Thus, it looks as if moderate alcohol consumption does not increase total cholesterol levels in the blood and may even help protect against heart attacks by increasing lipoproteins that have been associated with heart disease resistance. However, more research must be conducted before one concludes that alcohol is a heart attack preventive, the researchers warn.

Five populations of nondrinkers and moderate drinkers (those who drank between 5 and 20 ounces of alcohol a week) were studied. They lived in San Francisco, Honolulu, Albany, N.Y., Framingham, Mass., and Evans County, Ga. Blood was drawn from the subjects and analyzed for total levels of cholesterol and for levels of high-density lipoproteins, low-density lipoproteins, very-low-density lipoproteins and triglycerides. Very-low-density lipoproteins, like the high-density and low-density ones, carry cholesterol in the blood. Triglycerides, in contrast, are like cholesterol—fats carried by lipoproteins. Whether very-low-density lipoproteins and triglycerides play any role in heart disease remains to be seen.

Results showed only a modest correlation between the amount of alcohol intake and raised total cholesterol in the blood, and even then, there were marked individual variations with some drinkers even having low total cholesterol values. What's more, alcohol consumption was associated with a high level of high-density lipoproteins and with a low level of low-density lipoproteins and with perhaps some elevation in the very-low-density lipoproteins and in the triglycerides. The greater the consumption of alcohol, the stronger this association. (Past studies have likewise failed to associate heavy drinking with raised total cholesterol levels. However, they have linked heavy drinking with elevated levels of triglycerides.)

These findings, then, suggest that moderate alcohol consumption does not increase total cholesterol in the blood, which is a major heart attack risk factor, and that it may even shift the lipoprotein balance in the blood so that there are more heart attack-preventing lipoproteins and few heart attack-risk lipoproteins. However, it is too early to endorse alcohol as a heart attack preventive, Gordon and his colleagues warn.

For one thing, alcohol carries medical risks of its own. For another, their study did not examine whether increasing or decreasing one's alcohol intake might alter the levels of cholesterol or of various cholesterol-bearing lipoproteins, and even more crucially, whether such alterations might in turn increase or decrease the risk of heart disease.

"Our study is only a start toward answering these questions," Gordon stresses. And as he and his colleagues conclude in the LANCET report, "These are challenging new findings which require considerable follow-up before they can be fully understood. . . ." □

Space colonies: One step closer

For the third consecutive summer, a multidisciplinary group of scientists met to elucidate what could become man's next "manifest destiny"—the human colonization of space. A major outcome of the six-week collaboration of over fifty persons is that principal architectural schemes derived during the previous two studies are now understood in greater detail.

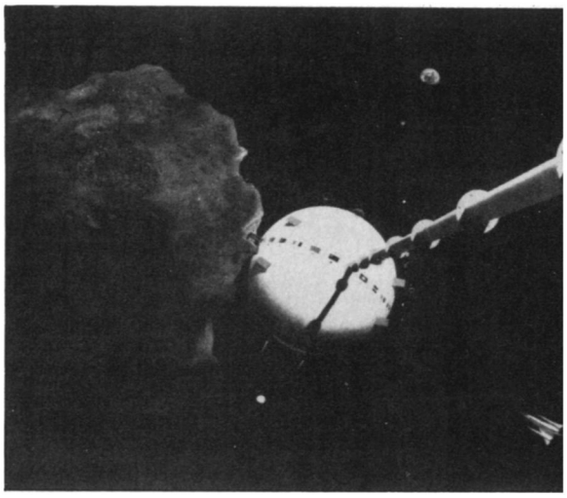
This summer's participants took further account of the U.S. Space Shuttle's foreseeable role. The shuttle itself, now undergoing preliminary flight tests, could ship material for the first habitat beginning in 1985, according to Princeton physicist Gerard K. O'Neill, chief initiator of contemporary interest in space colonization. By 1991 the first colony-manufactured, solar-power satellite could be finished and producing enough electricity for a city the size of Los Angeles. (This is strictly a technological forecast, of course, not an official timetable.)

An area of concentration by this summer's researchers, many of whom donated their time, was regenerative life-support systems. These differ critically from those routinely used in manned spaceflights, which rely on the one-time consumption of stored resources like oxygen, water and food. But for years-long colony habitation, the bulkiness of such an expendable environment would be prohibitively impractical.

As a first step toward developing an artificial, "closed" (self-replenishing) ecosystem, the scientists defined, then ordered according to relative importance, the associated research problems. An important aspect of any closed life-support mechanism is the conversion of carbon dioxide into usable oxygen and carbon. The former can be breathed and the latter can by synthesized, for instance, into protein and carbohydrate. Last year the Soviets successfully kept three people alive in a closed system for six months and illustrated many of the problems that still lack solution (SN: 11/13/76, p. 314).

The initial space habitat, orbiting about 400 kilometers above earth, may be a humble affair fashioned from the external tanks of several space shuttles. Each tank would house twenty-one persons on seven floors. And in accordance with psychologists' advice, each boarder would have a separate room, which he or she could decorate according to personal taste.

Working from this austere outpost, pioneering inhabitants would assemble in an orbit 50,000 kilometers above earth the first full-fledged colony, replete with luxurious, terrestrial-like landscapes and external, zero-gravity factories. The romance of this endeavor is reflected in names given to some popular colony designs, like "Island One" and the "Crystal Palace."



NASA-Ames/Chesley Bonestell

One idea: Mine asteroids for raw material.

Because of the enormous energy required to haul any payload against the formidable resistance of earth's gravity, most construction material will be derived from nonterrestrial sources. The veteran scheme is to mine the moon and then launch the soil in fiberglass bundles toward a processing station 40,000 kilometers away (the so-called mass catcher). The lunar ore, chemically separated and processed, would then be shuttled from the catcher to the main colony for manufacturing purposes.

As presently conceived, a moon-mining operation involving about fifty people could excavate 600,000 tons of lunar soil per year, by late 1989. The soil modules, about two kilograms each, would be stuffed into a procession of buckets, gliding (via magnetic levitation) on a 4-kilometer-long track. Along it, the buckets would accelerate (at up to 1,000 "g's") by magnetic induction and "cough up" their contents into space—towards the mass catcher—just before they are slowed down and returned for another go-round.

An alternative plan, which received detailed analysis this summer, involves mining asteroids. One research group estimated that about 200,000 asteroids of one million tons or greater are generally approaching the earth. Of these, about 50 are close enough to cross the orbit of Mars and only about 6 have known compositions. It would take less than two years to reach one of these, using the pull of Venus's gravity to advantage. Needed before this idea is implemented, however, is a systematic survey of the heavens to locate the choicest asteriods.

The summer studies, sponsored by NASA at its Ames Research Center in Mountain View, Calif., have reached the limit of their usefulness, says O'Neill. It is now time for in-depth, dedicated analyses of the manifold aspects of this project, he says, and time for an end to "band-aid" funding. Several contracts lined up for this coming year add up to only a fraction of one million dollars. □