

Bay on Baffin Island and to St. John's, Newfoundland. It will result in the most accurate geodetic grid ever achieved in Canada, and will serve as a basis for correcting and densifying the existing framework.

A FIRST BY SATELLITE

A geodetic grid is the starting-point for all other types of survey — topographic, hydrographic, municipal, legal and engineering. Although Canadian surveyors have been using sophisticated airborne survey instrumentation for a number of years, this is the first full-scale geodetic survey employing a satellite.

The survey, which started in 1964, is based on photographs of balloon-type satellites, originally ECHO 2, and now PAGEOS, against the star background. With a precise knowledge of star and satellite positions, and with timing controlled to within one one hundred-thousandth of a second, the relative positions of camera stations can be determined with a margin of error of about 1 foot in 200 miles. Conventional geodetic surveys have a margin of error of 1 foot in 10 to 40 miles.

In Canada, observations have just been completed at Whitehorse in the Yukon and Cambridge Bay, Northwest Territories, which connect the Canadian grid to similar stations in Alaska and the Aleutian Islands. Observing operations will be started at St. John's immediately; at Frobisher Bay the equipment will be stored until operations are resumed there in late September. By the end of March 1972, field operations in Canada will be completed, but, because of the wealth of data obtained and the complex processing required, the final positions of stations will not be determined until 1975. Following this, it will be possible to undertake a complete readjustment of the North American precise horizontal-control network.

The Canada-U.S. project is being carried out by the Surveys and Mapping Branch of the Department of Energy, Mines and Resources, the Mapping and Charting Establishment of the Department of National Defence and the U.S. National Ocean Survey. The Canadian project is part of the North American Densification Program that fits into the recently completed World-wide Geodetic Satellite Program. The World-wide Program ties points on all the continents into a single, unified geodetic grid for the first time in history.

OLD SEA FIGHT RECALLED

The Baie des Chaleurs on the Gaspé coast will give up more of its treasures this summer as underwater archaeological work continues on the French naval vessel *Machault*, scuttled in 1760 during the final sea engagement between France and England in the New World. Excavation of the 145-foot hull began in 1969 under the supervision of Walter Zacharchuk,

in charge of underwater archaeology for the National Historic Sites Service of the Department of Indian Affairs and Northern Development.

The *Machault* was one of three military supply vessels sent in 1760 to relieve the French forces defending Montreal after the British capture of Quebec in 1759. Unable to reach Montreal because of the British blockade, the convoy took refuge in the Baie des Chaleurs, near the mouth of the Restigouche River. There they were discovered by the British fleet. In the ensuing battle on July 9, one French vessel, the *Marquis de Malauze*, was captured and burned. The other two ships, the *Machault* and the *Bienfaisant*, were scuttled by the French forces, who then retreated inland.

OBJECTS RECOVERED

In their first two seasons, Mr. Zacharchuk and his team of divers excavated about a third of the hull of the *Machault* and recovered thousands of objects from it. Among these were quantities of Chinese porcelain and unused boots, cutlery, coins, wood-working tools, cannon balls and a 3,000-pound cannon.

RADIO EQUIPMENT FOR IRAN

A \$23-million export order has been received by Canadian Marconi of Montreal from the Imperial Iranian Government. The Telecommunications Division of Canadian Marconi will supply Iran with Canadian radio-relay communications equipment sufficient to provide about 1,000 man-years of work, according to Mr. L.M. Daley, the President of Canadian Marconi.

The contract will be financed by the Export Development Corporation as part of a \$100-million line-of-credit agreement signed by the Imperial Government of Iran and the EDC last February.

"I am pleased with the initiative taken by Canadian Marconi in negotiating this contract," said Mr. Jean-Luc Pepin, Minister of Industry, Trade and Commerce, in announcing the order. "This is the type of effort needed in exporting. I am gratified by the increasing interest shown by Iran in Canada's capacity to make useful contributions to its requirements, and am confident that this transaction will bring important benefits to both countries."

HISTORIC SHIP TO BE RESTORED

The sails of the *St. Roch*, the first ship to navigate the Northwest Passage in both directions and to circumnavigate North America, will soon be unfurled again. The three-year, \$316,000 restoration program for the former Royal Canadian Mounted Police schooner will be carried out by the National and Historic Parks Branch and the Technical Services Branch of the Department of Indian Affairs and Northern Development.