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Research and Development Board
Committee on Basic Physical Sciences

MEMORANDUM

28 January 1949

To: The Chairman, Committee on Basic Physical Sciences

Subject: Statement on Program Planning, Panel on Metallurgy

1. The organization of sub-panels supporting this Panel was begun in November. Of the groups now organized, none has met more than two times, and six of the groups projected have not yet had their first meetings. Accordingly, this statement cannot undertake to deal with the metallurgical programs in detail. The Panel has considered only the most urgent problems and the programs directed to their solution.

2. The following sub-panels have submitted reports of initial surveys of work underway in their respective fields:

Super High Temperature Materials
Ferrous-Base High Temperature Materials
Ceramic Coatings for Metals
Ceramics
Aluminum
Magnesium
Titanium and Zirconium
Carbon and Alloy Steel
Welding and Joining
Corrosion and Surface Treatment
Magnetic Materials

These reports, some of which are quite detailed, are being circulated among all interested committees of the Board, as well as among the Technical Services of the Departments.

3. The performance of weapons and carriers under development depends largely on the materials used in their construction, and better materials are essential to meet the new requirements. The properties of the materials are usually the limiting factors. Besides, most of the unique designs are based on the availability of materials with new and improved characteristics. For example, improvements must be sought in the following categories: (a) high temperature materials of

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all kinds and the techniques of welding and joining them, (b) metals and alloys of increased strength-weight ratios and toughness and (c) magnetic materials.

4. Accordingly, the Panel recommends that emphasis be so placed as to bring to completion, within a few years at most, all projects relating to the development of the following:

   a. Super high temperature materials for use in the temperature range, 1800-3000°F, including methods of production and development of molybdenum, chromium, tungsten and other unusual metals and their alloys in forms suitable for use.

   b. Nickel-base and cobalt-base alloys for use at temperatures up to 1800°F.

   c. Ceramics and ceramic coatings for metals for unusually high temperatures up to 5000°F.

   d. Iron, steel, aluminum and magnesium alloys for higher strength and toughness at both high and low temperatures.

   e. Methods of producing titanium on a commercial scale and the development of high strength and good corrosion properties at both room and elevated temperatures.

5. The Panel also recommends intensification, wherever possible, of long-range research directed toward new and better materials, as well as an extension of knowledge of the properties of known metals and alloys to facilitate better use of available metals in improved designs of military materiel of all kinds.

6. In connection with all those researches and developments, grave consideration should be given to the conservation of critical materials by such measures as the substitution of more plentiful materials, the use of smaller amounts of scarce materials and more efficient methods of extraction and recovery.

/s/ Clyde E. Williams

Chairman, Panel on Metallurgy,
Committee on Basic Physical
Sciences