Groups one and two were given alcohol (95 percent alcohol in water) through their gastric tubes every six hours for seven days. The daily alcohol dosage was increased by 1 gram per kilogram of body weight each day, from a dosage of 6 g per kg on day one to a dosage of 10 g per kg on day five. The 10 g per kg dosage level was then repeated on the last two days of alcohol intubation. At the end of this week, all of the rats were thus assumed to be alcoholics since rats given alcohol in this manner usually show a greatly increased tendency to select alcohol in a free-choice situation. In contrast, rats in groups three and four were only given water through their stomach tubes in order to serve as experimental controls. Water was then removed from all of the rats' cages although food continued to be available.

Rats in groups one and three, half of those that had become addicted to alcohol and half of those that had not, were given diazepam prior to each of eight choice-test sessions. Rats in groups two and four, the other half of the animals that had become addicted to alcohol and the other half that had not, were given water instead of diazepam before each of the same eight test sessions. During these experiments, all four groups could select either a flavored water solution or a flavored alcohol solution.

Throughout the tests, the four groups did not differ significantly in their drinking of the flavored water solution, although there were marked individual variations within the same groups. This finding ruled out the possibility that there might be overall thirst differences among the four groups—a situation that could have invalidated subsequent test results.

Some of the results were expected. Rats in groups one and two—those that had become addicted to alcohol—drank more alcohol than did rats in groups three and four (those that had not become addicted). Rats in group two became, like those in group four, low in alcohol consumption, indicating that their alcohol addiction was wearing off. Rats in group three also consumed little alcohol, showing that diazepam treatment in nonalcoholic rats has no influence on alcohol craving. These findings, too, the investigators expected. However, rats in group one, addicted rats that had been treated with diazepam, continued to drink a lot of alcohol. The investigators had expected opposite results—that diazepam would facilitate alcohol withdrawal in these animals.

Diazepam and related drugs thus appear to maintain the alcoholic state, not to diminish it. This suggests that the use of such drugs to treat human alcoholics may be counterproductive. "Such a result, if confirmed at the clinical level, has important implications for the pharmacological treatment of alcoholism," the researchers conclude in the Oct. 21 SCIENCE. □

Radio interferometer with satellite link

Interferometry is a technique for combining radiation received from a given source at two (or more) telescopes so as to obtain data with a spatial resolving power equal to that of a single telescope as large as the distance between the two receivers. With interferometry an astronomer can obtain details about the structure of a given celestial object that a single telescope would never reveal.

Resolving power depends on wavelength and, because radio waves are much longer than light waves, the quest for better resolution in radio astronomy quickly outran the size of the largest possible single radio mirrors. For a long time radio interferometers were limited to telescopes that could be physically connected (by cables or guided radio waves), because it is essential to combine signals received by the separate telescopes at the same instant.

About ten years ago improvements in atomic clocks made it possible to record the signals received by different telescopes and compare them later. This meant that interferometers could be set up using telescopes on opposite sides of the earth. In fact this has been done numerous times, and the technique of very long baseline interferometry (VLBI) has provided most of what is known about the fine structure of distant radio sources, especially the quasars and radio galaxies that have started serious controversies in astrophysics and cosmology. However, VLBI with recordings suffers from serious drawbacks. A way to escape these drawbacks and restore real-time data combination to VLBI has now been successfully tested and is reported in the Oct. 21 SCIENCE.

The technique involves using a geosynchronous (sometimes called geostationary) satellite as the link in the communications channel between the telescopes. The test case used the Hermes or Communications Technology Satellite, which had been put up as a joint Canadian-American program for communication with remote places. The first test was run in November 1976 using a telescope at the National Radio Astronomy Observatory in Green Bank, W. Va., and one at the Algonquin Radio Observatory at Lake Traverse, Ont. In May 1977 a second test, this time with a transcontinental baseline, was run between the Ontario telescope and one at the Owens Valley Radio Observatory in California. The astronomers involved include J. L. Yen of the University of Toronto, K. I. Kellermann and Benno Rayhrer of NRAO, N. W. Broten and D. N. Fort of the Herzberg Institute of Astrophysics in Ottawa, S. H. Knowles and W. B. Waltman of the Naval Research Laboratory in Washington, and G. W. Swenson Jr. of the University of Illinois at Urbana-Champaign.

A number of the current difficulties with VLBI are traceable directly to the necessity of recording the signals and the limitations of the recording devices. Comparison of the tapes must be done by a specialized computer, and this often takes more time than it took to make the observations, especially when more than two telescopes are used in a "multibaseline" observation. Time lags between recording and processing can run to several months.

Recording means that the observers lack continuous information on telescope performance during the observations so that undetected flaws can waste a lot of effort. It also means no access to the data as they come in. Sometimes knowing what is coming in can lead to important program changes while the observations are in progress. Tapes also impose a limitation on the waveband of the signals that can be observed that is narrower than the telescopes or a satellite transmission link can handle.

All these difficulties can be removed through real-time communication via satellite. A future prospect is the development of a phase-coherent interferometer, one in which the phase of the waves in each signal is known. That would remove certain ambiguities from the results, ambiguities that have contributed heavily to current astrophysical controversies. □

'Interim' policy for spent nuclear fuel

Almost 20 years after the first commercial nuclear reactor began operation, the United States is still without an agreed-upon means of permanently storing high-level nuclear wastes. The Energy Department, like its predecessor agencies, has promised that a decision on ultimate disposal of nuclear wastes—how and where to store them for the next 10,000 years—is only a few years away. Few are holding their breaths to see whether DOE meets that deadline, however, except electric utilities operating nuclear plants. For them the subject of permanent disposal is more than academic. Their capacity for storing spent fuel on site is dwindling; some are only two or three years away from filling to capacity. These plants will have to shut down if new storage is not found.

With this impending crisis in mind, President Carter offered last week to temporarily alleviate the problem by permitting the federal government to take possession of and title to commercial spent fuel on a voluntary basis. Utilities may turn over spent fuel to a government-owned repository for a fee which is now estimated to run about $100 per kilogram. (A 1,000-megawatt nuclear plant produces about 6,000 kilograms [30 tons] of spent fuel annually.) The one-time cost should also cover