

RADIO ASTRONOMY

Jupiter's Radio Signals

Studies of two kinds of radio waves coming from five distinct sources on the surface of Jupiter have established the existence of an ionosphere in the planet's atmosphere.

► RADIO SIGNALS broadcast by the planet Jupiter have 100,000 times the power of a strong lightning discharge on earth.

The source of these tremendous energies, however, is still a mystery, Roger M. Gallet of the National Bureau of Standards Radio Propagation Laboratories, Boulder, Colo., said. The radio waves come from five distinct sources believed to be permanently located on the planet's solid surface.

Using telescopes, astronomers are limited to observations of the top of Jupiter's cloud atmosphere. Since radio waves penetrate the atmosphere, Mr. Gallet used the five sources to determine the rotation period of the solid body as nine hours, 55 minutes and 30 seconds.

Although some observers of Jupiter's radio signals have suggested they originate in mighty thunderstorms on the planet, Mr. Gallet's studies rule out this possibility. He found two kinds of radio pulses being broadcast by Jupiter, long and short.

The long pulses average two seconds in duration and generate 100,000 times more energy than the total energy of strong lightning on earth. The short pulses, discovered a year ago at the Boulder Laboratories, last only about three-hundredths of a second and seem to be much more in-

frequent than the long signals. (See SNL, April 16, 1955, p. 243.)

The equipment used to detect Jupiter's radio signals was designed by Dr. Kenneth L. Bowles, also of the Boulder Laboratories, Mr. Gallet told a joint meeting of the International Scientific Radio Union and the Institute of Radio Engineers in Washington.

Mr. Gallet believes the long and short pulses must each have very different mechanisms for emission. He suggests they may have a shock wave origin.

"Perhaps they come from geyser-like phenomena or some sort of volcanic activity, although completely different from any such activity we know on earth, because the material constituting Jupiter is very different from that of earth," he said.

The clouds on Jupiter are thought to resemble cirrus clouds on earth, but with ice crystals made of ammonia, not water. Optical astronomers have found markings on the top of Jupiter's cloud atmosphere vary in rotation time at different latitudes, the equatorial band turning in five minutes less than the rest of the atmosphere.

Mr. Gallet's studies proved the existence of an ionosphere, or radio-reflecting layer, in Jupiter's atmosphere.

Science News Letter, June 8, 1957

ENTOMOLOGY

Study Insects-in-Amber

► INSECTS have not changed much in the last 30,000,000 years, if the fossil record of Mexico is a good yardstick.

University of California scientists are now studying insects that became embedded in amber some 30,000,000 years ago in Chiapas, the southernmost state of Mexico. The insects—some 75 species have been identified—are perfectly preserved.

So far the studies have not shown any major evolutionary changes in these insects over the last 30,000,000 years. Although some species are different from their modern counterparts, all show a close relationship to present day insects.

Representatives from most of the modern orders of insects were found in the amber collected last year by the California scientists.

The most commonly encountered forms are tiny flies and minute parasitic wasps, which is to be expected since these are the insects most likely to be trapped after coming into contact with the sticky tree gums that form amber.

Some of the forms found in Mexican amber no longer occur in that area. From

this fact and from a familiarity with the habits of these groups of insects, it is possible to gain better knowledge of the climate and vegetation of 30,000,000 years ago, the scientists assert.

One of the more interesting finds among the insects, they said, is the stingless bee. These have been found before in amber only in Sicily in the Mediterranean, which is more recent than the Mexican amber. The older Chiapas stingless bees are especially significant since some experts believe the modern honey bees arose from the stingless bee group through an intermediate form.

Amber is formed from the resins exuded by many trees. The resins collect on a tree, it eventually dies, falls to the ground and decays. The resin turns up as amber in soil deposits.

The amber-collecting expedition was conducted by Dr. J. Wyatt Durham, professor of paleontology, and Dr. Paul D. Hurd, lecturer in entomology. Dr. Ray F. Smith, associate professor of entomology, has participated in the insect specimens' analysis.

Science News Letter, June 8, 1957



DIGITAL COMPUTER—J. A. Githens and J. A. Baird of Bell Telephone Laboratories check the control panel of Leprechaun, a new high-speed digital computer. Described by Bell Laboratories as an "extremely flexible electronic computer," the Leprechaun is still in the experimental stage.

TECHNOLOGY

Build TV-Size Electronic "Brain"

► AN ELECTRONIC "brain" about the size of a home television set and requiring less power to operate has been built at Bell Telephone Laboratories.

It is named "Leprechaun," after the tricky sprite of Irish folklore. Compared with previous computers, it operates with many less parts. Of Leprechaun's 9,000 electrical components, more than half are transistors, tiny electronic devices replacing vacuum tubes for many uses.

One feature of the computer is its transistor-driven "random-access magnetic core memory." The machine can take its instructions immediately from its memory, no matter where the instruction may be stored.

The high-speed digital computer was developed under Air Force contract. It can store 1,024 "words" in its memory, each "word" consisting of 18 binary or dual digits. In these digital computers, all information is translated into a special code using only combinations of zero and one.

Science News Letter, June 8, 1957

● RADIO

Saturday, June 15, 1957, 1:45-2:00 p.m., EDT "Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. E. J. Wellhausen, director, and Dr. R. W. Richardson, assistant director, Mexican Agricultural Program of the Rockefeller Foundation, will discuss "Food for Mexico."