

## GEOPHYSICS

# Man-Made "Whistlers"

"Whistlers," audible radio waves produced by lightning, have been produced artificially, thus preparing the way for the creation of new radio channels.

► AN ENTIRELY NEW method of radio communication over long distances has been proved possible, two scientists reported.

The man-made radio energy in the very low frequency range travels from one hemisphere to another along invisible tubes of force in the earth's atmosphere. The artificial signals were imitations of the audible radio waves generated by lightning and known as "whistlers," so called because they sound like a whistle falling steadily in pitch.

An antenna hooked to an amplifier is sufficient equipment to tune in on these semi-musical sounds. Whether natural or man-made, whistlers heard at any point have traveled from the opposite hemisphere along the earth's magnetic lines of force, reaching at least 8,000 miles into space during their journey.

The first controlled tests showing how whistlers travel has been reported by Drs. R. A. Helliwell and E. Gehrels of Stanford University's Radio Propagation Laboratory, Stanford, Calif. The signals at 15.5 kilocycles were sent from Annapolis, Md., to Cape Horn, Chile, along the "magneto-ionic duct," they told a joint meeting of the International Scientific Radio Union and

the Institute of Radio Engineers in Washington.

The two points, about 6,000 miles apart, are at opposite ends of one of the invisible lines of force in the earth's magnetic field.

The study supports the theory of whistlers first proposed by Dr. L. R. O. Storey, an English radio engineer. (See SNL, March 5, 1955, p. 148.)

Proof of the theory also provides a new method of studying the very tenuous regions of the earth's outer atmosphere. To produce the gradual bending of the radio waves as they follow the earth's magnetic field, Dr. Storey's theory requires at least 400 free electrons per cubic centimeter of space along the path.

Scientists have not previously been able to demonstrate that this concentration actually exists as far as 8,000 miles in space above the earth's surface. The descending pitch of whistlers is caused by slower transit of lower frequency waves as they follow the magneto-ionic duct, making them gradually lag behind the faster moving higher pitched waves.

The National Science Foundation and the Office of Naval Research supported the research, in which the Chilean Committee for the International Geophysical Year cooperated.

Science News Letter, June 8, 1957

## ORNITHOLOGY

## Two Chicks Born To Whooping Cranes

See Front Cover

► TWO MORE whooping cranes have been added to the bare handful of these rare birds that are alive today. The successful incubation and hatching of the two eggs at the Audubon Park Zoo in New Orleans has aroused the interest of millions of bird-loving Americans and of scientists alike.

The picture shown on the cover of this week's SCIENCE NEWS LETTER was taken for SCIENCE SERVICE with the help of George Douglass, superintendent of the Zoo. The chicks, which are only a few days old here, are in the right foreground.

Both Mr. Douglass and George Scott, consulting aviculturist of the New York Zoological Society and Fish and Wildlife Service collaborator for the hatching "project" received the congratulations of Assistant Secretary of the Interior Ross L. Leffler. The prospect of maintaining at least some members of the vanishing species of cranes is now much more hopeful.

Science News Letter, June 8, 1957

## TECHNOLOGY

## Dust Speck Could Alter Guided Missile's Course

► GUIDING missiles and airplanes through the sky using the latest navigational system, inertial guidance, requires quite a bit of ground guidance on the manufacturing line, the Sperry Gyroscope Company has revealed. (See SNL, April 27, p. 259.)

Confirming reports that components for the inertial guidance system developed at Massachusetts Institute of Technology are now beyond the prototype stage, Sperry scientists gave a glimpse into the sterile and paperless rooms in which the parts of the new system are made.

In glass-enclosed areas, they reported, workers perform measurements with a three-ton instrument whose dial would be spun out of its working scale if a gnat landed on the device.

In other sealed rooms at Lake Success, N. Y., workers are clad in special nylon gowns, caps and boots to prevent dust or lint from reaching the ultra-sensitive elements of the gyros and "accelerometers" which are put together under microscopes.

A speck of dandruff, it has been found, on a critical bearing might cause an error of several miles at the end of a 5,000-mile inertially-guided voyage or flight.

Science News Letter, June 8, 1957



**SUPER-CLEAN**—This is not a photograph of a modern hospital laboratory! Skilled technicians, specially gowned, are shown at work at the Sperry Gyroscope Co. plant under conditions more tightly controlled than in a hospital. The extreme accuracy required in the manufacture of gyro "platforms" means the utmost care must be taken in eliminating dust and other possible contaminants.