



**RARE FIND**—Farm pond in southern Ohio yields more than 20 bullfrogs each having from three to eight legs. No explanation is yet available, although the phenomenon is believed to be a natural one since a radioactivity check gave negative results.

## BIOLOGY

## Many-Legged Frogs

➤ MORE THAN 20 bullfrogs each with from three to eight legs have been found in a farm pond in southern Ohio.

This rare natural-occurring phenomenon was reported by Dr. R. A. Hefner, professor of zoology at Miami University, Oxford, Ohio.

Multiple limbs have been induced on frogs artificially, but wholesale duplication of appendages in the natural state remains unique. The many-legged frogs of Ohio vary in abnormality from one extra hind leg below the knee to as many as six hind legs on a single animal.

No explanation for the abnormality occurring in such large numbers has been given. It is thought that the frogs are from a single clutch of eggs deposited in the farm pond by a lone female.

The frogs were identified as bullfrogs, *Rana catesbeiana*.

Because there is work in atomic energy research being done in the area, the Miami University scientists checked the mud and waters of the pond for radioactivity with negative results.

It is known that a tadpole whose limb bud has been nipped by a fish can grow another appendage before it reaches the frog stage of its development, thereby having more than the normal number of limbs.

The frogs were located by Alan Linn, a zoology student at Miami University. At

the present time, the Ohio zoologists are studying the muscle control and nerve supply provided by these frogs to the extra appendages.

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## CHEMISTRY

## Gas at \$1,440 Gallon For Anti-Knock Research

➤ THE MOST expensive gasoline in the world is being manufactured in connection with discovering the behavior of fuel in internal combustion engines.

Approximately \$1,400 per gallon is the average cost of a total volume of 422 gallons of 296 pure hydrocarbons produced, purified and examined during an American Petroleum Institute study.

Dr. Cecil E. Boord of Ohio State University and Dr. Wheeler G. Lovell of the Ethyl Corp., Detroit, reported progress on making the pure gasoline components and determining their knocking components in test engines to the American Petroleum Institute meeting in Chicago.

They found that for noncyclic paraffins and olefins the presence of a methylene group,  $\text{CH}_2$ , has a deleterious influence on the hydrocarbon's knock resistance.

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## PHYSICS

## Early Greek Athletes Used Jet Principle

➤ STONE WEIGHTS were used by sixth century B.C. athletes in an application of a principle of physics that plays today an important role in jet propulsion.

Greek broad jumpers held a weight, or "halter," in each hand behind their backs. When they started their jump, they swung the weights forward so that their legs and arms were almost parallel when in mid-air. Just before landing, the weights were swung back again. This caused the jumper's legs to shoot forward, thereby lengthening the distance of the leap.

The physical principle, conservation of momentum, as applied to early sports, is discussed in the *American Journal of Physics* (Oct.) by Prof. E. C. Watson of the California Institute of Technology.

An early sportswriter by the name of Aristotle, commented on this by writing: "That is why athletes jump farther with weights in their hands than without."

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## ASTRONOMY

## Stars 200,000 Times Sun's Brightness Found

➤ "CONSTELLATIONS" OF blue stars in the Large Cloud of Magellan, the nearest galaxy to our own Milky Way system of stars and nebulae, contain a few supergiant stars more than 200,000 times as bright as our sun.

This is a "remarkable" situation, Drs. Harlow Shapley and Virginia McKibben Nail of Harvard University, Cambridge, Mass., reported to the National Academy of Sciences meeting at Columbia University. It means that just one of these extremely luminous blue stars sends out more energy than is emitted "by all the tens of thousands of giant and average stars in the average globular star cluster."

Drs. Shapley and Nail also reported that they have discovered that many of the supergiant stars are "reddish, variable and in radiation exceed the sun 50,000 times."

The Magellanic constellations in which the very hot blue stars are found are each composed of a score of supergiant stars similar to those in the well-known winter constellation of Orion, the giant hunter.

An unexpected result of the astronomers' Magellanic Cloud survey was the discovery that the variable stars known as cepheids in the west end of the Large Cloud's stellar axis are larger, brighter and have a longer period than those in the center or at the east end of the axis.

As photographic and radio telescope techniques for studying this nearby galaxy are improved, Drs. Shapley and Nail predicted that astronomers will "unravel both the form and the inner turbulences of this important galaxy."

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