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ARMY RESEARCH AND DEVELOPMENT

By

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By law and regulation the War Department is appropriately charged, among other functions, with responsibility for the development of the various types of military equipment required by the Army. This responsibility has been delegated in turn to the various technical agencies of the department. Accordingly, in the Army Air Forces there are technical agencies directly charged with the design and development of equipment peculiar to the Army Air Forces and in the Army Service Forces there are seven technical services respectively charged with the development of ordnance, medical, signal, quartermaster, chemical warfare, transportation, and engineer devices.

The Ground Forces are the customers of the technical agencies of the War Department and specify the military characteristics of the equipment required by the ground combat troops. In a like manner the Air Forces specify the characteristics of the equipment required by the air organizations. Equipment developed by the technical agencies must first be tested for its suitability and be approved by the Ground or Air Forces before it is standardized for issue. The tests are carried out by various boards representing the different combat organizations. Often new equipment is procured in limited quantities for issue to troops in the theaters in order to obtain a service trial of the new items under combat conditions. This is the acid test and no equipment is actually considered fully proven until it has performed adequately in combat. Equipment which is superior, which performs effectively in competition with that of the enemy, and which enables our forces to carry out their missions expeditiously and with the least loss of life is the goal sought in our research and development effort.

This research and development program is directed by qualified leaders in the technical agencies of the War Department. Many of these men have been trained during their service in the department, others have been recruited from civil life; some wear uniforms, some are in the Civil Service, some have been borrowed from universities, laboratories, and other scientific agencies on part time assignments during the war--all have ably conducted the research programs which have done so much to create the fine equipment our Army is using today.

In these activities each of the technical agencies is employing its own resources, its own arsenals, manufacturing establishments, proving grounds, and laboratories. In addition, each is assisted by the engineering groups and laboratories of industry and of our universities. In fact most of the research and development for the technical agencies of the War Department is performed by these industrial engineering and scientific groups. The technical agencies of the War Department are further assisted by the services of the National Inventors Council, by the programs and personnel made available through the Office of Scientific Research and Development, and by the War Metallurgical Committee of the National Academy of Sciences. There is also complete cooperation and coordination on

problems of mutual interest between the technical agencies of the War Department, the various Bureaus of the Navy Department, and the agencies of the War Production Board.

The role of science in this war and the part played by the Office of Scientific Research and Development in assisting the War Department to meet its wartime research and development responsibilities have previously been covered in the pages of this publication. OSRD has done a masterful job in mobilizing scientific effort for our Army and Navy and the War Department has received outstanding contributions from the initiative, energy and creative effort of this great organization.

The experience of the War Department in research matters has produced throughout the entire structure of the Department the fullest appreciation of the importance of scientific effort in carrying this work forward. The Secretary of War, himself, is extremely conscious of the value of the scientific approach and has given many of the important new developments his personal attention. He is continuously advised by the chiefs of the technical agencies of the War Department in these matters and has at his hand consultants to advise him on the scientific aspects of the military effort. His special assistants are active in supervising and coordinating this work and they have been peculiarly effective particularly in the field of electronics. From the top to the bottom of the War Department the organization is indoctrinated with technically and scientifically trained men which are actively engaged in the solution of its problems. The War Department plans similarly to maintain this scientific indoctrination in the postwar period.

Recognizing the importance of research and development, the War Department over a year ago established the New Developments Division of the War Department Special Staff. This New Developments Division is charged in general with staff functions which relate to the initiation and coordination of research and development and the military application of new and improved devices and techniques. The Division is specifically charged with the following:

a. Primary responsibility for War Department staff action relating to initiation and coordination of research and development, including development procurement.

b. The exploitation of opportunities for new methods of employing existing weapons and equipment, and the initiation of necessary action relating to the development and prompt military application of new and modified weapons.

c. Coordination and supervision of the introduction and demonstration of new and modified weapons, devices and techniques to the appropriate commanders in the United States and theaters of operations.

d. The rendering of assistance to theater commanders in the solution of technical and scientific problems.

e. Maintenance of close contact with all joint Army-Navy planning and coordinating agencies and committees on new and modified weapons and devices through representation or direct liaison.

f. Supervision over the introduction and the activities of all civilian and military personnel constituting scientific and technical missions to the theaters of operations on matters of research and development.

g. Initiation of necessary action which will insure impartial and conclusive service tests of those weapons and devices which have not received adequate consideration.

h. Maintenance of appropriate relations with other governmental and civilian agencies and the coordination, through the New Weapons Committee of the Joint Chiefs of Staff, of programs of common interest.

i. The making of timely and appropriate recommendations covering standardization, classification, and approval of non-standard items for oversea use.

j. The coordination and reviewing of requirements for special or exceptional items whose future application can be foreseen, but for which the theaters of operations or the combat troops have not established a requirement.

