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Fundamental Science in the States

The total federal research budget of the United States for 1983–1984 is approximately $47 billion. About 14 percent of this ($6 billion to $7 billion) is dedicated to fundamental research, and half of this sum is spent at colleges and universities. Campuses in the ten states that are best funded have received the bulk (60 to 65 percent) of the federal research dollars, while only 1 to 2 percent goes to schools in the ten states where the funding is low.

The sophisticated equipment, laboratory facilities, libraries, and the high-quality professionals at the top institutions are a vital part of the relatively good health and status of the U.S. research picture. However, in view of the changing demographies in the country, it may be time to consider a greater distribution of high-quality science centers. Would an increase in research dollars to states that are not well funded and to the poorly funded institutions in the richer states enhance our total science base, improve undergraduate education in science, and provide better graduate education in these locations? Should incentives and opportunities be provided to scientists in these locations to become more competitive? The answer to these questions is affirmative for a number of reasons.

Since the middle to late 1970's there has been a dramatic increase in the number of people who receive Ph.D.'s at the top universities and find employment in the medium-level universities throughout the United States. Their ability to acquire competitive grants from federal agencies is hindered by heavy teaching loads, an inability to develop scientifically compelling grant applications, academic isolation, lack of mentors, and poor local support for scientific research and creative activity. Thus, the total scientific talent of these individuals has not been captured. Their research and teaching effectiveness might be greatly improved by funding their research efforts. To rectify some of these problems, the National Science Foundation in 1980 launched the Experimental Program to Stimulate Competitive Research (EPSCoR) in five states that were at the bottom in total federal research funding: Montana, South Carolina, Arkansas, West Virginia, and Maine. After each state had thoroughly assessed its problems and developed a comprehensive plan, a modest sum of $2 million to $3 million was awarded to each state. Since 1980 dramatic strides have been made in upgrading science in these states through speaker programs, extensive extramural peer review of proposals, consultants, infusion of new state and private dollars, and shifting of teaching loads.

In Montana the EPSCoR program, known as MONTS ("Montanans on a New Trac for Science"), has relied on more than 500 peer reviewers in evaluating its scientific proposals. It has supported several hundred seminar speakers and consultants. At present, well over 50 percent of the original MONTS investigators have acquired extramural research funds. These funds have come from federal, state, and private organizations and agencies, and the amounts are nearly double those originally received from NSF. Furthermore, after NSF-EPSCoR funding has ceased, the MONTS program will continue with state funding. In Montana, the unique local and regional land, water, and wildlife resources have been well suited for study by MONTS investigators. For example, MONTS paleontologist John R. Horner, now independently funded by NSF, is continuing to excavate in north central Montana where he discovered extensive dinosaur nesting sites, complete with eggs and young.

Ultimately, increased scientific activity in the EPSCoR institutions strengthens both undergraduate and graduate education. In some cases, political leaders realized that economic development in their area is directly related to the status of research activities at the educational institutions of the state. The achievements made under EPSCoR, with a relatively modest federal investment, show that this approach should be broadened by NSF and other federal and state agencies to advance science and science education nationwide.—GARY A. STROBEL, *MONTS Project Director and R. G. Gray Professor, Montana State University, Bozeman 59717*