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Society for History in the Federal Government 2003: Session on Research and Development in the U.S. Navy

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The U.S. Navy has had a long history of investment in scientific and engineering research and development. As the ocean is an unruly and unpredictable environment, any edge that science and engineering can give is a critical addition to the Navy's fighting and operating capabilities. Thus, the need to understand its operating environment has long been a *sine qua non* of the naval service. Science was well represented in the U.S. National Exploring Expedition and in the North Pacific Expedition during the 19th century, and the Depot of Charts and Instruments (1830) and then the Naval Observatory (1844) were among the earliest federal institutions dedicated to the application of natural knowledge for public gain. This tradition accelerated in the 20th century, reaching flood tide in the World War II and immediate post-war era, which is the subject period of the papers in this session.

Joseph-James Ahern's paper explores the immediate pre-war and World War II era during which researchers at the Naval Research Laboratory, led by Ross Gunn and then Phil Abelson, established a research program directed towards using the new discoveries in atomic structure and nuclear fission for nuclear propulsion. Gunn, who was a scientific entrepreneur in the classic sense, was one of the first to see the possible military applications of the work by Otto Hahn and Fritz Strassman in nuclear fission. Gunn

initiated collaborative work with the Carnegie Institution and the Bureau of Standards that was later moved to the NRL campus in southwest Washington. Ahern ably explores the early successes and difficulties of the work by Gunn and Abelson, which quickly faced considerable antipathy from the Army's Manhattan Engineering District. Faced with severe financial limitations and even greater restrictions in access to materiel and information, the NRL program demonstrated what was achievable when scientific acumen and determination are directed towards a research problem.

Ahern discusses the struggle between the Army and Navy over resources with respect to the new field of atomic research and comments on the coolness of Vannevar Bush to the Navy in general. This is one of the most interesting aspects of Ahern's paper, and I would have liked to see him explore the politics between Bush, Admiral Bowen and the Navy in even greater depth. The earlier sparring between Bowen and Bush over OSRD and civilian control of military research doomed the NRL program from the start. And, indeed, the Navy's competence and independence in science and technology, and its tradition of supporting intramural R&D, made a face-off with Bush and the OSRD inevitable. This conflict between opposed visions and institutional traditions is perhaps one of the most intriguing aspects of this particular episode in the history of military R&D. Ahern's thoroughly researched paper is a very welcome addition to the history of atomic physics and military R&D during WWII.

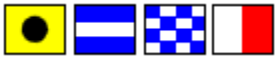
Gary Weir's paper on John Steinberg and ocean acoustics is a smaller part of his on-going larger study of the history of the Navy's SOSUS system. SOSUS was a massive Cold War R&D project that built upon earlier discoveries in ocean acoustics, particularly long-range sound transmission, and applied it to the detection of Soviet submarines. Weir's study of the collaborative work between naval officers and civilian scientists develops upon his earlier work detailing the partnership between the Navy and civilian scientists in developing the modern science of oceanography while meeting naval operational needs. Weir's work here nicely explores the contributions of Steinberg to bioacoustics and long-range sound transmission, as related to SOSUS development and application. But more than this his paper is intent on showing how the divide between so-

called basic and applied research disappears in the realities of actual research, experimentation, and development, which does not follow a classic linear path from basic to applied to operational systems, but rather is an integrated system with all sorts of feedbacks leading in multiple directions. Thus, Walter Monk's ATOC experiment has direct tie-ins with the earlier work of Maurice Ewing, John Lamar Worzel, John Steinberg and others. Their very applied research in ocean acoustics opened up entirely new frontiers in understanding ocean dynamics and the oceans' role both as a heat sink and indicator in climate change. Weir's eventual book on SOSUS will greatly expand our understanding of both the Cold War and its related R&D, through shedding light on an episode/technology in modern science and technology that until very recently has been buried in the black world of national security. I much look forward to seeing this important study in print.

Finally, Eric Hazell's overview of the Navy's RDT&E Acquisition Archives is an important and useful guide for historians interested in continuing the types of research exemplified by the work of Ahern and Weir. The Archive is not inclusive of all Navy developmental labs—it does not include materials from the Naval Research Laboratory, for example. But it does include source material relating to the management and policy of RDT&E acquisition at most of the Navy's warfare centers. These warfare laboratories primarily date to the last sixty years and are an artifact of the role of science and technology in the waging of World War II. Indeed, they are an indicator of the extent and importance that S&T has played in the creation of the modern Navy. It was the success of investment in research--as exemplified in the narratives of Ahern and Weir--that has sold the Navy on technology as an essential element of its investment portfolio. Unfortunately, the Archive lacks the materials that demonstrate technical development at the project level in Navy RDT&E. (The only exception here are the papers of Waldo K. Lyon, which came to the Archive separately.) But they do show the debates over management and policy that guided the Navy and its labs in the broader development process. The archive offers great opportunities for the historian and policy expert interested in the role of modern S&T in the Navy Department.

The role of science and technology in the Navy specifically, and the DOD generally, is a complex, rich, and valuable topic for historical study. There are important questions to be answered that revolve around how science and technology have been integrated into the operational side of the Navy, the interface between fundamental research and the application and development process that turns fundamental research into weapons systems, and the processes by which applied systems can be linked to originally undirected research, if they can be linked. Additionally, it would be helpful to have scholarly comparisons of how the different services have pursued and used R&D.

My thanks to all three authors for their interesting and important work that has helped advance us in answering these sorts of questions.



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