airports, says Dr. Whitcomb. That leaves out all the people who choose otherwise. "We are, in effect, building a railroad track through their backyards."

The Academy recommends some six to eight further studies which should be carried out before the SST is approved for overland flights.

Sooner or later, says Dr. Whitcomb, the Government will have to decide what boom level it will allow over the United States. At this point, the SST cannot be modified to do away with the sonic boom problem, though in 10 or 20 years, that may be possible, says Dr. Whitcomb. ◈

CARIBBEAN FRUIT FLY

Florida Crops Threatened

Except for the gilded upthrusts of Miami and Miami Beach, Florida's Dade County stretches flat and rich with orange groves and vegetable fields. Now the cities and the visitors they attract—not always human—threaten the countryside and its crops.

The huge agricultural areas that make Florida one of the nation's most important food production states and the nation's winter vegetable center are threatened by the highly destructive Caribbean fruit fly.

Estimates are that annual damage may already be running at the rate of $50 million a year.

Doyle E. Conner, Florida Commissioner of Agriculture, finds the situation so serious that he will immediately seek Federal aid for an all-out eradication program—the second to be undertaken—which he calculates may cost as much as $10 million. Aid may be slow coming, under Federal guidelines requiring documentation of economic threat. The U.S. Department of Agriculture says that, so far, only minor damage to citrus groves is evident.

The Caribbean flies were first discovered two years ago in fruit trees close to Miami International Airport, apparently brought into the country by some of the hundreds of planes landing each week from more southerly areas.

The Caribbean pests are cousins of the Mediterranean fruit fly, which is considered more dangerous only because it principally attacks valuable commercial crops, like citrus, on which depend much of the state's economy. Small concentrations of the Mediterranean fly were found twice within recent years in the Miami area, and were swiftly cleaned out by full scale emergency eradication efforts.

When the Caribbean flies were first found in the Miami area, a program for their eradication was also undertaken, but on a scale insufficient to do the job.

As a result, in the two years since then, the flies have swept into virtually every corner of big Dade County, which extends southward to the very edge of the Florida Keys. They've also multiplied at such an alarming rate that they're now found in 24 counties to the west, north and northwest of Dade.

The startling breeding rate of the Caribbean flies is evident in the numbers taken from special bush and fruit tree traps, designed to keep a check on their rate of increase.

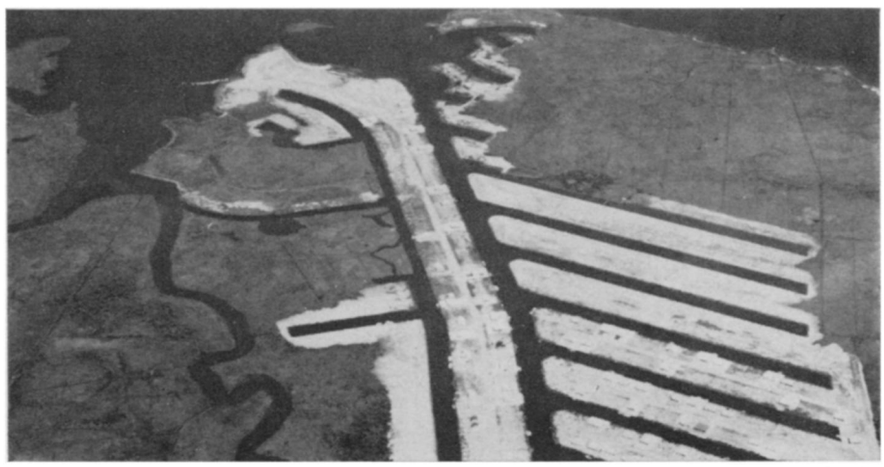
Official state agriculture commission figures show that only 356 flies were found in Dade County traps during March of 1966. The reasons for the alarm become clear on the basis of figures just released, showing that in March of this year, the same number of traps produced 6,076 flies. In Broward County, adjoining Dade to the north, traps caught only 132 flies in March of 1966. But 1,967 were found in the same month this year.

