

equals the one-part-per-million mark. More than 95 percent of fruits and vegetables could already pass, largely because of precautions being taken by the growers. Foreign countries that import U.S. products, however, are not satisfied simply to have the U.S. reassure them that pesticide residues are well below the present seven-parts-per-million limit, as some heated debates at international conferences have shown. So, Walker says, the limit is being tightened up as assurance.

Many researchers believe that the organochlorines will ultimately go out of business in favor of biodegradable pesticides such as the organophosphates. A step in this direction in the U.S. is a bill by Senator Gaylord A. Nelson, Democrat from the dairy-rich state of Wisconsin, which would ban all interstate sale or shipment of DDT. So far the bill hardly has Congress's undivided attention, because of the lack of conclusive evidence linking DDT residues with physiological damage to humans.

The first worldwide recommended levels for pesticide residues are being worked on by a committee of the United Nations, but the process inches forward at such a rate that many countries are likely to have taken care of some of the difficulties with national standards before any international standards are set. ◇

MOON RACE

Zond 5: Sputnik revisited

By sending an unmanned spacecraft, Zond 5, around the moon and back to earth for a safe landing, the Russians have achieved another space first and upped their chance of getting a man on the moon before the United States does. The impact in the U.S. is a new lease on life for a competitive space race, but little chance that the upshot will be a boost in space spending. Dollars are too hard to come by.

Zond 5 was launched toward the moon from another vehicle in orbit around the earth on Sept. 15. Three days later it whipped around the moon and started home. This requires aiming the spacecraft to fly close enough to the moon—about 1,300 miles—so as to use the lunar gravity to draw it around the moon and then whip it back toward earth with increased velocity, but without using any on-board rocket power. On Sept. 21, the spaceship re-entered the earth's atmosphere and splashed down in the Indian Ocean, where it was retrieved by a Soviet ship.

The success of Zond 5 has caused the National Aeronautics and Space Administration to up its estimate of the Russian lunar timetable. The Soviet

Union should be able to put a man on the moon "within the next 12 months or so," says Thomas O. Paine, newly named acting administrator of NASA.

The U.S. might still be first, but chances are slim. The earliest the U.S. moon landing could come is mid-1969. But to do this the next four Apollo flights—7 through 10—must be both successful and on schedule, a tall order, according to officials.

Apollo 7, scheduled for Oct. 11, will be an earth-orbit flight of 10 days. If 7 is successful, then Apollo 8, tentatively scheduled for December, will be either a circumlunar like Zond or a lunar orbit flight.

One of the factors that will determine whether the first U.S. manned flight to the moon—be it Apollo 8 or a later flight—is circumlunar rather than lunar orbit is whether the service module engine is working. Any spacecraft headed towards the moon can get into lunar orbit by following the proper course; to get out of lunar orbit and return to earth requires the firing of a large rocket—the service module engine

DUAL ADDICTIONS

Alcoholism compounded

Dual and triple addictions to chemical drugs are compounding the problem of alcoholism in the United States. Combined addictions are being seen chiefly in alcoholics under the age of 30, and include addiction to tranquilizers and stimulants, but not to narcotics or the psychedelic drugs.

The upshot is that while the country has yet to deal with the major public health problem of alcoholism, the nature of the problem has already changed.

This trend to multiple addictions will accelerate as more mood-changing drugs are developed, says Dr. Vernelle Fox, medical director of the Georgian Clinic and Rehabilitation Center in Atlanta, one of the nation's major alcoholism treatment centers.

"You rarely see anyone now under the age of 30 with a pure alcoholism problem," says Dr. Fox. That is becoming a phenomenon of the over-50 age group.

Evidence of the change emerged at the 28th International Congress on Alcohol and Alcoholism in Washington, D.C. Although the conference itself paid scant attention to drugs other than alcohol, a number of leading workers in the field believe that the treatment of alcoholism should be broadened to cover chemical addiction in general. Drugs being abused by young alcoholics include the tranquilizers, such as meprobamate (Miltown, Equanil), chlor-diazepoxide (Librium) and diazepam

for Apollo. Thus at some point before reaching the moon, Apollo astronauts will test the service module engine. If the engine does not work, then the spacecraft must follow the same circumlunar route as Zond 5.

If Apollo 7 and 8 are successful and on schedule, then Apollo 9 will go in March, 1969 and carry, for the first time, all the moon-landing equipment including the lunar landing craft LEM, which the astronauts will use in a later flight to descend from the main ship, in lunar orbit, to the moon and return. Apollo 9 calls for the LEM to be detached and flight-tested in earth orbit.

The date for Apollo 10 is unscheduled, but it could be the moon landing mission if all has gone well before it. The earliest Apollo 10 could go is mid-1969, which would put the U.S. on the moon ahead of the Soviets, based on the latest estimates by NASA in light of Zond 5.

Nevertheless, Zond 5 has greatly advanced the Russian lunar effort, and put NASA in the difficult position of having to produce flawlessly from here on out.

(Valium), and stimulants such as the amphetamines, and the sedatives.

The multiple addictions have been masked in the past in part because of the way they show themselves. Withdrawal troubles from these drugs occur at different intervals, so that an individual may pass through one set of symptoms after another over a period of one to two weeks depending on how many drugs he has been using. A patient can be discharged after one set disappears, but before another emerges.

Dr. Fox is currently bringing together data on the problem of multiple addictions. She says she has evidence that Librium and related drugs are addictive, contrary to medical investigation which has failed, so far, to prove a physical dependence. Meprobamate has already been declared an addictive drug by the Food and Drug Administration; its withdrawal effects resemble those of the barbiturates.

Dr. Fox bases her material on study of about 1,500 patients admitted in one year for treatment of alcoholism at the Peachtree Hospital in Atlanta

Some 40 percent of the patients had addictive chemicals other than alcohol in their bloodstreams. Of these, less than half were taking the drugs for medication and, Dr. Fox believes, probably 10 percent were primarily addicted to prescription drugs, with alcohol an incidental problem.

Dr. Fox says she became aware that Librium is addictive only in the past

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.

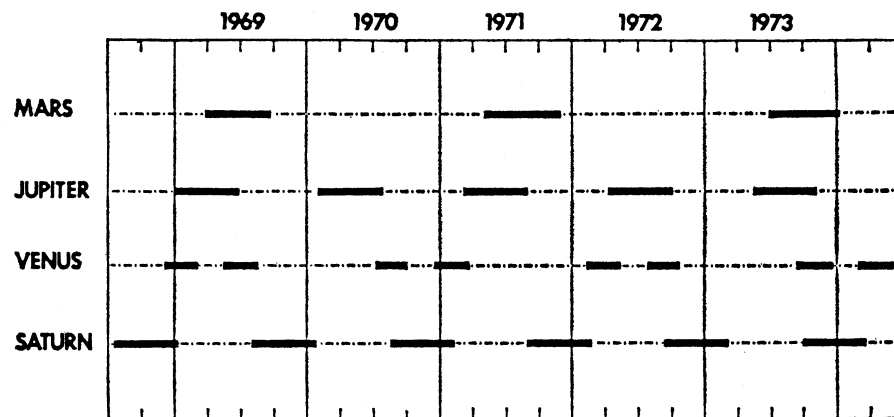
Dr. Fox notes that alcoholics must be treated in hospitals, not only because they are physically sick, but because nurses and doctors will otherwise receive no training in the treatment of alcoholism.

"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. Kniseley, 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