Thus, staff action in the War Department on research and development has been placed with a special staff agency close to the Chief of Staff and the Secretary of War to give impetus, incentive, and over-all supervision to these activities of the Department. Actually its role is that of providing assistance to the technical agencies of the War Department and its success is appropriately attained by aiding those operating agencies to carry out their responsibilities in their respective fields of research and development. The position of NDD in the War Department enables it to iron out differences which may develop between the Service Forces, Ground Forces and Air Forces in their research and development activities and to arrange a direct approach to the Chief of Staff and the Secretary of War for any appropriate decisions which may be required by such higher authority. If the demands for the development of new equipment by the combat troops are not being adequately met, NDD must arrange for appropriate action to be taken by the technical agencies to satisfy the needs which have been envisaged. When the technical agencies have developed equipment considered by them to be satisfactory, but which has not been established as acceptable by the combat forces, NDD must make sure that comprehensive service tests are conducted to demonstrate the tactical usefulness of the device and to insure that the device has received adequate consideration. NDD must be the crystal gazer of the War Department for special or exceptional devices for which the theaters or the combat troops have not established a need, but for which future application can be foreseen. Thus NDD must

let no device which will have future value evade the War Department and discarded. When these devices have become available, NDD must see to it that they are offered to our forces and appropriately exploited. To be certain that these new devices will be available when needed, NDD must continuously maintain an over-all examination of the research and development program, including the needs of future operations, trends in enemy equipment, and the research work of all agencies. The importance of this forward looking survey cannot be minimized in view of the fact that often eighteen months to three years must necessarily elapse between the inception of an idea and the delivery on the battlefield of standard equipment incorporating this idea. NDD must keep those in charge of War Plans advised of new developments which will come into use so that they will be sure to be fitted into operational plans.

NDD is also charged with the over-all examination of funds involved in research and development programs. This will become very important in the postwar era when funds will be a most controlling factor in determining the extent to which the development of new equipment may be undertaken. The Division will be called upon to exercise a very close review of the budget to be certain that the need for money for research and development is appropriately balanced with the operating requirements of the Army.

Where theaters of operation have need for scientifically or technically trained groups to assist them, it is the job of NDD to arrange to have this aid provided. In this connection, the Office of Field Service, OS has been of great help and, in fact, has been the agency which has provided many of the civilian scientists to the theaters. Permanent groups have been established by the Office of Field Service in several of the theaters and these have currently provided to the headquarters of the theaters technical and scientific assistance in solving complex problems which arise daily. It is impossible to give too much credit to this scientific and technical assistance or to that made available directly by OSRD, or by the technical agencies of the War Department.

Much assistance has been given by NDD in the introduction of new equipment into the theaters by arranging for trained teams to accompany new devices and to demonstrate and exploit their full potential usefulness to the combat troops. The Chief of Staff personally has directed the introduction of certain of these teams to meet initial needs, the requirements which he has observed, and he has personally sponsored the continuation of this important activity by NDD. These teams have been provided by the Ground Forces, Air Forces, and the Service Forces of the War Department by the Office of Field Service, and by OSRD. They have been drawn from all sources—military, civilian, industries, laboratories and universities. These teams, in addition to demonstrating equipment, have acquired valuable background which has been brought back to the United States and which has served to guide further research and development. They have thus been a means of determining the user's requirements on the spot, and have been the most important link in bringing the realization of those needs back to the War Department in order to enable all technical agencies promptly to attack the problem and supply them.

NDD has recently sponsored a special scientific group which, accompanied by one of its own officers, visited the European Theater of Operations in order to analyze the effect of our various weapons on enemy morale. Other groups, aided by NDD, have studied battle damage and the performance of standard weapons under combat conditions. The results of these various studies have been made available to all appropriate agencies for the purpose of further aiding the development of effective weapons for our Army.

NDD has consulted with other agencies of the War Department in the selection and prompt assignment overseas of scientists and expert technicians inducted into the service. Such action has been taken to aid in introducing, demonstrating and exploiting in the theaters now and complex equipment upon which these men have been working before they were inducted.

One type of specialty work undertaken by experienced personnel introduced into the theaters of NDD has been in the field of Work Simplification. Men trained in this work have been sent to the theaters to aid in improving the performance of certain selected jobs. Because of the promising results of their work, Work Simplification has been extended to various agencies of the War Department here in the United States which have not previously utilized this approach to improve their efficiency.

With an eye to the future and to enlist the continued aid of engineers and scientists in the development of new and improved devices required by our armed forces, representatives of civilian engineering and scientific bodies with representatives of the War Department and the Navy Department are together formulating a plan for the creation of a Research Board for National Security under the National Academy of Sciences. This Board is to consist of representatives of engineering and science and of the War and Navy Departments who will formulate and direct research, particularly fundamental research, in those fields of engineering and science which will contribute to our national security. By the time this article is published, it is expected that this Board will be in operation.

It is contemplated that the War Department will place with the Board research and development projects which will engage the creative imagination of the engineers and scientists enlisted by the Board. It is planned that the projects placed with the Board will be broadly stated in order to permit independent action without detailed review, thus allowing the Board full exercise of its initiative. The Board will no doubt carry forward into the postwar period some of the longer range projects of the type now being handled by OSRD. It will continue to be a focal point for bringing the best scientific brains of the country to bear upon many of the research problems of the armed services. It will thus become a team mate with other numerous agencies in bringing science to the further support of the War Department.

In the future, there must be no relaxation in the research and development activities of the Army and the application of science to the art of War must continue to be fully exploited in the over-all program of national defense. Aply assisted by the engineers of industry, by the laboratories, by the universities and by the added scientific effort which will be

