On the surface, both the Kennedy bill and the Daddario bill appear to have the same effect. Both would give added force to the Foundation's basic missions and would allow some internal reorganization. Both would strengthen the governing National Science Board, putting it in a wide-ranging science policy position. Both call for an annual State of Science report. Both would give the director more authority.

But differences in the two bills are expected to open up lively debate; Kennedy claims his bill was modified on the basis of objections voiced by NSF officials and other witnesses earlier in the year.

Two major issues will be the effect of giving NSF more applied research money in combination with authorization to support scientific activities relating to national security in the interest of the Departments of Defense and State. Harris has been stirring the controversy over involving more Federal agencies in international spy episodes like Projects Camelot or Sympatico which caused troubles in the Southern Hemisphere two years ago. The Senator is concerned that NSF not get into applied social science research (which can be stretched to espionage) internationally.

Reports from Rep. Daddario's staff indicate that he is ready to compromise in order to get the major portion of his bill through Congress this session or next. NSF officials also indicate that the Kennedy draft is more to their liking than the House version, and will support the move.

Kennedy has lined up Sen. Claiborne Pell (D-R.I.), whose interest in scientific legislation has also been waxing, and Sen. Robert P. Griffin (R-Mich.) as members of his ad hoc subcommittee. Indications are strong that the bill, in some form, will reach full committee before the end of the month.

Meanwhile, the younger Kennedy brother is expanding his interest in science; he is now considering hearings on the brain drain in his special subcommittee on immigration. His Massachusetts ranks fourth in the nation in Federal research and development spending (over $700 million to industries and universities last year). ◈

RELATIVITY CLUE

Icarus—strange swinger

Icarus was the mythical boy who flew with his father Daedalus to escape from an island prison by making wings out of feathers fastened with wax. Icarus soared too close to the sun; the wax melted, his wings came off and he fell into the sea.

His name, fittingly, has been given to the asteroid that passes closest to the sun, the only object beside a comet to swing within the orbit of Mercury. Most asteroids, or minor planets, are confined to a zone between the orbits of Mars and Jupiter.

Icarus revolves around the sun every 409 days at a mean distance of about 100 million miles. However, its orbit is highly elliptical, and the distance actually varies from about 17 million to some 184 million miles, coming 12 million miles closer to the sun than the innermost planet.

Next June astronomers will bounce radar waves from Icarus—the first such experiment with any asteroid, as this strange swinger moves within four million miles of earth. Although this is a close approach as astronomical distances go, there is no danger that the asteroid will crash into earth. The chances of this are less than a billion to one.

Icarus is a chunk of rock only six-tenths of a mile in diameter, a miniature planet that could well provide the most critical astronomical test yet of Einstein's theory of general relativity.

Until the discovery of Icarus in 1949 by the late Dr. Walter Baade of Mt. Wilson and Palomar Observatories, Mercury was the only object in the solar system suitable for detecting small changes in perihelion motion due to relativity. Perihelion is the point in the path of a planet, asteroid or comet that is nearest the sun.

Relativity theory predicts that over a period of time this point should shift a small amount, different for each planet. Because the asteroid has very much less mass, this change is much smaller for Icarus than for the planet Mercury.

Nevertheless, partly because of its extremely fast motion around the sun, the perihelion shift can be measured more accurately for Icarus than for the planet.

The slow rotational change, or precession, of Mercury's perihelion is one of the three principal experimental effects supporting Einstein's general relativity theory (SN: 2/11). The other two are the gravitational red shift and the bending of light in a gravitational field.

Even after next June's radar measurements, however, astronomers will need many more years of observation before they will know the asteroid's path accurately enough to detect the change in perihelion.

Icarus will not become visible to Northern Hemisphere astronomers until early June. At its brightest in mid-month, it will be only magnitude 13, too faint to be seen without a telescope at least 15 inches in diameter. ◈