year, because the onset of withdrawal symptoms is so delayed.

Alcohol withdrawal comes first, about 12 hours after the patient has stopped drinking, and lasts up to four days. Then withdrawal from meprobamate or barbiturates begins, peaking on the fourth, fifth and sixth days. Finally withdrawal from the second class of chemical tranquilizers, which includes Librium, appears on the seventh, eighth and ninth days.

The symptoms were missed, says Dr. Fox, because patients would go home in four or five days, after the alcohol withdrawal.

Dr. Fox attributes much of the chemical addiction problem to the growing faith in what she calls instant comfort —a notion that the individual can swallow something to make him feel right.

But public attitudes do not bear all the blame for the alcohol-chemical addiction problem in the United States. As the alcoholism congress made clear, neither the medical profession nor anyone else has made anything like an adequate effort to treat alcoholism. Alcoholics are still being turned away from the majority of hospitals; medical schools do not train physicians in the treatment of alcoholism.

This is so despite the fact that over the past decade alcoholism treatment centers have been demonstrating that they can reach and help about two thirds of alcoholics. The Atlanta center has treated 10,000 to 12,000 alcoholics over the past 12 years and claims a 65 percent recovery rate, of which five in 10 are almost totally abstinent.

Dr. Freddy Schual, director of the alcoholism unit at Pilgrim State Hospital in New York, believes the nation's alcoholism problem, sometimes estimated at 5 million alcoholics, can be cut by more than half with an adequate national medical effort.

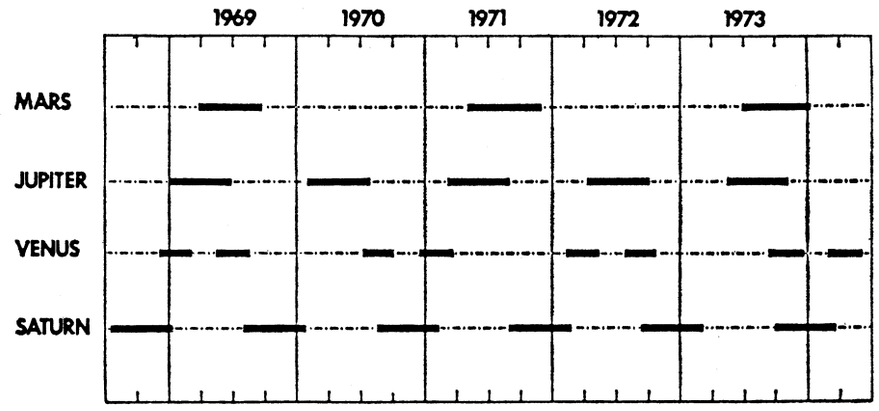
Dr. Fox notes that alcoholics must be treated in hospitals, not only because they are physically sick, but because nurses and doctors will otherwise receive no training in the treatment of alcoholism.

"Doctors are not unwilling to treat alcoholics," she says, "but they don't know how."

The same meeting brought evidence that alcohol damages the brain by causing blood cells to clump. According to the calculations of Dr. Melvin H. Knisely, anatomist at the Medical College of South Carolina, this agglutination would slow the rate of blood flow through capillaries in the brain, killing brain cells by oxygen deprivation. His figures indicate that about 12 to 15 shots of alcohol at a sitting would be needed to dangerously clump the blood; social drinking would be an unlikely cause of such damage.

PLANETARY ASTRONOMY

New telescopes urged



National Academy of Sciences

Some projects must start now to catch the planets at their nearest points.

Until about the turn of the century, studying the planets and other objects in the solar system dominated the field of astronomy. Then such powerful telescopes as the 60-inch and 100-inch instruments on Mt. Wilson disclosed the immense reaches of the universe, overshadowing telescopic investigation of the solar system for all but a few specialists.

The limitations of trying to see through earth's dancing atmosphere for the long viewing times necessary for observing planets also served to keep most astronomers looking beyond the solar system with their telescopes. This outlook changed a decade ago with the launching of Sputnik.

