliding membrane fully extended. A special cartilage extends the squirrel's "wingspan" beyond his tiny front feet. While fairly common in the U.S., this nocturnal animal is seldom seen in the daytime. The unusual photograph was made by John W. Alley, University of Michigan technical photographer.

## Ant Sounds Audible

► FOR THE FIRST time, ant sounds have been heard and recorded.

Ants communicate in sounds, audible to humans, made by snapping leg joints, scraping feet and rapping mandibles, as well as by the stridulatory organs, the same type of organ which allows the grasshopper to fiddle.

What is more, the sounds can be heard without amplification at very close range by a person with good hearing.

Miss Helen Forrest, Rutgers University zoologist, reported her findings in what is believed to be the first scientific discussion of ant communication by sound to the American Society of Zoologists in Corvallis, Ore.

The sound-producing organs are very similar in all species of ants studied, she said, but the "songs" produced by each are quite different.

Both male and female ants have louder "voices" than sexless worker ants and are especially sensitive to vibrations, she found. Miss Forrest also said that she has located possible receptors of the sounds.

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## Cold Storage Embryos

► EIGHT or ten high-grade cows instead of only one is the future promise of a new technique of transferring embryos stored in freezers.

Scientists now know how to take an embryo from one rabbit, store it and later give it to a different mother to bear, Dr. E. S. S. Hafez of the department of animal science, Washington State University, told a meeting of the American Institute of Biological Sciences in Corvallis, Ore.

This method is being applied to cows. The best cows now are limited in number and usually have only one calf a year. Through transfer of embryos, the best stock could produce eight or ten embryos a year, which could be born by ordinary cows.

Reporting on experiments to find out how much antibiotic should be used to help preserve embryos, Dr. Hafez said he had discovered that the addition of gelatin to the storage liquid improved the protection against germs.

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## Test for Vision Theory

► A MATHEMATICAL translation for a physiological theory designed to explain a unique function of the human eye was reported at a meeting of the Western North American Region of the Biometric Society in Corvallis, Ore., by Dr. Donald L. Bentley, assistant professor of mathematics at Colorado State University, Fort Collins, Colo.

He presented a mathematical technique for use in testing a "compartment theory" developed by Dr. George Wald, a Harvard ophthalmologist.

Dr. Wald's theory suggests that rod vision in the human eye, which is concerned only with black-and-white sight, is directed by

tiny "compartments" within the eye. These "compartments" act independently of each other in reacting to light and producing what we know as sight. In other words, one such "compartment" within the rod may react to light while one or even all others will not.

Dr. Bentley, in translating the complex theory into mathematical terms, applied stochastic, or random, mathematical processes to rod vision.

He said that the "compartment theory" fits various statistical models, and that these statistical models can be utilized in proving or disproving Dr. Wald's theory.

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## Fungi Invasion Feared

► DEADLY foreign fungus organisms are constantly feared by U.S. scientists for the destruction they could cause to susceptible plants in this country.

Only the sharp eyes and constant research of the Federal plant quarantine inspectors have kept U.S. crops and forests free from the disease organisms such as the fungus that early in the century wiped out every chestnut tree in the country in a few years.

The sweet orange fungus that wreaks havoc among citrus fruits, for example, has been successfully kept from this country, although it is often found on planes or ships coming from South America, Mrs. Alice J. Watson, a mycologist at the U.S. Department of Agriculture Plant Industry Station, Beltsville, Md., told the Mycological Society of America meeting in Corvallis, Ore.

Another was the rust disease reported in a serious 1959 outbreak in lentil fields of Chile, she said.

A quarantine action against the South American seeds protected crops in Oregon and Washington.

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## PALEONTOLOGY

### Life Exists Outside Earth, Nobelist Believes

► LIFE EXISTS outside earth, fossils found in meteorites suggest to Nobelist Dr. Harold C. Urey of the University of California, San Diego.

The evidence is not yet conclusive and all scientists who can contribute to solving the problem of whether the fossils are actually from out of this world or merely contaminations should do so, Dr. Urey urges.

However, the discovery of possible fossils in meteorites makes the evidence for extraterrestrial life better now than it was before.

He summarizes the evidence for and against extraterrestrial origin of the fossils in Science, 137:623, 1962. Most of the evidence on both sides was originally presented at a meeting of the New York Academy of Sciences last spring, of which Dr. Urey was chairman.

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## Do You Know?

*Scandium*, a scarce, light metal with a high melting point, is frequently present in waste liquors, in minute quantities, from mills processing uranium or rare-earth ores.

Early cutting of *alfalfa* provides the highest quality hay.

About 20 colleges and universities in the U.S. now offer undergraduate *degrees* with soil and water conservation majors.

Rare earth *metals* are neither rare nor unavailable, they are present in trace amounts in much of the earth's crust and in both plant and animal life.

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