

PROMETHEUS BOUND

THE BASICS ABOUT BASIC RESEARCH

by Fred L. Smith Jr.

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Why does Newt Gingrich want to double the annual federal science budget from today's \$16 billion to some \$32 billion? (The real current number is actually about \$80 billion.) Perhaps because politicians have yet to free themselves from the "government does it better" mindset that has dominated America since the start of the Progressive Era. So-called "Progressives" regarded markets as fragile institutions often requiring careful political fine-tuning to function effectively. Markets, they claimed, under-produce "public goods"—valuable activities, infrastructure, and information, that for various reasons the private sector can't pay for. Basic scientific research, we are told, falls into that category. Research is costly, success is not guaranteed, and investors might not be able to recoup their cash. Duplicating, that is, free riding on someone else's discovery, is easier. Thus governments must fund scientific research needed for technological innovation and economic growth. QED!

That R&D is useful is clear, but how valid are the "public goods" and "free rider arguments" and why does anyone think that those problems are best solved politically? One assumption of the "public goods" scenario is that only economics drives scientific discovery. That ignores the fact that many scientists are deeply motivated by an aesthetic search for the truth. The passion can be every bit as compelling as the desire for personal wealth or the fulfillment sought by the painter or musician. Read any memoirs of the

great scientists—Watson's or Crick's recounting, for example, of the discovery of the structure of DNA—and it becomes obvious.

Moreover, some basic research does attract private funding. Number theorists engage in seemingly obscure research. But they find ready employment in the encryption field. And, although it is more difficult to attract financing for basic (as opposed to applied) research, applied technology often precedes any deep understanding of the underlying theory. Metallurgy, for example, was a valuable craft for centuries before advances in crystallography made it possible to predict the properties of a new alloy.

The profit motive encourages investments in basic research. Bell Labs scientists searching for the sources of static in phone lines discovered the cosmic background radiation from the Big Bang that created the universe. And the high rate of dry holes in early oil explorations stimulated the development of seismology. Pharmaceutical companies invest heavily in basic molecular biology and biochemistry because biotech offers promise of new, effective drugs.

Also, before we accept the "market failure" rationale for taxpayer funded R&D, we should review the risks of "government failure." First, government research funds are distributed politically. Political influence, not some "objective" evaluation of need determines who and what will be funded. Certainly, Congress cannot set meaningful priorities for basic research projects—should we invest more in

cell biology or neutrino research? Such problems guarantee that taxpayer-based science funding will rapidly mutate into a variant form of pork barrel spending.

Nor does state investment in R&D necessarily translate into an increase in overall R&D spending. Indeed, Terence Kealey in *The Economic Laws of Scientific Research*, argues that total R&D spending relates most closely to national GDP. Nations with low government R&D funding finance more of such activities privately. Nations where government provides major funding attract less private sector support. That should not be surprising—why give at home when you've already given at the office? This displacement/substitution effect suggests that taxpayers gain little from political R&D expenditures; we simply shift research costs from business to the citizenry. Finally, if "public" goods are financed politically, then "private" parties should not be taxed more heavily. The deadweight losses of those tax increases must be balanced against the value of whatever additional knowledge is gained.

Exploring the frontiers of knowledge is best done by those who care enough to spend their own monies or energies. As elsewhere, lowering the tax burden and eliminating antitechnology "gatekeeper" regulations would be a better way of advancing R&D. There is no doubt that science and technology are critical to the future of the United States and the world. There is much doubt that those activities are best advanced by politics.