

Radio Propagation Studies

Special airborne measuring equipment, including four high-frequency radio transmitters installed in a PBY-5A aircraft, is being used by the atmospheric studies division of the U. S. Navy Electronics Laboratory, San Diego, California, in over-water studies of ultra-high-frequency radio waves. Conducted 250 miles at sea off the California coast, these experiments are directed by Dr. E. W. Thatcher, head of the research department at the Navy laboratory, and are under the immediate supervision of Dr. J. B. Smyth.

In an effort to chart the effects of weather conditions on radio transmission, signals from the airborne transmitters are received by specially calibrated receivers mounted on the shore line of Point Loma at heights ranging from 100 to 450 feet. These tests, conducted at various transmitting altitudes, are similar to experiments conducted last summer by the Navy Electronics Laboratory scientists in the Arizona desert.

Results thus far obtained indicate that weather conditions play a large part in the transmission of very-high-frequency signals, altering both their strength and the distances over which they can be transmitted. Because of the nonuniformity of the lower atmosphere, the high- and very-high-frequency radio waves do not follow a line-of-sight path. Instead, they tend to travel through ducts created by the presence of alternately hot and cold or dry and moist layers in the atmosphere. Since these layers bend, so too do the radio waves.

Direct application of the results of these experiments to commercial radio broadcasting and television is seen by Navy scientists.

Reading Errors

A large proportion of airplane accidents might be avoided by redesigning the plane's instrument panel, according to studies made by psychologists and engineers of the Air Materiel Command. Their reports (now available from the Office of Technical Services, Department of Commerce) explain how aircraft instrument reading errors can be classified into nine different categories, each representing a different type of psychological difficulty. Accounts of errors were obtained through recorded interviews with pilots and their written reports. The two most common types of errors were reversal errors, in which the reading of an instrument such as the artificial horizon was reversed with the result that subsequent action aggravated rather than corrected the original error, and errors in interpreting multi-revolution instruments such as the altimeter. Substitution errors were also frequent, in which the pilot mistook one instrument for another, or confused the engines referred to by a point on a dual-indicating instrument, or had difficulty in locating an instrument because of the unfamiliar arrangement of instruments on the panel.

Anacom

A calculating machine based on a new approach to mathematics has been designed to solve problems in elec-

trical circuits, machinery, applied mechanics, hydraulics, and heat flow, according to an announcement from the Westinghouse Electric Corporation. The new analyzer, called the Anacom, uses an array of capacitors, resistors, and inductance coils to act as an electrical analogue of the actual machine it seeks to analyze. Forces (such as short circuits, impacts, etc.) applied to a real machine are represented by electrical currents or voltages that can be applied to the synthetic machine set up on the computer at the same places where the actual forces occur. The resulting voltages representing stress, motions, and the like, can be measured accurately at any point by connecting the leads of a cathode-ray oscilloscope to the analogous parts of the synthetic machine.

Electroplating Magnesium

The Dow Chemical Company announces a new process for depositing a thin film of zinc on magnesium, thus permitting the electroplating of magnesium by essentially standard techniques for the first time. Excellent adhesion, wear, and resistance to accelerated corrosion have been claimed. Parts have been hammered and severely rubbed without lifting the deposit, and the finish has withstood heat, humidity, and salt-spray tests satisfactorily. Applications for the new plating process are expected to include automotive and building hardware, optical equipment, and sporting goods. Magnesium engraving plates are being chrome plated experimentally and are being found to exhibit increased wear resistance.

Summer Sessions

A Symposium on Theoretical and Nuclear Physics, extending from June 28 to August 11, has been announced at the University of Michigan. Visiting lecturers include: H. B. G. Casimir, Philips Research Laboratory, Eindhoven, who will present "Theoretical Aspects of Low Temperature Physics"; Julian Schwinger, Harvard University, whose topic will be "Recent Developments in Quantum Electrodynamics"; E. M. McMillan, University of California, "Recent Experiments in High Energy Physics"; and Martin Deutsch, Massachusetts Institute of Technology, "Selected Topics in Nuclear Spectroscopy." There will be no fees for visitors holding the doctoral degree. Further information can be obtained from: Department of Physics, University of Michigan, Ann Arbor, Michigan.

A series of three one-month courses will be held at Oak Ridge this summer in the techniques of using radioisotopes, the courses to be conducted by the Oak Ridge Institute of Nuclear Studies from June 28 to July 23, August 2 to 27, and August 30 to September 24. The courses will not attempt to cover any special field of application in chemistry or biology but will be based on simple chemical experiments selected and designed to give participants a maximum knowledge and ability in the techniques of handling radioisotopes. Application forms and additional information may be obtained from: Dr. Ralph T. Overman, Acting Head, Department of Special Training, Oak Ridge Institute of Nuclear Studies, P. O. Box 117, Oak Ridge, Tennessee.