

## VETERINARY MEDICINE

**Calves Blinded, Crippled  
By Lack of Vitamin A**

► TWO new vitamin-deficiency diseases in cattle have been discovered by Dr. Lane Moore of the U. S. Department of Agriculture. Both affect calves, and result from lack of vitamin A, either in the diet of the cow before calving or in the diet of the calf itself immediately after birth.

The first malady is an overgrowth of spongy bone in the skull, especially around the eye-sockets. This closes the channel through which the optic nerve passes from the brain to the eye, pinching off the nerve and causing total blindness.

The other result of vitamin A lack is an increase in the pressure of the spinal fluid to as much as six times normal. This destroys the calf's ability to coordinate its muscle movements. If the affected animal is given vitamin A, its spinal fluid pressure slowly returns to normal and muscular control is restored.

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## AERONAUTICS

**"Package" and Power  
Give Jets High Speed**

► AN airplane's speed is due to the power you can put into the engine, plus the smallness of the "package" you can wrap that power up in, two aviation engineers explained.

Reinout P. Kroon, engineering manager of the Westinghouse Aviation Gas Turbine Division in Philadelphia, and Winston R. New, manager of the Laboratory, discussed the principles of jet propulsion as guests of Watson Davis, director of Science Service, on Adventures in Science heard over the Columbia network.

Jet engines are suitable for high speed because they are very small, light and simple for their power. That is one of the reasons for their terrific speed, the engineers stated. Smallness is essential to speed because it reduces the frontal or so-called "barndoor effect" you get in pushing a piston engine through the air at high speed.

"With modern jet engines, this saving in frontal area is so great that a single engine can give the power that it would take conventional engines with ten times the frontal area to produce," Mr. Kroon declared.

The other reason for the speed of a jet engine is the fact that the faster a jet-powered plane goes, the more power

its engine produces. That is why a jet engine has virtually no power limitations—its thrust power goes up constantly as the plane goes faster. A piston engine, on the other hand, produces relatively constant horsepower, no matter what its speed.

Five years from now, engines may be built powerful enough to drive airplanes at 1,400 miles per hour, the engineers predicted. That will leave it up to plane designers to plan an airplane that can hold the engine, they concluded.

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## GEOLOGY

**Glaciers' Autographs  
Are Collected by Briton**

► GLACIERS' autographs are being collected by a London scientist, Dr. G. Seligman of the British Glaciological Society. The procedure is very simple: he holds a sheet of paper against a smooth surface on the ice and rubs it with a soft pencil, bringing out the pattern of the ice crystals beneath.

He finds that the crystals are "surprisingly small," particularly where the ice is actively flowing. There also seems to be some relation between the crystal size and the steepness of the glacier bed.

Dr. Seligman invites persons who have glaciers available to cooperate with him in this new type of study.

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## PLANT PATHOLOGY

**Replanting of Elms To Be  
Tested in New England**

► WHETHER young elm trees can profitably be planted where the Dutch elm disease has destroyed their predecessors is to be tested in New Haven in a cooperative test that has been planned by the Connecticut Agricultural Experiment Station and the New Haven Park Department.

About 250 young trees will be set out. Part of them will be supplied with water containing a chemical, oxyquinoline benzoate, which is claimed to be effective against the disease-causing fungus. Several different groups will be treated with DDT sprays, on various schedules. One group will be left untreated, as controls. Full answers are not expected for several years.

Dutch elm disease, incidentally, is a misnomer. The elm-killing fungus did not originate in the Netherlands, and did not come to the United States from that country.

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**IN SCIENCE**

## PSYCHOLOGY

**Superstition in Pigeons  
Developed by Experiments**

► THE superstition that makes a card player get up and walk around the table to "change his luck," can be produced experimentally in pigeons. The "superstitious" birds were developed by Dr. B. F. Skinner, psychologist at Indiana University, Bloomington, Ind.

These birds go through all sorts of strange rituals even more elaborate than that of a baseball pitcher. One goes running wildly around his cage—always in the same direction. Another pokes his head into one of the upper corners of the cage. Another acts as if he were trying to toss something with his head. Two birds swing their heads and bodies in a sort of pendulum motion.

It was fairly easy, Dr. Skinner found, to teach the pigeons to trace their luck to such absurd gestures. All he had to do was to rig up a clock to give food to the birds at regular intervals, entirely regardless of what the bird is doing at the moment. The bird, who is ravenously hungry, tends to repeat rapidly whatever he was doing when the food arrived.

The trick in setting up the "superstitions" was just to set the clock to give food at frequent intervals. If a bird is swinging his head and gets a seed, and then he is given another seed after a few seconds, the chances are he will be swinging his head when the second one arrives. Like the card player, who interprets this as a "run of luck," the bird learns to repeat his gesture.

If the clock were set slower, however, there would be less "superstition" because the chances would be greater that the bird would be in a different part of the cage doing something altogether different when the second seed came.

Fifteen seconds, it was found, is an effective timing for producing superstitions; one minute is too long. Once the superstition is set up, however, the time can be lengthened. One bird was kept repeating this absurd gesture for many hours with a one-minute interval between rewards.

Dr. Skinner describes his superstitious pigeons in the *Journal of Experimental Psychology* (April).

