

An insecticide with a twist

Grate the skin of an orange, lemon, lime or grapefruit and you may have a potent insecticide. Tons of orange peels, usually discarded by the juice industry, could provide raw material for a pesticide that is not only safe for humans but also smells good, say University of Georgia scientists.

In preliminary studies, oil from citrus peels killed all insects tested — fire ants, houseflies, stable flies, black soldier flies, paper wasps and grey crickets. The insects generally showed hind leg paralysis, soon followed by convulsions and death. Direct contact and exposure to vapors both proved effective. The lethal chemical has not been isolated yet, but D. Craig Sheppard finds no detectable residues of any commonly used insecticides in the citrus peel extract.

"Citrus peels seem to be non-toxic to humans and other vertebrates in our everyday contacts and are used as flavorings in soft drinks and baking," Sheppard says. He was led to test citrus peel oil when a group of mechanics brought a hand-cleaning product, called Dirt Squad, to the Coastal Plain (Ga.) Experimental Station. They had dumped some of the grease re-

mover, which is made from orange peels, on a fire ant hill, and all the ants subsequently died.

Sheppard suspected that the insecticidal action was due to the hand cleaner's citrus base. He reports that intact fruit, obtained at a local grocery, does no harm to insects confined with it in a cage. But, for example, when he scored the outer peel of a lime with a knife, after 15 minutes houseflies were unable to walk and after 2 hours they were dead. Sheppard says, "The liquid containing the toxic factor or factors must be released from the glands within the [citrus] skin before it can act as a fumigant or a contact poison." In further experiments liquid collected from bent segments of orange peel also killed insects. In a final test, Sheppard successfully treated a flea-ridden cat with a bath of Dirt Squad and water.

"This natural insecticide, a by-product of the citrus industry, could prove valuable for treating pets, livestock and humans for ectoparasites [parasites living on the exterior of their hosts], for fumigating food handling and storage facilities, and for pest control around households," Sheppard says.

"The next step," he adds, "must be to isolate and identify the insecticidal factor or factors present and to characterize the toxicological properties of the pure substance or substances." —J.A. Miller

DSDP on its last Leg

For 15 years the drilling ship *Glomar Challenger* has been nearly synonymous with the Deep Sea Drilling Project (DSDP), as scientists and vessel made nearly 100 voyages to probe the earth's history as recorded in the ocean floor. Last week the ship left the shores of Ft. Lauderdale, Fla., and headed for the Mississippi Delta on its 96th voyage for the DSDP. When it returns, both the *Challenger's* tenure and the DSDP will come to an end.

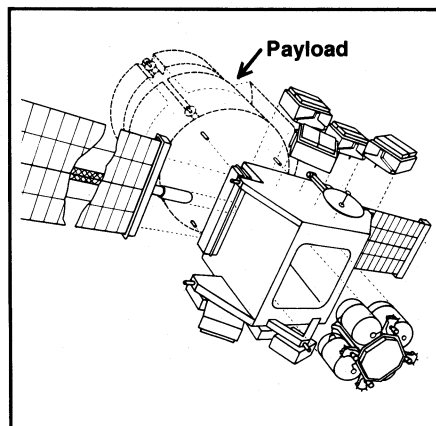
The *Challenger* will return to its owner, Global Marine, Inc., of Los Angeles; the DSDP will be disbanded, to rise again in October 1984 in the form of the Ocean Drilling Program. During the one year hiatus in drilling, project scientists will evaluate sites for future drilling while the next ship is refitted for scientific use. The National Science Foundation has issued requests for proposals for potential ships. Responses are due back next month, says Herman Zimmerman of the NSF Office of Scientific Ocean Drilling. The most likely candidates are oil exploration drilling ships idled by the decline in demand for oil. The NSF learned last spring (SN: 3/5/83, p. 152) that one of these ships could be converted far more cheaply than could the *Glomar Explorer*, once the first choice for replacing the aging *Challenger*. □

NASA and industry to offer space for lease on space platform

The National Aeronautics and Space Administration, while pushing for a go-ahead for a manned U.S. space station, has now also signed a joint agreement with a private corporation to pursue development of an unmanned space platform on which customers would lease space for a variety of purposes. Called "Leasecraft," the platform would be deployed and serviced by the space shuttle, while Fairchild Industries of Germantown, Md. (which would also build it), would handle the business end, seeking both commercial and government users with projects ranging from orbiting factories to remote sensing and scientific research.

The crux of the matter is, will anyone use it? Part one of the two-phase agreement includes identifying possible mission requirements and beginning the design process, but it also includes marketing the idea to potential users. A similar NASA-industry plan collapsed several months ago when not enough customers could be found for a proposed shuttleborne materials-processing oven. In recent months there have been increasing calls for NASA to do something to enhance private-sector involvement in space, but there has been only one project that has seemed close to commercial application — an electrophoresis system for pharmaceutical manufacturing, test-flown several times on the shuttle and co-sponsored by

McDonnell Douglas Astronautics Co. and Ortho Pharmaceutical Corp. (SN: 7/2/83, p. 4). Fairchild has a "memorandum of understanding" with McDonnell Douglas to at least consider the device for use on Leasecraft, but more than one customer might be necessary to justify the \$200 million that Fairchild estimates it will cost to get the first Leasecraft developed and flying. Pharmaceuticals would seem to be natural candidates, the company suggests, because of the potential high economic return for the amount of space their manu-



Industry and government would lease room for payloads on proposed unmanned space platform, job-tailored using plug-in modules and serviced by the shuttle.

facture requires (critical on an orbiting facility); research has also been done regarding the manufacture under near-weightless conditions of crystals, alloys and other materials.

The central module of Leasecraft, as presently envisioned, would be a 15-by-15-by-14.5-foot structure equipped with a pair of 66-foot-long solar panels for power. Data-handling, attitude-control and other functions would be provided by a variety of individual, plug-in components that could be replaced by shuttle astronauts in case of malfunctions or to adapt the platform to the needs of a new payload. The 18,000-pound Leasecraft would carry 6,000 pounds of fuel for its own rocket engine, enabling it not only to move from its shuttle deployment altitude to a nominal orbit 300 miles up, but also if necessary to be stationed as high as 1,000 miles. Under the agreement's second phase—if the first phase produces the customers—Fairchild will actually build one, and NASA will launch it (now planned for 1987), providing a re-servicing flight six months later. Fairchild envisions each platform lasting as long as 12 years, with the shuttle visiting periodically for service, resupply of raw materials and pickup of the all-important finished products. The company foresees a market for as many as 10 Leasecraft within five years. But first, there is the matter of that "it." —J. Eberhart