The Round Tablette

Thursday, 9 February 2012

Welcome to the February meeting of the Harold C. Deutsch World War II History Round Table. Tonight, our topic is the importance of code-breaking for the development of computers, particularly the computer industry in Minnesota. Pioneer members of the electronic computer industry join our speaker, Colin Burke, to discuss their roles in this industry.

Before World War II began, the Army and Navy were both trying to break Japanese diplomatic, military, and naval codes. In Europe, the Poles had obtained copy of a German ENIGMA machine and were trying to solve its mysteries. They passed both machine and a copy of their work to British Intelligence shortly before Poland fell to the Nazis. In both efforts, frequency analysis - often of enormous amounts of data - was a primary tool. Mechanical tools were used to assist in analyzing the data. Tonight's subject comes out of the Navy's ENIGMA-breaking efforts.

Even before World War II, libraries were suffering from too much information. Government collected too much data to process. A large number of people, universities, and businesses were attempting to find solutions to these inter-related problems. At the same time, other people were trying to develop machines, building off Hollerith's punch cards and sorting machine, to store, retrieve, and manipulate these growing streams of data. With the war, the need for machines, for manipulation of large data files, and the ability to repeat analyses frequently and rapidly - in a time-sensitive way, became critical. The Navy needed an analog flight situation simulator to speed up training pilots, which include computational machine development.

The Royal Navy was particularly interested because the German U-boat fleet used ENIGMA encoded messages to communicate with Grossadmiral Karl Dönitz, providing location, fuel status, etc. in every message. Given the volume of the messages, the RN presumed they contained information helpful to the Allied cause. The British project, based at Bletchley Park, utilized highly skilled engineers, physicists, mathematicians, and statisticians, and developed calculating machines, called "bombes," for this work. These were highly specialized devices for code-breaking, and like most early "computers," were tailored to specific tasks. Success meant knowing where U-boats were – convoys could be re-routed around wolfpacks and anti-submarine destroyers and destroyer escorts could be vectored to attack the wolfpack to the great happiness of Allied mariners.

The British had produced several bombes, each more sophisticated, but at ever increasing cost in resources. Americans, peripherally involved in this effort prior to US entry into the 1939-1945 European War, now became junior partners in developing new bombes. We were also considered neophytes at code-breaking. Among the leading Americans were Vannevar Bush of Yale University - a father of "big science," and Rear Admiral Stanford Hooper, an expert in radio communications and a father of Radio Corporation of America (RCA). These two men were the "kingpins" of the American effort to build bombes and break codes.

Several different agencies were established to build ever bigger, faster, more capable calculating machines, and to repeatedly try cracking the codes. In 1942, when the *Kriegsmarine* added a fourth operating rotor to the ENIGMA machine, all previous effort became so much waste paper. The Navy established a cryptanalytic machine group (OP-20-G) in the Naval Computing Machine Laboratory to create a new "*bombe*" to break this new code series. Lead by Joseph Desch, they were located in Building 26 on the Dayton, Ohio campus of the National Cash Register Company. The "Desch Bombe" proved to be the physical platform needed for the task.

In 1943, the Navy began to put together the aviation assets (German submarines ran surfaced when possible to save batteries,

and were easily spotted from the air without knowing it) based on "jeep" or escort carriers (CVEs) built on Liberty ship hulls, with destroyer escorts as a submarine hunter-killer task force. One such Task Group, 22.3, built around the *USS Guadalcanal*, CVE-60, and commanded by Captain Daniel V. Gallery, USN, captured the U-505 intact, and with it, its code books.

Another Navy group, the Communications Supplementary Activity–Washington, was devoted to the code-breaking and located German submarines by intercepting their high speed transmissions and locating their origin points. CSAW needed devices suited to their tasks, similar to bombes, but different in critical aspects.

When the war ended, the Navy wanted to keep these people available and working. Many of the men did not want to stay in service, but liked the work. The compromise was the creation Eckert-Mauchly Computer Co., and Engineering Research Associates of St. Paul in 1946. Among the founders of ERA, were Commander Howard Engstrom and Lieutenant Commander William C. Norris of CSAW, Captain Ralph Meader of NCML, and John Parker, head of the Northwestern Aeronautical Corporation, which built gliders. Under the NAC name, ERA gained the necessary experience and "credibility" as a contractor to acquire Naval contracts that were the mainstay of their work. ERA people went on to found a large number of computer development and software firms, including the unknown and some very familiar to Minnesotans: Control Data Corporation, UNIVAC, UNISYS, Sperry, and Cray.

Further Reading:
Jim DeBrosse and Colin Burke, *The Secret in Building 26: the Untold story of America's Ultra War Against the U-Boat Enigma Codes* (New York, NY: Random House, 2004).
Colin Burke, *Information and Secrecy: Vannevar Bush, Ultra, and the Other Memex* (Metuchen, NJ, The Scarecrow Press, 1994, *out of print)*.
Arthur L. Norberg, *Computers and Commerce: A Study of Technology and Management at Eckert-Mauchly Computer Company, Engineering Research Associates, and Remington Rand, 1946-1957* (Cambridge, MA: MIT Press, 2005).
Sperry Corp. *Engineering Research Associates: The Wellspring of Minnesota's Computer Industry* (St. Paul, MN: Sperry Corp., 1986).

Round Table Schedule 2011-2012

2012
Mar 8 OPERATION PLUM 27th BG
Mar 22 Japan's Mistake: Starting the War
Apr 12 Jedburgs-Jumping Behind Enemy Lines
May 10 Battle of Leyte Gulf

If you are a veteran or know a veteran **of one of these campaigns** –, contact Don Patton coldpatton@yahoo.com

This is our 25th Year!

Robert Price, r, and the ERA 1103 computer, http://www.computerhistory.org/collections/accession/102665140

ERA employees and magnetic drums produced by ERA, http://www.computerhistory.org/revolution/memory-storage/8/252/950