tion and others will fill the gap and satisfy the nation's future need for such highly trained manpower," according to the House Subcommittee on Space Science and Applications.

As a result, the Subcommittee recommended, and the full Committee endorsed, and added $10 million to NASA's request of $20 million for the program, together with an admonition by Subcommittee chairman Joseph E. Karth (D-Minn.) that NASA's reasons for the cutback offer "an illogical and totally unacceptable way to make policy."

The additional $10 million cannot be earmarked especially for Ph.D. training in the basic House appropriations bill, but the Committee hopes that Congress will state that the additional funds may not be reprogrammed or diverted to other purposes.

The manned spaceflight program has not been faring so well. The Committee chopped almost $47 million from the $3.4 billion authorization requested by NASA, with the biggest cut—$25 million—coming from Apollo.

It has also made $61 million worth of cuts in NASA's space science and advanced research budget requests. Biggest chunks were $15.9 million for physics and astronomy and $14.4 million for launch vehicle procurement.

Altogether, then, the space agency finds itself faced with a minimum of $108 million in cuts, plus the estimated $75 million cost of refurbishing the Apollo program, all in a plan that NASA head James Webb has (as usual) termed an "austerity budget." And there may be more hard times coming on Capitol Hill: the Senate has not got its licks in yet.

Milky Way: Old

Astronomers and other scientists assume that the Milky Way galaxy, and the universe at large, were initially composed of pure hydrogen, by far the most abundant element in the universe.

One point at issue has been how much of this hydrogen is in an atomic state, how much is molecular. Only the atomic form has so far been detected.

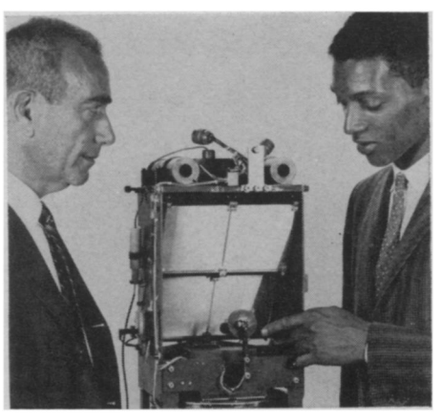
The molecular form is believed to be the one from which stars are born, but whether it was more, or less, abundant than the atomic was not known.

Now Naval Research Laboratory scientists have found that molecular hydrogen is only a minor constitutent of the interstellar gas from which stars condense "like clouds forming from coalescing raindrops," at least in the Milky Way.

This means that the galaxy to which earth belongs is an old-timer as galaxies go; that most of the star formation possible in the Milky Way must have already occurred.

Only in the extreme ultraviolet and from heights greater than 100 miles above the ground can the characteristic absorption line spectrum of molecular hydrogen be observed. In the NRL experiment, 14 stars were scanned with an image intensifier spectograph, carried aloft by an Aerobee rocket from White Sands, N. M., on March 16.

The spectrograph, designed by Dr. George R. Carruthers, detected the shortest ultraviolet radiations yet observed from distant stars. The instrument is 30 times faster than conventional photographic devices. The experiment was under the direction of Dr. Herbert Friedman (see p. 504).



Naval Research Laboratory

Drs. Friedman and Carruthers

For two of the stars, the observations extended well into the wavelength region—from 1,000 to 1,150 angstroms—where the absorption bands of molecular hydrogen are expected, but no bands were detected.

If the amount of molecular hydrogen in space were as much as 10 percent of atomic hydrogen, the bands would have been seen.

Only half the matter of the Milky Way galaxy is contained in visible stars, including those that can be seen with the largest telescopes. The other half is distributed as hidden matter—invisible stars, a thin sprinkling of dust (about 100 grains per cubic mile) and huge clouds of gas, composed primarily by hydrogen.

The NRL flight was also significant because it marked the first successful attempt to use an electronographic image converter for observations in space (SN: 1/14). The NRL instrument, which had a six-inch collecting mirror, was equivalent in detection efficiency to a 36-inch telescope using the fastest photographic plates.

Study of Tropic Seas

Establishment of a multimillion-dollar Tropical Marine Science Center in either Miami, Fla., or Mayaguez, Puerto Rico, is being studied by the Associated Universities, Inc. for the National Science Foundation.

Results of the study should be presented to the AUI directors in mid-July.

AUI officials making the study are looking at a possible site on Virginia Key in Miami's Biscayne Bay. The site would be almost next door to the recently-approved location of the East Coast Oceanographic Facility of the Environmental Science Services Administration.

There, the center would also be flanked by the University of Miami's Institute of Marine Science, the Tropical Atlantic Biological Laboratory of the Bureau of Commercial Fisheries and and the Miami Seaquarium.

The Mayaguez location, which would have easier access to the tropical waters to be studied, is also a developing center of science. In the town are the Institute of Marine Science of the University of Puerto Rico and the Puerto Rican Nuclear Center, an Atomic Energy Commission-financed laboratory having a strong biological program.

Orbiter Struggles On

The Lunar Orbiter program ranks with the most successful in U.S. space history. Four of the five planned spacecraft have been launched so far at the intended three-month intervals with no practice shots, and all four have worked successfully, sending back photos of the moon's surface taken from as close as 28 miles away.

The first three Orbiters were hunters, sent to seek out suitable landing spots for the Apollo astronauts (SN: 1/28). On May 4, Orbiter 4—a mapper—was launched. Its polar orbit around the moon, the first of its kind in the series, positions it to photograph 95 percent of the lunar surface, thus providing valuable information for future missions that will go outside the limited landing area of Apollo. Instead of flying close to the surface of the moon, Orbiter 4 is in an elliptical orbit that gets no closer to the moon than 1,560 miles.

Despite troubles, Orbiter 4 has been doing its job. Several photos of the moon's south polar area include thousands of square miles that have never been photographed before. One striking lunar feature found by the spacecraft is a vast trench, 150 miles long and up to five miles across. Al-