

to find discrepancies in our known knowledge which will lead us to interesting new possibilities.

Mr. DADDARIO. Dr. McLean, I am pleased to see that you have included in your preliminary remarks the concern that the researcher has with the social, economic, and political problems. I believe this to be a very important aspect.

Dr. McLEAN. Yes.

Mr. DADDARIO. This gives us a great opportunity to use these talented men in the solving our social, economic, and political problems, and a great effort must be made to enhance this capability.

Dr. McLEAN. Yes, sir. I think the interdisciplinary work is very important to include in laboratory programs.

Mr. DADDARIO. You were here yesterday when Dr. Weinberg talked about this?

Dr. McLEAN. Yes.

Mr. DADDARIO. In some of their work at Oak Ridge they find as they begin to accomplish some of these objectives for other agencies they are going further and further into problems of society. This would also be the case from what you have said.

Dr. McLEAN. I believe so, yes.

We know that federally financed research and development can be accomplished through several different means: the in-house laboratory, the Government-owned facility operated by a contractor, universities provided grants or contracts, contracts with nonprofit organizations, and contracts with private corporations. All of these types of management structure appear to work well. To me, the crux of the problem is not the type of organization but the process of setting management objectives for the organization so as to keep them broad enough and just impossible enough that people can generate their own methods of working toward these common objectives and be judged by the impersonal process of competition. Management of the development of our weapons systems is a complex and complicated task requiring not only the skills to solve the purely technical problems, but also the highest order of management coordination. Let me illustrate from my past experience as Technical Director of the Naval Ordnance Test Station, a laboratory of approximately 5,000 people engaged principally in the development of air launched weapons—now the Naval Weapons Center.

The ASROC weapons system involved an extensive research and development effort whereby NOTS as lead laboratory for the Bureau of Naval Weapons undertook project responsibility for development of the entire weapons system, including propulsion, fire control, launcher, and development of the torpedo and mechanical test and incorporation of the nuclear depth charge. This required interfaces with a wide range of governmental and industrial activities, including several Navy bureaus, the Atomic Energy Commission, and numerous prime and subcontractors for production of the system and its component parts. The laboratory's involvement with this program started with the definition of a fleet need. It carried through concept development, feasibility demonstration, prototype development, contractor direction on production, and finally fleet introduction and troubleshooting.