The Caribbean fly attacks a wide variety of hosts, including peaches, limes, sour oranges, grapefruit, tangerines, sweet oranges, bell peppers, tomatoes, mangoes, kumquats, loquats, guavas, rose apples, gooseberries and tropical almonds.

Malathion and similar insecticides are used for Caribbean and Mediterranean fruit fly control. However, at the University of Florida, Dr. R. M. Baranowski, associate entomologist, is working on a program to effect eradication through sterilization of Caribbean fly male adults. This was notably successful in the elimination of screw worms among cattle (SN : 3/11), which annually caused tens of millions of dollars in losses. The USDA gave the university a $31,000 grant for the Caribbean fruit fly sterilization work and the state augmented this with another $24,000. The effort has not yet produced a successful formula, but Dr. Baranowski says he's hopeful. ◈

CONSERVATION

Last Ditch Fight for Vanishing Estuaries



Interior

New Jersey housing creeps over marshland near Atlantic City.

Estuaries, the often swampy areas where rivers meet the sea, are a valuable but vanishing part of America's natural resources. Though they are essential as breeding areas for many of the most desired fish and shellfish, estuaries are rapidly being dredged and filled.

California, with relatively little estuarine fish and wildlife area to begin with, has suffered the greatest rate of destruction—67 percent. New Hampshire, Connecticut, New York and New Jersey have lost between 10 percent and 15 percent of their estuarine areas to dredging and filling.

Efforts to slow this rate of retrograde progress have met with little success in the past. But last week, the Federal agencies most concerned—the Army and Department of Interior—agreed, under Congressional prodding, on a policy designed to protect important estuarine areas from unnecessary development.

The Army's Corps of Engineers has, in the past, issued waterfront construction permits without much regard for conservation. Under the new agreement, they will submit all requests for permits to the Interior Department for comment on their effects on wildlife.

Interior officials will still have no final authority, but the Army has agreed to respect their judgment. The knowledge that conservation has strong support in Congress should make this easier for the Engineers, who are canny

readers of Congressional weather.

The agreement is especially welcomed by Representative John D. Dingell (D-Mich.), chairman of the Subcommittee on Fisheries and Wildlife Conservation of the Merchant Marine and Fisheries Committee.

Rep. Dingell has been trying to get a bill to protect estuaries through his subcommittee with, so far, little success. The sticking point has been two sections of the bill that essentially would authorize the Secretary of the Interior to control dredging in estuaries independently of the Engineers.

The sections are vigorously opposed by commercial interests who see in them one more obstacle to profitable construction ventures in estuarine areas. With their elimination—the Interior-Army agreement makes them unnecessary—Rep. Dingell feels that his bill, H. R. 25, should have no trouble winning the approval of a conservation-minded Congress.

Everything, however, will depend on how well the Army and Interior Department honor their agreement. Their memorandum of understanding spells out a six-step procedure for dealing with applications for dredging permits. If agreement cannot be reached at local or regional levels, the last resort is a conference between the Secretaries.

"I can assure you I'm going to be monitoring this agreement," Rep. Dingell says.

His bill, now in its third complete revision, has stirred interest among the members of the Senate Commerce Committee, which last September held a one-day hearing on a similar bill. No action will be taken until Rep. Dingell's bill passes the House, however, according to a spokesman, although Senator Edward M. Kennedy (D-Mass.) has introduced a similar bill.

At stake, according to Dr. Stanley A. Cain, assistant secretary of the Interior for Fish and Wildlife and Parks, is the future of "the highest dollar value seafood we have." Oysters, crabs, clams and shrimp are among the species making their homes for at least part of their lives in estuarine areas.

Rep. Dingell's bill represents the first step of a two-step process to protect estuaries. It would require an inventory of all unspoiled and only partially spoiled estuarine areas would be made immediately and a report, including recommendations for protection of important areas, submitted to Congress.

