

AERONAUTICS

CAA Checks Airway Aids at 40,000 Feet

► TO CHECK the accuracy of airway aids that keep pilots on course at 20,000 to 40,000 feet, the Civil Aeronautics Administration is using two B-57 jets on loan from the Air Force.

Studies from the 525-mile-per-hour "platform" will show, for the first time at these altitudes, exactly how good are the instruments on which routine flights of the future will depend.

Previously, the CAA had no planes able to fly at 40,000 feet and reports from the military were random. Now, with elaborate electronic equipment, automatic recorders, computers and other apparatus, the two-man crews of the jets return from a flight around a range station or marker beacon with information on its effectiveness recorded on paper for analysis and study.

One basic problem was to pinpoint the plane's position in space at 40,000 feet, then from there measure many signals and information transmitted from the ground. Using present equipment, this position can be pinpointed with an accuracy of 500 feet, even when flying at 525 miles an hour.

Science News Letter, August 17, 1957

AGRICULTURE

New Nitrogen-Fixing Bacterium Discovered

► A NEW TYPE of nitrogen-fixing bacterium has been discovered, two Indian scientists report in *Nature* (Aug. 3).

A. B. Roy and M. K. Mukherjee of the Jute Agricultural Research Institute in Barrackpore, West Bengal, described the microscopic organism, found while investigating soils cropped with jute, as showing "certain morphological and physiological differences" from related forms of free-living nitrogen-fixing bacteria.

These bacteria are of very great importance since by their activity the fertility of the soil is built up naturally without any attention from man. They are able to "fix," or make available to plant life, the free nitrogen found in the air.

The new organism apparently does not use inorganic nitrogen as an energy source since, the scientists report, practically no growth is obtained with compounds such as ammonium or nitrates. The bacterium, which is at first bead-shaped, gradually becoming rod-shaped, can grow in a low acid medium, and the cells were found to contain fat.

Nitrogen-fixing bacteria are particularly important for growing alfalfa, clover and other legumes. They enter the roots of these plants and, once inside the plant cells, the bacteria take in free nitrogen from the air and change it into complex nitrogen compounds. These compounds are either used directly by the plant or returned to the soil. The presence of abundant numbers of nitrogen-fixing bacteria can thus mean the difference between profit and loss for many crops.

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ASTRONOMY

Naked-Eye Comet Visible

The second comet to be visible this year without the aid of a telescope or binoculars can now be seen in the northern sky shortly after sunset.

► A NEW COMET, expected to be named Mrkos after its discoverer, is the second naked-eye comet visible this year. Comets bright enough to be easily visible without binoculars are rare, and three in one year is most unusual. The present one rivals Comet Arend-Roland, visible last April. (See SNL, April 6, p. 212.)

The third, Comet Encke, is scheduled to be just barely visible to the naked eye in October. (See SNL, Aug. 10, p. 94.)

Comet Mrkos can be seen by facing north and finding the North Star, shifting your gaze to the left and then down close to the horizon.

Its magnitude was 2.5, approximately the same as the brightest stars in the Big Dipper, when it was spotted on Aug. 2. It will be best seen about an hour or so after sunset.

Comet Mrkos appears to be a typical "well-behaved" comet, Dr. William Liller of the University of Michigan Observatory told SCIENCE SERVICE. He said its head was quite sharp and clearly defined, the tail slightly curving and clean-cut.

There is no sign of the strange sunward tail that marked the April naked-eye comet, Comet Arend-Roland. That comet, too faint

now to be seen without a very large telescope, is now in the bowl of the Big Dipper.

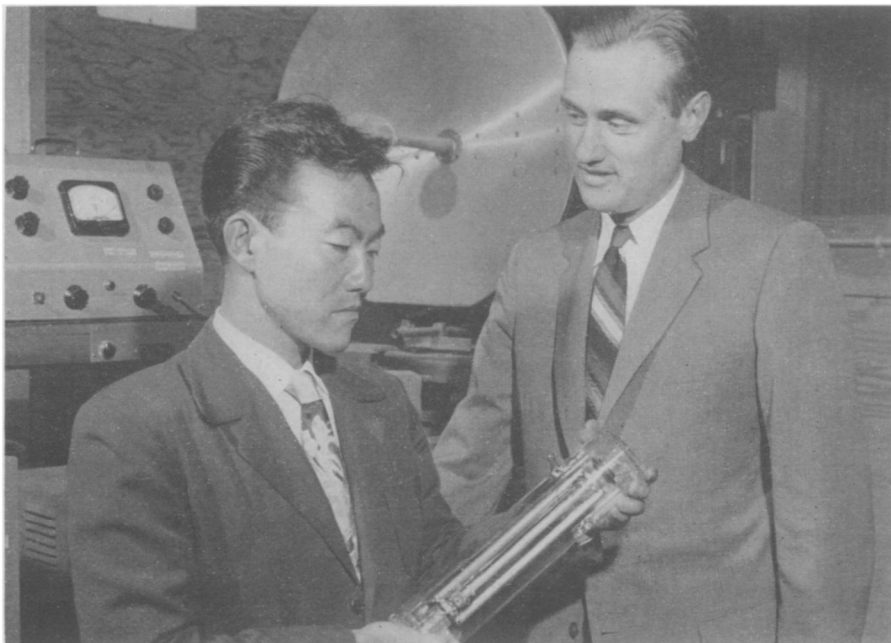
The new Comet Mrkos also appears to be heading toward the Big Dipper's bowl, but its exact orbit is not yet known. A preliminary study of the orbit indicates the comet will be 15 or 20 degrees south of the bowl by Aug. 20.

Comet Mrkos was discovered by Antonin Mrkos of the Skelnate-Pleso Observatory in Czechoslovakia. News of his find was cabled by Copenhagen Observatory to Harvard College Observatory, clearing house for astronomical information in the Western Hemisphere. Since then, astronomers both here and abroad have trained their telescopes on it.

The tail of Comet Mrkos covers about two degrees of the sky, the equivalent of four moons.

Comets are thought to be cosmic icebergs flying through space. The comet's most spectacular part, its tail, is a diffuse misty halo forced in a direction away from the sun by solar radiation. Most of its mass, which is not much, is loosely bound together in the nucleus.

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HELITRON—Instantaneous radar tuning over what is described as a "prodigious range of microwave radio frequencies" can be accomplished with a new electronic tube called the helitron. Invented by Prof. Dean A. Watkins, right, of Stanford University's Electron Tube Laboratory, the device is essentially a major improvement of the backward-wave oscillator. Research assistant George Wada holds the slim, foot-long glass vacuum tube. It can be designed to operate from 200 to 10,000 megacycles.