

Year 1949—Stanford.

- (a) Compressible and supersonic flows.
- (b) Theoretical chemistry.

During the period at Philadelphia he was in charge of all instrument development for the aeronautical organization of the Navy. This included navigational instruments and techniques for aircraft.

While at Inyokern he worked for the California Institute of Technology as experimental officer. This included all work on the rockets developed by the OSRD and the building of the technical facilities at Inyokern. The Manhattan District work called for him to work on checking all radar fuzing and its operational functioning on the weapon. The explosive casting and assembly work was also done. This work was done with Los Alamos under the direct supervision of Dr. Oppenheimer and the late Rear Adm. W. S. Parsons, USN. He went to Japan at the close of hostilities for the Nagasaki and Hiroshima study. In 1946 he had charge of the first attempt to photograph a nuclear explosion (Bikini) at 800,000 frames a second to see if one could relate yield to actual expansion rate of fireball. This year found him in charge of the first Bumblebee tests at Johns Hopkins.

The passage of the Atomic Energy Act brought his transfer to New Mexico in 1947, where the construction of the Sandia Base began and personnel were actively trained for use of the atomic weapons. Here facilities were designed in conjunction with the Bureau of Ships. The *Coral Sea*, *Midway*, and *Roosevelt* were the first to be so configured. He participated as a technical assistant in Sandstone where he worked on the measurement of alpha rays and an attempt to measure neutrons of various energies. His work was in close collaboration with Los Alamos and specifically with Dr. Bradbury, the new Director.

In 1949 he was designated to organize and train the first heavy attack squadron which was to be a wing. This tour lasted 2 years and out of the successful operation of the AJ grew the first atomic capability. The A3D concept had been chosen earlier with the decision that the AJ would be the interim solution.

In 1951 he was ordered to the Atomic Energy Commission as the Head of Weapon Research in the Division of Military Application, where he participated in program planning for all atomic weapons laboratory work at Los Alamos and Sandia. Operation Greenhouse, Buster and Ivy were in these programs and were of considerable technical impact on our whole atomic program. The formation of the Livermore Laboratory program in 1952 was one of the responsibilities of this Division. His work on this program was done in close collaboration with Dr. Ernest Lawrence and Dr. Edward Teller. His tour with the Commission lasted over 2 years.

In 1954 he became the Commander of the Naval Ordnance Laboratory at White Oak. During his tour, Dr. Bennett, the Technical Director, transferred to General Electric, and until another director was appointed Admiral Hayward was responsible for both jobs. This was a period of 4 months. While there he participated in graduate programs at the University of Maryland.

His work has brought him in contact with practically all the outstanding scientific people of our country. His graduate work was done originally to further his education in physics, his favorite hobby. He is an Associate Fellow in the Institute of Aeronautical Sciences; a member of the American Physical Society and the Society for the Advancement of Science.

STATEMENT OF VICE ADM. JOHN T. HAYWARD, U.S. NAVY, DEPUTY CHIEF OF NAVAL OPERATIONS (DEVELOPMENT)

Admiral HAYWARD. I have no prepared statement, Mr. Chairman. My feeling is that the Secretary covered it by saying the implementation of this directive is the most important thing. The Secretary of Defense has told me, along with the Secretary, personally, to continue the programs that we were doing, and if we had any difficulty continuing them, to let him know.

The CHAIRMAN. Now, Admiral Connolly, do you have a statement, sir? You have been quiet there and have not said a word.