Congress would then designate National Estuarine Areas to be set aside from development. ◈

PYGMY STARS

A Debate Rages—in a Professionally Low Key

Astronomers argue, in a very low key, whether "pygmy stars" really exist.

Dr. Fritz Zwicky coined the term about a year ago to describe a new class of objects he believes are halfway between ordinary white dwarfs—the last luminous state of a star—and neutron stars—extremely dense, dark bodies thought to be the final stage in stellar evolution.

Now, after exhaustive observations, Drs. Olin J. Eggen and Allan Sandage are convinced that there is no such thing as a pygmy star. Dr. Zwicky, they contend, has misinterpreted the motions and colors of high-velocity white dwarfs.

Photoelectric measurements of the colors by Drs. Eggen and Sandage show that the stars are redder than assumed by Dr. Zwicky. From a previously known calibration of color versus absolute luminosity, the distances of Dr. Zwicky's candidates for pgymy status make them white dwarfs rather than a new class of stellar objects.

Although all three astronomers are connected with Mt. Wilson and Palomar Observatories, Pasadena, Calif., they conduct these arguments not face-to-face, but in the staid pages of the ASTROPHYSICAL JOURNAL.

Dr. Zwicky, in cooperation with other astronomers both at Mt. Wilson and at other observatories, is measuring the parallaxes of the stars in question. He expects these measurements to be completed by the end of the year, definitely settling the distances of the stars and thus their nature.

The fundamental point on which Dr. Zwicky based his announcement of pygmy stars involves the distance of five stars from the solar system. Drs. Sandage and Eggen state unequivocally that their observations of these stars "remove the necessity to postulate the existence of pygmy stars." The astronomers find they are farther away than Dr. Zwicky reports. In sharp contrast to the usually guarded statements scientists use in reporting their results to colleagues, the phrases Drs. Sandage and Eggen use are strongly worded.

White dwarf stars have a mass averaging about half that of the sun, but their diameters are not much larger than earth's. When the star's supply of available fuel is almost exhausted, so that not enough energy is being released in the interior to keep it inflated, the star collapses. It continues to shine however, from the heat previously generated.

Although a white dwarf's matter is very dense, it is nowhere near as tightly packed as that in neutron stars, which have been postulated theoretically but never actually observed. A neutron star would be so dense that a cubic inch of its matter would weigh about 16 billion tons, according to some estimates. Such stars consist of nuclei stripped of their electrons and would not radiate visible light.

Pygmy stars, if they exist, as Dr. Zwicky believes they do, would lie somewhere between white dwarfs and neutron stars, although no such stars have yet been observed according to Drs. Eggen and Sandage. ◈

TAR DERBY

New Dark Horse Entry

Ever since Columbus found the Indians smoking tobacco, its effect on health has been a point of contention. The Indians generally believed it had medicinal properties, and this was the chief reason for its early use following introduction into Europe.

The age of science has torn the leaf apart, and found hydrocarbon compounds, which, isolated from cigarette smoke, cause cancer in experimental animals. But psychologically at least, smoking seems to benefit many people who can't give it up, and the national effort is turning to production of so-called safer cigarettes, while warning smokers about the hazards.

Efforts to find the actual ingredients in tobacco that could cause lung cancer, emphysema and heart disease, go on. Tars in the smoke are a likely but still less-than-certain candidate.

Cigarette manufacturers launched their tar derby in 1957; cigarette companies began competing with claims for "safer" cigarettes. People switched to filter-tip cigarettes in great numbers, and debated the safety of different brands. Filters now dominate the market, though for years, under Federal Trade Commission rulings, manufacturers had been forbidden to advertise tar and nicotine reduction. FTC later reversed itself (SN: 12/10/66) hoping that a reopened tar derby would encourage development of a less hazardous cigarette.

But no official has ever said filters do any good, or that one is better than the other or better than a length of tobacco itself.

And that was the scene when Robert L. Strickman gave Columbia University the rights to a new low-tar filter this month.