

- relative effectiveness and efficiency, and
- avoidance of conflicts of interest.

*Relative effectiveness and efficiency*

In selecting recipients, whether public or private, for research and development assignments, the basic rule (apart from the conflict-of-interest problem) should be to assign the job where it can be done most effectively and efficiently, with due regard to the strengthening of institutional resources as well as to the immediate execution of projects. This criterion does not, in our judgment, lead to a conclusion that certain kinds of work should be assigned *only* to certain kinds of institutions. Too much depends on individual competence, historical evolution, and other special circumstances to permit any such simple rule to hold. However, it seems clear that some types of facilities have natural advantages which should be made use of. Thus:

*Direct Federal operations*, such as the governmental laboratory, enjoy a close and continuing relationship to the agency they serve which permits maximum responsiveness to the needs of that agency and a maximum sense of sharing the mission of the agency. Such operations accordingly have a natural advantage in conducting research, feasibility studies, developmental and analytical work, user tests and evaluations which directly support the management functions of the agency. Furthermore, an agency-operated research and development installation may provide a useful source of technical management personnel for its sponsor.

At the present time we consider that the laboratories and other facilities available to Government are operating under certain important handicaps which should be removed if these facilities are to support properly the Federal research and development effort. These matters are discussed at some length in part 4 of this report.

*Colleges and universities* have a long tradition in basic research. The process of graduate education and basic research have long been closely associated, and reinforce each other in many ways. This unique intellectual environment has proven to be highly conducive to successful undirected and creative research by highly skilled specialists. Such research is not amenable to management control by adherence to firm schedules, well-defined objectives, or pre-determined methods of work. In the colleges and universities graduate education and basic research constitute an effective means of introducing future research workers to their fields in direct association with experienced people in those fields, and in an atmosphere of active research work. Applied research appropriate to the universities is that which broadly advances the state of the art.

*University-associated research centers* are well suited to basic or applied research for which the facilities are so large and expensive that the research acquires the character of a major program best carried out in an entity apart from the regular academic organization. Research in such centers often benefits from the active participation of university scientists. At the same time the sponsoring university (and sometimes other, cooperating universities) benefits from increased opportunities for research by its facilities and graduate students.

*Not-for profit organizations (other than universities and contractor-operator Government facilities)*, if strongly led, can provide a degree of independence, both from Government and from the commercial mar-