

location now and likely to stay one for some time to come.

The main piece of equipment for the new observatory would be a 90-inch telescope. (Lick's biggest piece on Mt. Hamilton now is 120 inches.) Together with the University of Wisconsin Lick has applied for funds from the National Science Foundation and the Fleischmann Foundation. The estimated cost would be \$8 million, of which the universities are prepared to put up \$1.2 million in state funds. Though Osterbrock told the regents he has reason to believe the request has been favorably reviewed, the money has not yet been granted, and because of the current climate for Federal support of science he is not very optimistic about getting the whole of the sum very soon.

Meanwhile it is necessary to get some kind of observing program going at Junipero Serra, among other reasons to stake out the site, so to speak. Osterbrock proposes to move the observatory's twin 20-inch astrographs to Junipero Serra. Astrographs are telescopes used to measure stellar positions precisely. The astrographs are among the worst affected by skylight, and they could do a better job of the project they are now engaged on, the measurement of stellar proper motions (SN: 8/18-25/73, p. 119), at the dark site. A longer-range plan is to build a new 60-inch telescope to be assembled first on Mt. Hamilton and later moved to Junipero Serra. Osterbrock concludes: "The University of California has always been at the forefront of astronomical research. We at Lick Observatory intend to do all we can to keep it there. . . ." □

Space shuttle to piggyback around

In the olympic-pool-sized alphabet soup of acronyms and abbreviations that is constantly a-simmer at the National Aeronautics and Space Administration, one of the more unusual terms is vpg. One might reasonably expect it to stand for Voltage Pressure Gradient or something, space jargon being what it is, but in fact it is short for Very Pregnant Guppy. The vpg and its slightly less ponderous relation the PG were a pair of preposterously bulbous aircraft, looking about as flightworthy as bumblebees, used for carting Apollo spacecraft and other unwieldy components around the country.

Of late NASA has been confronting an even hairier transportation problem: how to move the 30-ton, 122-by-

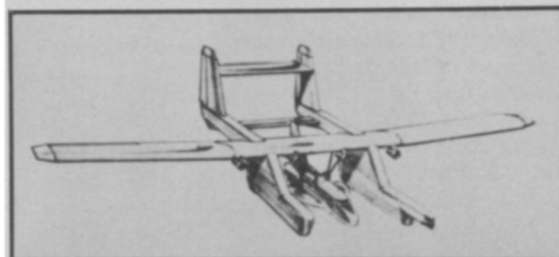
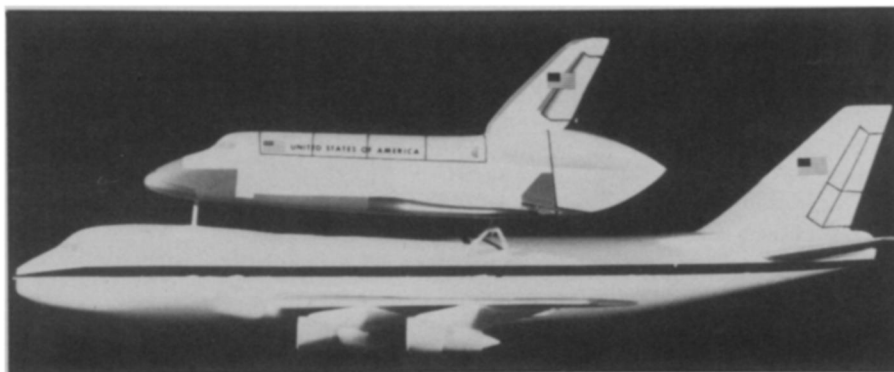
78-foot orbiter section of the space shuttle (not to mention its 153-foot-long fuel tank). There needs to be an efficient way of carrying the orbiters on trips from the manufacturer in California to test sites in Alabama and elsewhere to launch sites at Kennedy Space Center in Florida and Vandenberg Air Force Base in California.

Last week, the space agency made its choice, but not before considering some exotic alternatives. One idea was to hang the orbiter from a dirigible (which would also please growing numbers of proponents of lighter-than-air craft), but the leisurely pace of such an approach, according to NASA officials, would expose the spacecraft to too much weather. Another plan was to use a design by John Conroy, who created the Guppies, calling for a pair of B-52 fuselages attached to a

single, immense 450-foot wing with the orbiter fastened between them.

NASA's final choice at first seems more orthodox, but it is likely to look every bit as bizarre. The shuttlecraft will be perched atop huge, vertical stanchions above a Boeing 747 jetliner, equivalent to flying a 747 with a DC-9 sitting on the roof.

An advantage to the system is that it will be able to double as a flying test bed. For approach and landing tests of the orbiter, which will be the first spacecraft also to operate as an airplane, the original plan was to attach six jet engines, in order to fly it high enough to run through the landing sequences. The 747 will simply carry it aloft piggyback, then blow loose the stanchion mounts, allowing the orbiter to return to earth just as it will when it returns from its missions in the 1980's. □



The space shuttle's orbiter section will be transported and tested atop a 747 jet (top) rather than by a specially-built aircraft (center) or the ungainly Pregnant Guppy (bottom) of Apollo days, which is too small for the 122-foot spacecraft of the 1980's.