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# E FIELDS

## BIOCHEMISTRY

### Penicillin Makes Germs Prisoners, Study Shows

► WHY sodium penicillin is so deadly to germs has been discovered by Prof. Ernst A. Hauser, of the Massachusetts Institute of Technology, Cambridge, Mass.

Contrary to former opinion, sodium penicillin when dissolved in water does not form a true solution but a colloidal solution, a sort of finely divided jelly. Penicillin dissolves in the blood stream and coats the germs with an impenetrable layer of colloid. Trapped in this jelly, the germs find themselves prisoners, unable to move, to forage for food, to multiply.

In a study of the chemical behavior of this very important drug, Prof. Hauser and his co-workers found that sodium penicillin markedly reduces surface tension, that is, it acts in the same way as a soap.

Looking at the solution through an ultramicroscope, they noticed that the more potent the drug was in action, the more finely divided it appeared. When this test is applied to determine the potency of penicillin, it will be possible to give patients smaller but more effective doses.

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## BOTANY

### Mushroom Soup Prepared From Asparagus or Pears

► MUSHROOM soups, and other mushroom-flavored gourmets' delights, can be produced without having the actual mushrooms, out of the supporting thread mass, or mycelium, of mushrooms grown in a liquid medium made of such cannery wastes as asparagus butt juice or press juice from pear waste, supplemented with certain mineral salts.

This suggestion for the possible utilization of cannery wastes, which makes it possible to dispense with the increasingly scarce horse manure that has long been the mushroom-grower's standby, is offered in *Science* (April 9) by Dr. Harry Humfeld of the U. S. Department of Agriculture, who carried out his experiments at the Western Regional Research Laboratory in Albany, Calif.

He inoculated the cannery-waste nutrient media with mushroom threads obtained from a commercial mushroom grower, and let them grow until a sufficiently massive matted clump had developed. He got rid of the culture fluid by centrifuging and washing, then froze and dried the mycelium. He found the flavor satisfactorily "mushroomish", so that the material was suitable for soups, gravies and similar purposes, though of course not for dishes requiring mushroom caps or buttons. Chemical analysis showed a close similarity to ordinary market mushrooms.

One beauty of the new technique is the rapidity with which new growth can be obtained, once a sufficient mass of mycelium has been built up. Half the growth can be harvested, and in 12 hours the same quantity can again be removed, and so on indefinitely so long as fresh nutrient juice is supplied.

Dr. Humfeld also suggests that this technique might be employed for the culturing of other kinds of higher fungi, useful in the production of commercial solvents, antibiotics and other substances.

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## ANTHROPOLOGY

### African Man-Like Ape May Have Been Ape-Like Man

► THE man-like ape of South Africa, Plesianthropus, may have been an ape-like man instead. Such is the indication of some recent research into his brain size made by his discoverer, Dr. Robert Broom of the Transvaal Museum, along with Dr. J. T. Robinson.

Restorations of the brains to fit the cavities of the several skulls that have thus far been discovered give volumes ranging from as low as 400 cubic centimeters in females to as high as 700, or possibly even 750, in the largest male skull.

Modern gorillas, which are much larger animals than was Plesianthropus, have 500-cubic-centimeter brains, while the cranial content of a modern man's skull is 1500 cubic centimeters or more.

Writes Dr. Broom, in a letter to the editor of *Nature* (March 20): "We know that Plesianthropus had a pelvis that was essentially human, and we can be sure that it walked on its hind feet and used its hands for the manipulation of tools and weapons. If some of the males had brains of perhaps 750 cubic centimeters, we can say with confidence that, if Plesianthropus was not quite human, it was nearly human."

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## ENGINEERING

### Diesel Research Equipment From Germany to Serve Us

► COMPLETE equipment of a former German diesel engine research laboratory, one of the world's largest and best at the beginning of the war, will soon be in use at the Oklahoma Agricultural and Mechanical College, Stillwater, Okla.

This equipment, valued at over \$1,000,000, will be used in the newly established Oklahoma Institute of Technology, formerly the division of engineering of the institution. This state college will have over \$100,000 annually to conduct diesel research and instruction, and this equipment will make it the second largest diesel research center in the United States.

The equipment is a gift from the federal government to the college. It was formerly in the Klockner-Humboldt-Deutz Diesel Engine Research Laboratory at Oberursel, Germany. The Supreme Headquarters Allied Expeditionary Forces sent it to the United States to prevent it falling into the hands of any unfriendly nation and as a means of advancing diesel research in this country.

The complete laboratory consists of three units: an engine testing laboratory for engines of from one to eight cylinders, a materials testing unit, and a fuel injection laboratory.

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## INVENTION

### Arc Process Cuts Holes in Wire-Drawing Diamond Dies

► TINY diamonds have minute holes bored through them more rapidly and cleanly by a newly patented arc process for making dies used in the drawing of super-fine wires. Hitherto the drilling has been accomplished by mechanical means alone, using fine steel needles, with diamond dust as the abrasive. In the new method, this kind of drilling is still used, but in addition a current is fed through the needle, with the diamond embedded in its metal dop to complete the circuit. The minute resulting arc greatly speeds the several steps of the drilling.

Rights in U. S. patent 2,438,941, issued on this invention, are assigned royalty-free to the government by the five-man team of inventors: C. G. Peters, F. K. Harris, W. B. Emerson, I. L. Cooter and K. F. Nefflen.

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