RADIO

Messages Sent Via Moon

THE MOON will be used during periods of severe sun disturbances to relay radio messages for the Navy from Hawaii to the U.S. Naval Radio Station in Cheltenham, Md.

By sending ultra-high-frequency radio waves on a 480,000-mile round-trip to the moon, teletype messages and pictures reproduced by facsimile equipment can be transmitted when conventional radio communications are disrupted.

The value of the moon relay system was confirmed last November when a particularly bad disturbance in the earth's ionosphere blocked normal long-distance radio transmission. The Navy used its experimental set-up to get messages through.

About 100,000 watts of power are pumped from the radio transmitters into steerable antennas. The 84-foot dish antennas concentrate this power into a beam having an effective power of 400,000,000 watts.

It takes about two and a half seconds for a signal from Hawaii to reach Cheltenham. Radio frequencies of 435 to 445 megacycles per second are used.

A drawback of the system is that both points must be able to view the moon at the same time. The moon thus can be used as a relay only once a day in a time band of three to 12 hours, depending upon the moon's orbital position with respect to the earth.

In wartime, it is believed the moon relay could offer a way of minimizing radio jamming opportunities available to the enemy. To jam a moon-relayed transmission, the enemy would have to be able to see the moon at the time when the message was being sent.

The $5,500,000 system has separate transmitter and receiver installations at each terminal. Transmitters are at Annapolis, Md., and Opana, Oahu. Receivers are located at Cheltenham and at Wahiawa, Oahu.

Research into transmitting voice messages is scheduled but on lower priority to facsimile and teletypewriter transmission. The moon relay system will be used operationally "at discretion" when the circuit is not being used for research, the Navy said.

Science News Letter, February 13, 1960

ASTRONOMY

Radar to Sun and Back

A RADAR SIGNAL has been sent with the speed of light from earth to the sun and back, marking man's first direct contact with the sun.

The signal took 17 minutes to make the round trip to the star that is the center of the solar system, scientists at Stanford University's Radioscience Laboratory report in *Science* (**131,** 329, Feb. 5, 1960).

Drs. Von R. Eshleman and Philip B. Gallagher and Lt. Col. Robert C. Barthle of the Army Signal Corps, who is doing graduate work at Stanford, report the sun was very difficult to reach by radar because of the "thunderous radio noise arising from its turbulent surface," as well as its great distance, about 93,000,000 miles.

The solar radar echo did not come from the sun's visible surface, but from its outer corona, the pearly white upper atmosphere of the sun usually visible only at time of an eclipse.

The Stanford solar contacts were recorded on magnetic tape at daybreak, April 7, 10, and 12, 1959. Scientists have spent the intervening months analyzing the tapes, which contain nothing but unintelligible crashing sounds to the human ear, with the aid of an electronic computer.

The transmitter is a standard model, about the same as those for major commercial shortwave radio stations. The low frequency signal for radar of 25.6 megacycles was chosen to minimize signal absorption by the sun's corona.

The scientists hope to use radar techniques to learn more about solar flares and similar violent eruptions on the sun that hurl streams of particles into space. Some of these particles trapped in the earth's magnetic field are thought to form the radiation belts expected to be a threat to manned space travel.

Science News Letter, February 13, 1960

EDUCATION

New Trends in Plans Of Teen-Aged Scientists

SIGNIFICANT new trends are indicated by the future professional plans of the year's most promising teen-aged scientists, with more than one-fifth of them looking forward to careers in physics and nearly three times as many boys as girls choosing science teaching.

Information released by SCIENCE SERVICE shows that 21% of the 448 outstanding high school seniors recently announced as members of the Honors Group of the 19 Science Talent Search hope to make contributions to modern physics.

Professional educators and scientists, as well as parents, may be cheered to learn that the 10% planning to teach science to the next generation include 32 boys and 13 girls.

Almost as many girls as boys are looking forward to careers in medical research and practice, with 29 boys and 22 girls making up the 11% choosing medicine.

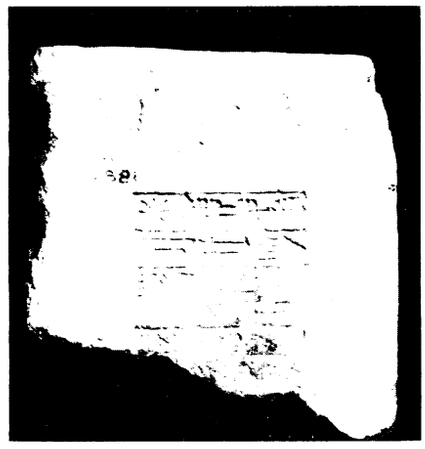
Other scientific disciplines chosen by the Science Talent Search Honors Group include special fields of engineering, 12%; chemistry, 9%; and mathematics and general research, 7% each.

Others of the group want to explore the biological sciences, electronics, biochemistry, rockets, psychology, astronomy, biophysics, dental science, geology, meteorology and geophysics.

The reasons these young persons give for their professional goals include the desire to make a contribution to human knowledge and progress, the appeal of unexplored possibilities, and the great personal satisfaction experienced in independent research.

The annual Science Talent Search is conducted by Science Clubs of America, an activity of Science Service, and is supported by the Westinghouse Educational Foundation.

Science News Letter, February 13, 1960



5,000-YEAR-OLD BRICK—This clay brick dates from the third dynasty, ruling 3,000 years ago in Ur of Chaldea. Presented to the American Institute of Architects by the Structural Clay Products Institute in Washington, D. C., it will be on permanent exhibit.

TECHNOLOGY

Ring Takes the Shake From Airplane "Skin"

AN ALUMINUM ring and a magnet can take 97% of the shake out of a metallic panel of airplane "skin" and thus reduce metal failure due to vibration fatigue.

Lloyd B. Cherry of Lamar State College of Technology, Beaumont, Texas, told the American Institute of Electrical Engineers meeting in New York that the aluminum ring is fastened to the inside of the skin panel to be protected. A permanent magnet, placed so its magnetic field engulfs the ring, is attached to the airplane frame.

When the skin vibrates, the aluminum ring moves back and forth in the magnet's field. This causes an electric current to flow in the ring, producing a second magnetic field. The new magnetic field reacts with the field of the magnet to restrain the aluminum ring from vibrating.

Science News Letter, February 13, 1960