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Research and Political Power

It is now widely accepted that research is the spearhead of the economic growth of a country, giving rise to new products, new industries, and new jobs. Over the last two decades, the pattern of industry of the more highly developed nations has altered massively in accordance with world scientific discovery, and increasingly countries and firms are concerning themselves with how much of their income they should invest in research.

This does not mean that economic strength is determined by the research expenditure of a nation or a corporation. Many other factors operate—availability of raw materials, investment capital, skilled manpower, and, perhaps above all, leadership. It is probably true, however, that the greatest economic gain comes to those countries which exploit research most quickly and most completely, rather than to those which contribute most to the world store of new knowledge.

This is especially so since it is still accepted throughout the world that the results of fundamental research should be published freely and internationally. The pool of common world knowledge is therefore there for all to exploit who will and can. It is frequently said that, until World War II, at any rate, the United States had the genius to exploit new discoveries more quickly than other nations, while the countries of Western Europe produced new science to a greater extent than other regions but failed to make full use of it. There is certainly much truth in this, but as science and industry become more complicated, exploitation and research contribution are tending to come ever closer together.

The fact is that very little of contemporary discovery in fundamental research can be put to productive use until much applied research has been undertaken. Fundamental research, applied research, technological development, and production are becoming more and more parts of the same spectrum of activity in the new science-based world into which mankind is emerging. This means that research power in the larger sense will, in the future, be more determinative of economic power.

While the economic significance of research has long been accepted, albeit in some places grudgingly, it is only recently that its political influence has become obvious. The atomic and hydrogen bombs dominate the foreign policies of the powers that possess them and influence greatly the foreign policies of countries which lack them. But even neglecting these scientific monsters, whether they are regarded as threats to the peace or as deterrents to war, modern warfare and defense have become so sophisticated in the technological sense with the numerous uses of radar, jet planes, guided weapons, proximity fuses, and so forth, that only countries possessing highly developed research resources and the elaborate industries supporting the defense program can feel secure and strong.

Political power is founded on economic and defense strength, both of which are increasingly dependent on research. It follows, therefore, that research power and political strength are now mutually dependent through a complex chain of cause and effect. This is recognized even by the politicians. In introducing a recent debate on foreign affairs in the House of Commons, Harold Macmillan, the British prime minister, said, "The

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