The ability of the playful, intelligent dolphin to swim at such great speed has led to an unusual study at the University. Two engineering professors believe that the fish's flabby skin is essential to the speed it attains in the water. Further, they are seeking to apply this principle to bodies which fly through the air. This impudent representative at the right, a resident of Marineland of Florida near Jacksonville, has refused to comment on the scientists' study, but that smirk may mean something.

MARINELAND OF FLORIDA

FLABBY SKIN IS 'IN'

A CALIFORNIA ENGINEER stood by the deck railing of the ocean liner and watched a group of dolphins as they cut through the water, effortlessly, gracefully. He was fascinated by their speed. Gliding through the water like torpedos, the fish were able to overtake the liner with apparent ease. He wanted to know how they did it.

After investigation Dr. Max Kramer, now vice president of Coleman-Kramer, Los Angeles, was convinced that the dolphin's high speed is due to the damping action of a flabby outer skin and the spongy layer underneath. Similar coatings applied to the hulls of ships produced lower drag and led to further research.

Now two OU engineers are testing the flabby skin concept with bodies which move through air. Dr. Edward F. Blick, who received his PhD from OU in 1963 and is assistant professor of aerospace and mechanical engineering, and Dr. Charles W. Bert, an associate professor who joined the faculty in 1963, are co-investigators in a research contract awarded by the Army Research Office. The study, administered through the Research Institute, calls for a 12-month investigation which bears the non-best-seller-type title—"Distributed Damping as a Means of Aerodynamic Drag Reduction."

The first person who applied the flabby skin principle to aerodynamics was Donald Fisher, an OU graduate student. While working with Blick last fall, Fisher demonstrated with the aid of a model wing in a campus wind tunnel that flabby skin can cause a large reduction in turbulence over a wing.

Blick and Bert began work on the project this spring and will resume their study in the fall. Both are working in California this summer. Blick, an aerodynamicist, will handle the wind tunnel testing and fluid mechanics problems. Bert, a specialist in solid mechanics and wave propagation in elastic media, will concentrate on the dynamics of the membranes tested.

"The looseness or flabbiness of the dolphin's outer skin reduces the drag as it swims through water by increasing the laminar flow and cutting down the turbulent flow," says Blick.

"These two kinds of flow can be illustrated by the smoke from a cigarette. As the smoke first comes off the cigarette, it flows smoothly; it's streamlined. This is laminar flow. Then the smoke at a given point begins changing directions; its flow is disturbed. This is turbulent flow.

"The flabby skin produces an lengthening of laminar flow which reduces drag, thereby increases speed. It can make a high speed flight smoother. The turbulent flow is pushed to the rear and is diminished. We will start with this principle and try to find answers and ways to use this knowledge in aerodynamics.

"If the concept of distributed damping proves feasible for aerodynamics," says Blick, "it's possible that aircraft of the future might be covered partially by flabby coatings. In addition it may prove feasible to cover high speed racing autos and the insides of pipelines in order to reduce the drag."

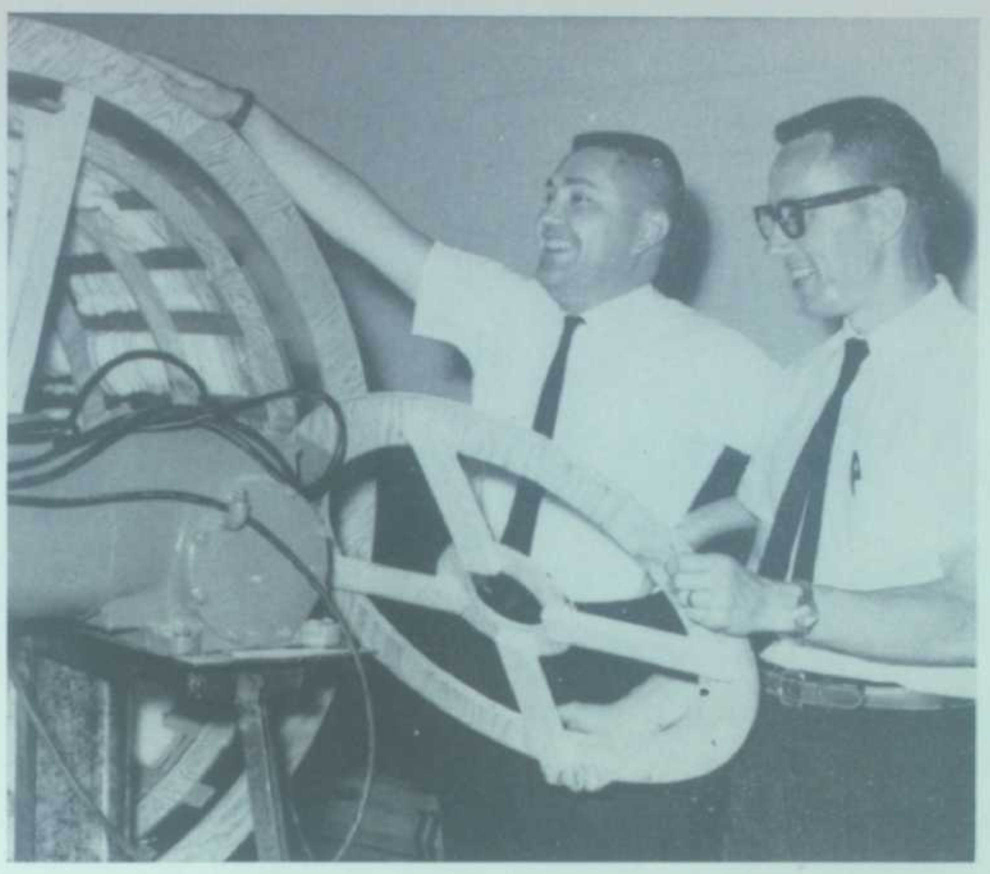
Blick and Bert at present have one working test model, an inelegant contraption made of a thin wooden board covered on one side with a clear plastic skin. Under the skin the two engineers have tested several liquids, including water and 30-weight motor oil. This rather crude simulation of the dolphin's skin was tested in a subsonic wind tunnel, and the results were impressive enough for the Army to grant a one-year contract with possible extensions.

This fall the two will direct the project, which will utilize several graduate students as aides, from the new Aerospace Building on OU's North Campus. Under construction is a wind tunnel specially designed by the research pair for the project. Constructed with wood and fiber glass and cone-shaped, the tunnel will be used to test a number of models which will vary with the materials used.

Blick and Bert will use a number of experimental techniques in measuring the turbulence intensity along the flabby-skinned wings and along wings without the compliant covering.

Liquids to be tested will vary in viscosity and will include glycerin and silicone. Plastic and rubber will be used as the outer covering. Factors like skin tension, depth of the liquid and porous materials will be varied during experiments.

The research that Blick and Bert are conducting may produce some other happy by-products. People who up until now haven't been particularly proud of their flabby skin may walk a little more erect, knowing that potentially they may be the speediest things under water since Johnny Weismuller churned through the Congo. At least they can identify with Flipper, that flabby-skinned television star, who helps humans every week thanks to distribued damping which reduces skin friction drag by lengthening the laminar flow and thereby. . . . *END*



Drs. Blick (right) and Bert stand by the wind tunnel they are building for their drag reduction tests. Below, Dr. Blick holds the first wing model used in the study. Motor oil is the liquid used under the plastic skin. The model simulates a dolphin's outer skin.