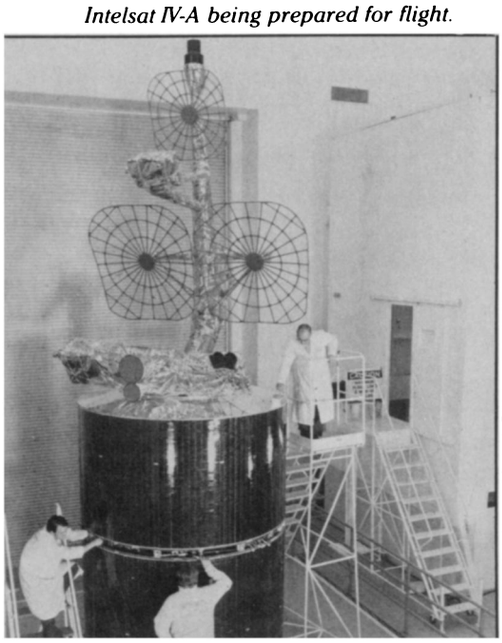
tiny fraction of people in treatment and in the general population," report Ralph Hingson, Norman Scotch and Eli Goldman of the Boston University School of Medicine in the JOURNAL OF STUDIES ON ALCOHOL (Vol. 38, No. 11). Of the persons interviewed, only four said they had suffered a relapse, and acknowledged the Rand findings as an influence only when asked about it. "In only one instance," say the BU researchers, "did the report appear to play a primary role in the decision about drinking." □

Intelsat replacement launched

The first Intelsat IV-A communications satellite to be stationed over the Indian Ocean was launched successfully on Jan. 6, replacing an identical satellite that was destroyed when its Atlas-Centaur rocket blew up seconds after launch on Sept. 29. The newcomer will be stationed at 63°E to serve the Indian Ocean region, which, according to the International Telecommunications Satellite Organization, is the world's most rapidly growing area in the use of satellite communications, with a 20 percent increase in circuit use between December 1976 and December 1977.

Following last September's explosion (SN: 10/8/77, p. 228), NASA investigators examined telemetry signals as well as spent rocket hardware recovered from the Atlantic Ocean floor, in working out the scenario of the mishap. Apparently, they have concluded, a flexible coupling for the rocket was exposed to excess carbon during a brazing process, which rendered the coupling sensitive to corrosion along the grain boundaries in its otherwise stainless steel. Delay in using the coupling allowed two years' exposure to Florida's salt air, and the corroded device blew out in flight, letting propellant gases back to the engine compartment where they exploded. □

Intelsat IV-A being prepared for flight.



Hughes Aircraft Co.

Catch an imp and find a quark

The masses of subatomic particles are a property that theory has always had great difficulty explaining or predicting. Each known particle has a particular rest mass, but why the values for the different particles are what they are (and the meaning of the differences that exist) remain a subject for future elucidation.

Especially puzzling has been the mass or masses of the quarks, the elementary sub-particles out of which the overwhelming majority of particles are supposed to be built. Theorists generally agree that the quarks are very heavy, much heavier than any known particle in most estimates. But the criteria are elastic, and theory gives no way of exactly figuring out what the mass of a quark should be. The various figures that have been suggested depend on adding other considerations to the basic theory.

Until now, however, every particle has had a definite rest mass assigned even if it could be determined only by experiment. Now comes a suggestion that quarks may not. B. M. McCoy of the State University of New York at Stony Brook and T. T. Wu of the CERN laboratory in Geneva propose that quarks are indeterminate mass particles, or imps, objects with no well-defined rest mass. If the proposal is correct, it would be the first irruption of imps into reality.

Writing in CERN publication TH.2405, McCoy and Wu point out that the possible existence of imps is calculable from the usual principles of particle-physics theory, and state that they intend to take it seriously and to explore the consequences of quarks being imps. One of the first things to come up is an explanation of why all searches for free quarks have failed to find them. Imps have the property that their size increases rapidly with age. This means that very soon after quarks are produced they get too large to interact effectively with electrons and ionize atoms. In most quark searches detectors that depend on ionization have been used (bubble chambers, wire chambers, etc.), and the detectors have been placed at some distance from the place where the quarks were supposed to be made. This means, McCoy and Wu say, that by the time any quarks got to the detection chambers they had lost their powers of ionization, and were masquerading effectively as neutral particles, which make no impression in these chambers. Two ways quarks might be found if they are imps, are to use nuclear emulsions, a type of experiment in which the quarks would be made inside the emulsion and make small tracks in it while they are still capable of ionizing, or to use electric and magnetic fields to bring the quarks to a place where they can be distinguished from neutral particles and where their interactions or radioactive decays might be seen. □

Pacific weather study is model for future

The vast research effort known as GATE — the Atlantic Tropical Experiment of the Global Atmospheric Research Program — sent about 4,000 people from six dozen countries into the equatorial Atlantic in 1974 to learn how the tropics affect the world's weather systems. One lesson from the experience was that it is difficult, if not impossible, to generalize from even a huge Atlantic data bank to the rest of the planet, or even the rest of the tropics.

Since last November, U.S. researchers have been working to collect similar kinds of information about the warm portions of the Pacific, using aircraft, ships, buoys and bottom sounders in what is known as the Equatorial Shuttle Experiment. Even as the shuttle experiment winds up this month, its participants are already organizing its methodologies and results into guidelines for a larger, and this time international, effort to begin in the fall and last a full year.

The "shuttle" experiment is so called because its data-gathering resources are marshalled both north and south of the equator, but along a single meridian of longitude. This is in contrast to GATE, in which the observers covered a swath from 40°E to 90°W, spreading from 20° north of the equator to 20° below it. The shuttle teams cover the same 40° of latitude, but only along the 150°W meridian, with occasional checks at 158°W to be sure that the main store of data is a representative one.

Besides the National Oceanic and Atmospheric Administration, the study has involved the Office of Naval Research, the University of Hawaii and the Scripps Institution of Oceanography. Every third day, a NOAA WP-3D "flying laboratory" makes the 3,400-kilometer run from Honolulu to Papeete, Tahiti, sampling air conditions and dropping bathythermographs about every 15 minutes to record water temperatures at depth (ONR provided nearly 2,000 bathythermographs for the purpose). Nearly two dozen free-floating buoys have been deployed in the area, along with 10 others at fixed locations. Some of the fixed buoys are instrumented along their tethers to collect data from as many as 20 different depths, while others, current meters and pressure sensors from the University of Hawaii, are actually moored near the sea floor. Meanwhile, the university's research vessel, *Kana-Keoki*, sails the 150°W meridian to take "sea-truth" readings at the surface as calibrations for the tethered and air-dropped instruments. □