Then studies of nearby space—the moon, Venus, Mars and Mercury— acquired a definite purpose for space exploration. That goal has also rekindled interest in the outer planets, comets, asteroids and other components of the solar system.

New impetus was added by innovation in observing techniques, such as radar and radio astronomy, that make planets and their atmospheres more amenable to study from earth's surface.

These techniques also include image converters (SN: 1/14/67, p. 37) and Fourier interferometers (SN: 4/15/67, p. 350). They not only complement information garnered by interplanetary probes but give more precise data on atmospheres, for instance, than that radioed to earth by space vehicles.

The use of modern equipment incorporating these and other new techniques for earth-based observations could herald a period of "substantial advances in our knowledge of the solar system," a committee of the National Academy of Sciences' Space Science Board has concluded. The 15-member panel, which was advised by some 40 other specialists, was headed by Dr. John S. Hall, director of Lowell Observatory in Flagstaff, Ariz.

In the panel report, which calls for more support for ground-based planetary astronomy, particular emphasis was placed on construction of a 60-inch telescope in the Southern Hemisphere specifically reserved for planetary studies. It ought to be in operation by 1971, the panel says, in order to take full advantage of the close approach of Mars, which will then make its nearest brush to earth in half a century. Favorable oppositions of Mars usually are visible from southern rather than northern declinations.

The panel on planetary astronomy recommended the use of better observation sites for optical viewing, like those now being developed in the mountains of northern Chile (SN: 10/14/67, p. 375). Telescopes there reveal views of the planets far surpassing in clarity those from most locations in the United States.

The report takes special note of a new interferometric spectrometer developed by the French astronomers, Drs. Janine and Pierre Connes (SN: 4/22/67, p. 384). This instrument, attached to a ground-based telescope, makes use of infrared light to analyze planetary atmospheres. Details thus available are believed the equivalent of those that could be obtained from observations from above the earth's atmosphere.

Other observations in the infrared have also revealed the great potential of this spectral region for studying planetary atmospheres, leading the panel to recommend construction of a 120-inch infrared telescope. Such an instrument would be relatively inexpensive, since image precision is not extremely critical at infrared wavelengths as it is optically. The instrument could have an

all-metal mirror, but should be built at an arid, high-level site because water vapor in the atmosphere absorbs infrared radiation.

No price tag for any of these recommendations was set by the panel.

The present state of funds for basic science facilities in the budget is poor. The National Science Foundation is cutting this year's spending by 10 per cent and will shrink next year by even more. And the Navy, another traditional supporter of astronomy, last week announced a cutback of 2,400 jobs at 15 research laboratories. Given the dollar drought, astronomers privately declare that although they would like to see all recommended facilities placed in operation, the most feasible—and the most urgent as far as time is concerned—is a 60-inch instrument in the Southern Hemisphere. ◇

TOIL AND TROUBLE

Cracks in the ivory tower

As America's college and university administrators open their campuses this fall, they are finding themselves caught between the hot fire of student anarchists and the cold wind of the draft. And over it all stands a Congress, bearing down on student protests, and a Department of Defense, growing skeptical about faculty members who accept Federal research money while publicly denouncing Federal policy.

Student demonstrations or disturbances have already occurred this fall on a number of campuses—most notably Columbia University's which was closed by a student insurrection last spring (SN: 5/25, p. 493).

While the more radical students have no less a purpose than total social revolution—at least according to Mark Rudd, leader of the Columbia disturbances—the moderates have various programs for here-and-now reform of their universities. Some administrators, like Columbia's new president Andrew W. Cordier, who set up committees of faculty members, administration officials and students to consider a thorough reshaping of the university's organization, are moving in with reform programs in an attempt to split the moderates away from the radicals. How much success they will have remains to be seen.

Some observers see the demonstrations as the Spock-raised, permissive generation's attempt to turn the whole world into its playpen.

