gether the bacteria and plasmid manufactured the missing enzyme. These results are published in the February PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

In different experiments Kevin Struhl, John R. Cameron and Ronald W. Davis used a virus to package yeast genes and move them into a bacterium. The Stanford researchers also found that one of the yeast genes allowed the bacterium to grow in the absence of a previously required amino acid (PROCEEDINGS 73:1471, 1976).

More experiments were needed to prove that the transplanted yeast genes were directly responsible for the new enzyme, rather than somehow reversing the effect of the bacterial mutation. In their most recent work, Carbon and Ratzkin examined enzyme activity of plasmid-containing bacteria that had previously lacked an enzyme for synthesis of the amino acid leucine. The normal bacterial enzyme is stable in the cold, but the yeast enzyme can be completely destroyed after 40 minutes on ice. The researchers found that the enzyme from deficient bacteria with the plasmid was quite sensitive to cold. "Therefore it has the properties of yeast," Carbon concludes.

At first, the deficient bacteria with the plasmids grew more slowly than normal bacteria, but after three days many grew at the normal rate. "The take-home lesson is that *E. coli* are amazingly versatile," Carbon says. "They can take a segment from eukaryotic DNA and make it work with high efficiency."

Similar experiments using the red bread mold *Neurospora* have produced preliminary evidence that its genes can also function in a bacteria, reports J. W. Jacobson of the University of Georgia. A plasmid containing mold DNA allowed bacteria of a deficient strain to survive in medium not containing certain essential amino acids. Biochemical analysis of normal bacteria and deficient bacteria with the plasmid showed several differences in the relevant enzyme. "We still need to do more experiments," Jacobson says.

Together these results indicate that bacteria may respond to genes from yeast, mold and perhaps other higher organisms more readily than had been expected. □

Carbon dioxide laser: Fusion at last

Scientists have been somewhat skeptical about the practicality of the carbon dioxide laser's ability to induce thermonuclear fusion. Although the CO_2 laser has a high repetition rate and high efficiency, its wavelength, 10.6 microns, was considered too long to attain fusion. Researchers at Los Alamos Scientific Laboratory nevertheless argued that wavelength was not nearly as important as theory had suggested (SN: 11/27/76, p. 340). Last week they announced their two-beam CO_2 laser has achieved fusion reactions resulting in an energy release of 14 MeV per reaction.

Laser-beam fusion has had considerable success using glass lasers doped with neodymium, which produce light with a short wavelength of 1.06 microns. In both systems, laser light is directed at a fuel pellet containing a mixture of deuterium and tritium gas. The energy of the light explodes the pellet's outer shell, causing an implosion of the shell inside and compressing the gas mixture to fuse the atomic nuclei. Scientists had believed that the long wavelengths of the CO_2 laser would waste most of its energy exciting a few electrons on the shell and preheating the target.

The Los Alamos team found this not to be so. Instead, the laser light distributed itself fairly evenly over all the electrons resulting in considerably less preheating of the target.

Heading the project at Los Alamos were Sidney Singer, project leader, and Gene McCall, alternate division leader of the Laser Research and Technology Division. Their targets were standard glass microballoon pellets, measuring about 200 microns in diameter. Maximum power output reached 0.4 terawatt with a pulse length of 1.2 nanoseconds.

The achievement of fusion at Los Alamos appeared to challenge the work on glass lasers continuing at Lawrence Livermore Laboratories. Although glass lasers have been successful their "coolability" has posed a problem. Glass lasers heat up very quickly and take an extremely long time to cool down, making their use in reactor applications impractical. Carbon dioxide lasers, on the other hand, maintain a continual gas flow and therefore remain relatively "cool." Thus, the finding that the short wavelengths of the glass lasers need not be essential to achieve fusion implies that CO_2 lasers may have passed up glass lasers in the race for controlled fusion. No one at Lawrence Livermore or ERDA, however, cared to speculate on such a prospect. Officials at ERDA say they feel it is too soon to begin thinking about abandoning any route to fusion, glass, CO_2 or other.

Just who wins the race to fusion will ultimately depend on the amount of funds each project receives. President Carter has cut some $80 million from the budget for all types of fusion research, $12 million of which came from the Los Alamos 100-kilojoule six-beam laser originally scheduled for completion in 1981. The researchers had hoped that they could scale up the two-beam laser to a 10-kilojoule system by 1978 to produce one percent of the energy required for breakeven. By 1982, the researchers thought they might use the 100-kilojoule system to achieve breakeven, where energy of the fusions produced equals the energy required to cause the fusions. If the budget cuts go through, the schedule would slip at least one year, assuming the funding is replaced the following year. □

Ozone: A world plan of action

A world plan of action on the ozone layer was recommended this week by an international meeting in Washington convened by the United Nations Environmental Program. The meeting grew out of widespread concern that human activities could lead to significant reduction in the protective ozone in a few decades. For nine days, representatives of 30 nations considered reports on research by individual countries, the World Meteorological Organization and the International Civil Aviation Organization. "There was substantial agreement on what we know scientifically," says Edward Epstein, head of the U.S. delegation. The participants considered chlorofluorocarbon emissions from aerosol spray cans to be a matter of serious concern but concluded that the current aircraft emissions probably have a negligible effect on the ozone layer. No conclusion could be reached on the ozone depletion role of volcanoes, solar activity, nuclear explosives or nitrogen fertilizer.

The representatives suggested a three-part program for future study of the ozone layer: study the chemical reactions of the layer and monitor changes around the world, investigate the impact of ozone depletion on humans and the biosphere and evaluate the costs of policies that might reduce ozone depletion.

The participants also requested that UNEP set up a facility to compile and redistribute ozone-related information.

The meeting did not include any discussion of potential regulatory actions.□

MJS christened Voyager

The twin spacecraft of the Mariner Jupiter-Saturn mission (SN: 1/1/77, p. 10), due to be launched this summer, have been renamed Voyager 1 and 2 instead of Mariner 11 and 12. Officials of the National Aeronautics and Space Administration considered more than 100 names solicited from project and headquarters personnel, public affairs officials and the press. The winner was selected despite the fact that Voyager was also the name of a proposed Mars mission that was cancelled in 1968 as being too costly. One awkwardness is that although Voyager 1 will be launched 12 days before Voyager 2, it will be the second of the two to reach Jupiter and Saturn, promising years of confusion. Officials are considering reversing the numbers. □