PYKRETE - ICE SHIPS IN THE ROCKIES!

By George H Pitt, Alberta, Canada.

http://www.combinedops.com/Pykrete.htm

Ice ships in the Rockies? The improbable but true story of a top secret WW2 project to build ships from a mixture of ice and sawdust. Project Habbakuk! *Behold ye among the heathen, and regard and wonder marvellously: for I will work a work in your days, which ye will not believe, though it be told to you*. So reads a biblical quotation from the book of Habakkuk ... a name adopted by the top secret project to build ice ships.

Part I

In 1942 the Allies were already developing plans for the re-occupation of Europe, and Winston Churchill favoured large floating platforms to support the landings. In addition the allies were suffering heavy merchant shipping losses from German U-boats, due, largely, to the limited range of patrolling aircraft and the resulting “mid Atlantic Air Gap.” Churchill therefore welcomed the idea of building large ships made of ice as presented to him by Lord Louis Mountbatten,

Mountbatten was Chief of Combined Operations, an organisation responsible to the Chiefs of Staff for the development of equipment and special craft for offensive operations. One of his scientific advisers, Geoffrey Pyke, presented the idea of constructing “berg-ships” - up to 4,000 feet long, 600 feet wide and 130 feet in depth – that could be made cheaply, and in great numbers, from ice. The ships would be insulated and cooled, made practically invulnerable to bombs or torpedoes. They could be used by aircraft to provide protection for shipping, particularly in the mid Atlantic, and as a base for invasion. With Winston Churchill’s enthusiastic endorsement, the project got underway.

In early 1943 two American professors discovered that a very tough material could be produced by adding a small amount of wood pulp to water before freezing. They called this material pykrete, in honour of Geoffrey Pyke.

Part II

Lord Mountbatten had a block of Pykrete prepared by a Canadian engineering company and took it to the Quebec Conference in the fall of 1943. As it appeared that “Habbakuk” would run into supply and technical problems, not to mention the high costs ($100 million for the first ship), it was Mountbatten’s aim to get the Americans to take over the project. What better way than to set up a live demonstration! It is reported that he took out his revolver and fired at a block of ordinary ice which immediately shattered. He then fired at a similar block of Pykrete which was so strong that the bullet ricocheted, narrowly missing Sir Charles Portal the Chief of the Air Staff!

Studies commenced into the two paradoxical elements of ice – plastic flow and brittleness. One such study involved the construction of a structure, 60 long by 30 feet wide and 19.5 feet high on a lake in the Canadian Rocky Mountains - Patricia Lake in Jasper, Alberta.

The structure was of wood frame construction with 3 inch x 6 inch studs and 3 inch x 8 inch floor joists and was filled with ice cut from the lake. The structure was insulated and included 3 Freon compressors driven by 10 hp electric motors. Cold air was distributed throughout the ice by a network of 6 inch galvanized-iron cooling pipes. This study was to determine problems of construction and thermal behaviour of ice in summer.

A further experiment was conducted simultaneously in front of the Chateau Lake Louise, near Banff, Alberta. The requirement of this project was to determine ways to reinforce large ice units. The work at Lake Louise indicated that a hull at least 35 feet thick, would be needed to contain damage from bombs and torpedoes.

By this time the Battle of the Atlantic had been virtually won and new aircraft carrier construction was promising to further strengthen defences. Reluctantly the project was shelved.

The floating structure in Patricia Lake in Jasper was abandoned at the end of August 1943. After removing all machinery, it was left to sink in place. In the 1970's scuba divers discovered the remains and they were subsequently studied by the Archaeology Department of the University of Calgary. (Photos left; Work in progress on Patricia Lake, Jasper, Alberta, Canada. Circa 1943 courtesy of the National Research Council of Canada.)

In 1988, the Underwater Archaeological Society of Alberta marked the site with an underwater monument. The following year, with the assistance of the National Research Council and the National Parks branch a plaque, commemorating these unusual wartime events, was erected on the shore of the lake. (Photo above right July 2001)