Other observers take a grimmer view. FBI Director J. Edgar Hoover warns the country's law enforcement agencies that "these militant extremists are not simply faddists or college kids at play. . . . It would be foolhardy for educators, public officials, and law enforcement officers to ignore or dismiss lightly the revolutionary terrorism. . . ."

Congress seems to agree with Hoover. Recently a House-Senate conference committee voted to permit—but not require—university administrators to deny Federal funds to students supported by the Higher Education Act if they are convicted of a crime involving use of force, disruption of campus activities or seizure of college property, or who willfully refuse to obey lawful orders of college authorities.

The Senate tacked a similar amendment onto the appropriations bill for the Departments of Labor and Health, Education and Welfare.

Meanwhile the same beleaguered administrators are trying to prepare their graduate schools for the still-pending threat of Selective Service. New regulations last spring (SN: 3/23, p. 281) changed graduate students from a safely deferred class to the most eligible for induction. Deans predicted that graduate schools would be emptied.

So far there has been no such depopulation, but deans attribute the maintenance of graduate enrollment to the unusually low draft calls of the last few months and to willingness of students to take a chance. They are now worried about what will happen when the second semester starts in February.

Betty M. Vetter, executive director of the Scientific Manpower Commission, estimates: "In engineering, mathematics and the physical sciences we can expect the loss of about three half-classes of entering graduate students . . . and three half-classes of Ph.D.'s a few years later."

Even faculty dissenters, who are presumably older and wiser than the students, are coming in for governmental slaps. Some months ago a group of mathematicians, many of whom are supported by the Defense Department, signed an advertisment against the war in Vietnam. They have now received letters from the Army Research Office and the Air Force Office of Scientific Research asking them to consider whether in light of their views they felt they could continue to accept the department's money.

A few days later, Dr. John S. Foster Jr., director of defense research and engineering, issued a memo which at once supported the policy of his departmental subordinates in asking such reviews and, at the same time, suggested that they not lean on the dissenters too hard. They are to review questionable contracts, he said, but should not "emphasize nontechnical issues in your evaluation of the desirability of terminating or renewing research contracts."

INEVITABLE SWINGER

SST: fixed wing for now

The variable-sweep wing has almost certainly been designed out of the U.S. supersonic transport. It has recently been the cause of troubles with the F-111 fighter as well. Nevertheless it may still have a bright future.

The wing system has promise at least as great as the problems it currently faces. It offers plenty of wing area for control and lift at low speeds, then allows the pilot to sweep most of the surface out of the way during supersonic flight, when it would only cause unwanted drag.

The Boeing Co., contract winner in the United States' supersonic sweepstakes, has conceded that the swing-wing will not be a part of its SST design—although the concept was a key factor in getting Boeing its contract. Boeing has shifted gears and is now devoting most of its design energies to a fixed wing rather like the one Lockheed Aircraft Co. had submitted in the contract competition.

The swing-wing is in more trouble with the SST than with the F-111. A swing-wing big enough for a commercial airliner poses problems that a small, fighter-sized wing does not.

Because a swing-wing must withstand the stress of being moved during flight, it must be made much more rigid than a fixed wing, at the cost of additional weight. Fighter planes, particularly supersonic ones, are designed in the first place to withstand extreme stresses such as those caused by high-speed turns, so that most of the extra rigidity is already present.

Airliners, however, are not designed for such loads. Building the extra stiffness into the wing exacts a punishing weight penalty—one of the major reasons that Boeing has switched the bulk of its SST design effort back to a fixed wing (SN: 3/16, p. 254).

Beyond the SST lies the hypersonic transport (SN: 6/3/67 p. 528), predicted to fly in the 1990's at speeds from six to as much as 15 or 20 times the speed of sound. At such speeds, every square foot of wing that can be shaved off will be worth miles per hour, gallons of fuel and perhaps hundreds of dollars in operating costs.

New lightweight but strong materials and alloys now being created and studied may turn the trick for hypersonic (and perhaps even second-generation supersonic) airliners to come. Another help will be development of more powerful engines to fly the heavy structures needed by swing-wings.