INTERVIEW WITH DR. VANNEVAR BUSH

August 20, 1944

I began my interview with Dr. Bush promptly at 9:00 a.m. - the first item on his daily calendar. He received me in his impressive new office but with the utmost informality. The man is positively magnetic: friendly, shrewd, frank and made of steel springs.

On the formation of OSRD he said that he had begun thinking about the subject soon after the outbreak of war in 1939. He talked over the problem on a number of occasions during the winter of the phony war with men like Compton and Conant. There was general agreement that something ought to be done. "There were half a dozen plans around this town", but it was impossible to get any action in the winter of the phony war. It was only the victorious German offensive of April and May of 1940, and the invasion of the low countries, that detonated the activity. When France fell Professor Tolman moved east fully aware that something would be done in the near future.

Dr. Bush had his preliminary conversations with Harry Hopkins who was interested, as Secretary of Commerce, in the formation of the Inventors Council. The two projects were launched simultaneously. This was the period [as indicated above] when all sorts of proposals were being made. Bush outlined his idea succinctly in a few paragraphs on one sheet of paper calling for a war research organization. He spent only 15 minutes with the President who approved the plan with an annotation: "O.K. FDR." [date ?] He had a series of conversations with Army and Navy people and spent one day appointing people by telephone.

Bush, within about a week, had split the organization into four divisions of about the same size and importance. He determined to let the Chairman of each division choose the men who were to work under him, and let them decide on the organization of their division.

Bush and Compton had been clear from the beginning that one of Compton's subdivisions should be devoted to radio detection. Bush says that he envisaged the general problem of detection and not merely microwaves. He was very specific about this. For some time before the foundation of NDRC Bush had known about radar, not only in the American Navy and the American Army, but about British radar and French radar. "I made it my business to know what was going on." He was unwilling to divulge his sources of off-the-record information. [Possibly A. V. Hill was one of them].

The atmosphere was not hospitable in the Services for cooperation with civilians. The Army and Navy even kept things from one another. The Navy and the Army had separate developments in fire control, in fact, the Navy refused for a long time to tell Army aided-laying. In one plant engineers working on Army fire control were not allowed to talk to those working on Navy fire control [even now the Navy refuses to let the Army use proximity fuses]. Certain restrictions were laid down in the matter of NDRC work. For a time there was no NDRC work on anti-submarine work, the Navy saying they had the problem licked, until later the NDRC came to the rescue of the sonar program that had completely bogged down. "It is one of the big scandals of the war."

To illustrate the attitude that was found in the Services, Bush recalled a remark in a conference with himself and Dr. Jewett made by General Mauborgne: "When a nation goes to war it is necessary to freeze all new developments - development should stop because production problems of the present day are so vast. You have to fight a war with what you have." There were, however, military minds more sympathetic to the NDRC. Dr. Bush mentioned especially General G. V. Strong, who was the War Department's liaison representative on the committee, and whom he urged me to talk to. Another supporter was General Dillon, an old friend and West Pointer. Actually as early as 1939 Bush was trying to get a new G in the Army. [Wanted a G_5 for science to put consideration of scientific research on a high echelon.] This was actually brought before the general staff and voted down [when ?]. The

effort to get the armed forces to do this finally succeeded in 1943 [By the appointment of General Henry as scientific officer in the Secretary of War's office, or by the creation of the Joint New Weapons Committee of the Joint Chiefs, of which Bush is Chairman. Bush revived the idea in the 13 p. paper "Organization of Defense Research" prepared in February-March 1941 for the Bureau of the Budget. See notes of Chalkely's family album].

I gathered from my talk with Bush that the shift of the detection problem to microwaves was in part due to the necessity of not treading on the toes of the Services. As it turned out, as Dr. Bush put it, "We ran away with the ball."

In response to questions about the British Mission he replied that he discussed the problem of scientific interchange with A. V. Hill during the latter's visit. No official contacts had been established, however, and "we didn't get far." The Tizard Mission was prepared for by an aide memoire that was signed by President Roosevelt and the British Ambassador, the late Lord Lothian. It was very broad. It was to be a military interchange - the mission was accredited to the Military, and it was understood that the civilians would have to "get together behind the barn". Upon the arrival of the mission, Bush saw Sir Henry and agreed they had better not get together until after the military exchanges had taken place. The interchange was not completely free. The Americans refused to release information about the Norden bombsight. Lord Lothian spoke of the Americans having an obsession on the question of bomb sights. It was Dr. Bush's opinion that the British were farther advanced in the transmitters and that the American longer wave radar had better receivers.

