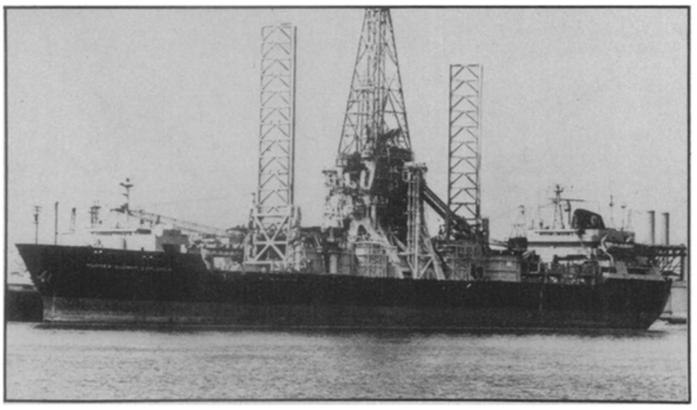
current and confinement times on the order of 100 milliseconds are expected to be achieved if outstanding problems can be overcome.

A final footnote to the whole business is that big physics has reached its ultimate. There have been papers signed with two or three dozen names—in some cases the list of authors is longer than the paper. There have been papers modestly inscribed by the X group of Y laboratory or the so-and-so experimental group. Here comes the end. The first paper in the PLT session at San Francisco was signed by "everybody." To pile up the irony, in the act it was presented by "nobody." The material in it was combined with Stodiek's presentation. □

Glomar Explorer: Conversion to science?



The sophisticated salvage ship Glomar Explorer may be converted to handle deep-sea drilling, extending research to previously impossible areas.

After the Central Intelligence Agency gave up attempts to raise the rest of a sunken Russian submarine, with its specially constructed salvage vessel, the Glomar Explorer (SN: 3/29/75, p. 204), the government found itself holding a uniquely designed, $300 million white elephant. A year-long effort to commercially lease the vessel has found no takers, and the Explorer is languishing unused.

Now the National Science Foundation has authorized a feasibility study to determine what would be necessary to modify the ship for deep-sea scientific research drilling. The $75,000 study is expected to take three months and will be conducted by Global Marine Development, Inc., of Newport Beach, Calif.

As a research vessel, the Glomar Explorer could offer some unique advantages. The ship is 618 feet long by 115 feet wide and displaces 21,000 tons. This displacement is nearly twice as large as that of the vessel currently used for deep-sea scientific drilling, the 400-foot Glomar Challenger. The greater size, coupled with a larger derrick and more powerful engines, means that the Explorer has a lifting capability nearly 10 times greater than the Challenger and could operate under more adverse conditions of weather or currents.

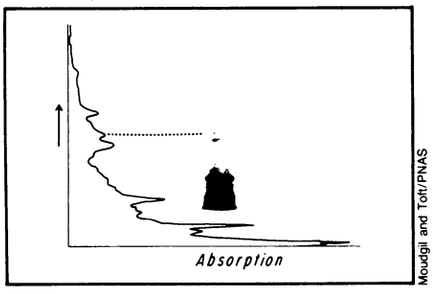
These developments come at a time when the current Deep Sea Drilling Project (DSDP) is approaching the limits of what can be accomplished with the Glomar Challenger. After years of virtually round-the-clock operation, the Challenger is beginning to show signs of age, and the ship is expected to be returned to its owners, Global Marine, Inc., in 1979. Also there have been three major areas of the oceans where the Challenger has not been able to function adequately: deep trenches, arctic seas and regions with hydrocarbon deposits.

The NSF project officer for DSDP, Peter E. Wilkniss, told SCIENCE NEWS the Glomar Explorer might be able to operate in these three neglected areas for an expanded research drilling effort in the 1980s. With its thicker hull it could probably venture farther into icy areas of the arctic seas. With a greater lifting capacity, it could hold the heavier drills needed for obtaining cores from deep trenches, and it could handle the complex, self-contained "riser system" and "blowout preventer" needed to drill safely in oil or gas fields. (Risers circulate viscous "drilling muds" around a drill to equalize pressure in case of striking a subterranean gas chamber, and should a "gusher" occur, the blowout preventer seals the hole.)

Scientifically, ocean trenches are particularly interesting since it is unknown whether ocean sediment is concentrated in them or carried away under a continental plate. An expanded drilling program obviously has practical implications also; mineral deposits may be found in trenches and new petroleum beds may be discovered in previously unexplored areas of the continental shelves. Drilling in arctic seas is important for determining the history of climate changes, since organisms in these areas are most susceptible to temperature variations.

Officials at NSF hope the feasibility study will be completed in time to submit it to the next meeting of the international consortium that finances DSDP. A changeover to the Glomar Explorer would probably entail a doubling of expenses, Wilkniss estimates. □

Cell receptors pinch-hit as enzymes



Progesterone receptor (position indicated by broken line).

Cell receptors are one of the hot topics in molecular biology these days. Researchers have discovered that these tiny proteins, which may have sugar chains attached, reside on cell membranes and catch hormones, drugs, viruses, neurotransmitters and other chemicals that pass by. Receptors, they have found, can sit inside cells and pass along or interpret chemical messages that enter cells. Receptors even appear to play a role in diabetes, obesity and some other diseases (SN: 8/16/75, p. 110).

Now that scientists have learned quite a bit about *what* receptors do for cells, they want to better understand *how* the receptors do it. In the case of cell membrane receptors for protein hormones, for instance, the receptors probably pass a chemical message from hormones to a membrane enzyme, which then activates the intracellular messenger cyclic AMP. But how about those receptors that operate inside cells, say the receptors for the steroid hormones? Two Mayo Clinic molecular biologists have found that one of these receptors, for progesterone, actually works as an enzyme. "This activity," they declare in the October PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, "could represent a major event in the mechanism of steroid hormone action."

Last year the Mayo scientists, Verinder K. Moudgil and David O. Toft, found that the progesterone receptor interacts with ATP, the primary high-power energy molecule inside cells. But what kind of interaction? Moudgil and Toft attempted to find out, and they now report that the receptor catalyzes an exchange reaction between ATP and pyrophosphate. In other words, the receptor works as an enzyme.

Specifically, ATP, which had been previously shown to bind to the progesterone receptor, is apparently split into an AMP-enzyme complex and pyrophosphate, and can be totally regenerated in the presence of pyrophosphate. This exchange reaction is totally dependent not only on the receptor, the investigators have found, but also on ATP and magnesium cations. Other cations, such as calcium, and nucleotides,