Dr. Bush was very definite that "We were all immediately convinced that we needed a central laboratory" [date ?] although the general philosophy had been to use existing facilities as much as possible and have great decentralization. This was partly to save time, partly to save money. Dr. Bush had conversations on the subject with Dr. Compton and Alfred Loomis. Loomis urged that the labora-

tory be established here in Washington, set up under the Carnegie Institution. "I protested, and we had a hell of an argument that took half the night and a bottle of scotch." Bush's objection was not that the space was unavailable at terrestrial magnetism, it was rather that he knew the set-up out there intimately and that he would have disciplinary and administrative troubles with one or more persons, whom he was careful not to mention out there. Loomis still held on to the idea of Washington, and the Bolling Field idea was considered. Dr. Bush said that suggestion "didn't really fall through" but that MIT suggested itself as a better alternative. When it was proposed Dr. Compton "made the same objections I had."

In response to my question about the relative importance of Loomis and Bowles he stressed the energy and determination of Alfred Loomis. But it was necessary to "give him plenty of steers, to steer him into a path." Bowles, on the Microwave Committee, was only Loomis' aide. "It was always a powerful group," remarked Dr. Bush.

Dr. Bush was very sympathetic with Bowles in the matter of the conflict at the Radiation Laboratory. "MIT was a physicist's show" and Dr. Compton wanted it that way. "Bowles represented the center of thought" that some engineering and engineering methods might well be tried in the Radiation Laboratory, but "it was Bowles against the field - they pasted hell out of him."

Bowles' appointment to the Secretary of War's office was not a kicking upstairs of Bowles to alleviate a difficult situation (though it had that effect). It was the result of a request from the Secretary of War. "The man with the greatest vision in the War Department is the old Secretary. A lawyer, and an old man, he yet has more vision than anyone else in the Army. I had a number of conversations with Mr. Stimpson, on where the war was going, and so forth, had talks with him at his home. He was unhappy at the way radar was being used or not sufficiently used in the Army. The use of radar in the Battle of Britain had set him on fire. He wasn't satisfied with the way things were going in the Army. He got the idea

independently of joining a man to his staff who would be cognizant of important developments and keep him informed. Bundy got hold of me." Loomis, who had met with the Secretary and discussed radar, seemed a logical person for the job. But Loomis was a relative both of the Secretary and of Bundy and they wished to avoid a suggestion of nepotism. So Bowles was appointed. Dr. Bush spoke of Bowles as having done a "gorgeous piece of work. The Secretary had been butting in all over the Army and everybody got the jitters. This stopped when Bowles took over. He has become virtually an Assistant Secretary of War for radar."

Bush evidently had a high regard for Bowles and sided with the engineer's point of view in the matter of the laboratory's history. Far from looking upon K. T. Compton as taking a middle of the wood position he spoke of him as wanting it to be "a physicist's show." Bowles had tried to set up an engineering office at MIT but these wouldn't use it.

Bush spoke of the constitution of the Microwave Committee as having "at the outset worked well to get a meeting of minds with Industry." But after a while "The Radiation Laboratory took the ball and ran away."

Dr. Bush spoke of the shift in organization (creation of OSRD ?) when the structure became Totalitarian. He said however he was "not damn fool enough" to think he could enforce that had he wanted to. He had a policy of encouraging as much autonomy as possible, he encouraged direct contact with the Services. He took moves to reduce central control.

We discussed the opposition of the big companies to the development of the Laboratory and the rise of the small companies. Jewett, it seemed, had desired to confine to the Radiation Laboratory the fundamental research. There were "lots of fights with Jewett" apparently some fairly rip-snorting ones. One nearly disrupted the organization. Dr. Bush spoke of the Big Companies as being "damn conceited" but the RL physicists were "also conceited." There were times when he felt like saying "a plague on both your houses." Both the big companies and the small companies have their serious faults. Bush appears to feel that the struggle has

had a beneficial effect on both the small and big companies. But, he concluded, "the stuff never would have been done if the big companies had done it."