

CURRENT SCIENCE

Volume 83 Number 5

10 September 2002

EDITORIAL

Philanthropy and the funding of science

'And gradually there is coming into being a new branch of science – molecular biology – which is beginning to uncover many secrets concerning the ultimate units of the living cell. . . .

Among the studies to which the Foundation is giving support is a series in a relatively new field, which may be called molecular biology, in which delicate modern techniques are being used to investigate ever more minute details of certain life processes.'

Warren Weaver
The Natural Sciences Report
Rockefeller Foundation
1938, 203–204

Molecular biology is central to all modern research in biology. The discipline was born in a report of the Rockefeller Foundation, when the director of its program in natural sciences, Warren Weaver, coined the term 'molecular biology' in arguing for directing funding towards a new, reductionist approach to biology. Weaver's intentions were to promote a new 'intellectual ferment' in biology, turning to physics and chemistry, for attacking the central issues of cellular processes. Weaver was spectacularly successful, overseeing grants of over \$ 90 million in the period between 1932 and 1959. The Rockefeller Foundation supported a stellar cast, Hermann Muller, Max Delbrück, T. Caspersson, E. Hammarsten, Linus Pauling, Robert Corey, T. Svedberg and W. T. Astbury, who would transform biochemistry and genetics in the years between the World Wars; setting the stage for the Watson–Crick double helix to emerge in 1953. The birth of modern biology was truly midwifed by the Rockefeller Foundation. Both Lawrence Bragg and Max Delbrück, two of the field's most influential founding fathers, have acknowledged their indebtedness to the Foundation, while Linus Pauling's seminal work on the magnetic properties of hemoglobin was catalysed by the carrot of support offered by Weaver (*The Path to the Double Helix*, Robert Olby, Dover, New York, 1994). The Rockefeller Foundation's spectacular success in supporting biological science came at a time when govern-

ment funding for research in the West was modest. Indeed at the beginning of the 20th century the Rockefeller and Carnegie foundations, started by two of America's richest businessmen, John D. Rockefeller and Andrew Carnegie, had begun a new experiment. 'Foundations with large established endowments were to supply venture capital for the common good. And giving should be strategic – philanthropy should not simply respond to needs but should look for investment opportunities that yield significant returns' (Fitzpatrick, S. M. and Bruer, J. T., *Science*, 1997, **277**, 621). Can there have been a more successful 'venture' in directing basic research than the effort of Warren Weaver at the Rockefeller Foundation?

In the 50 years since the double helix and, of course, the Sputnik, public funding for science has grown enormously in the West, particularly the United States. The breathtaking advance of contemporary science and technology, on an extremely broad front, can be traced to the substantial public investment in science. At the peak of the boom in public interest in science in the US even private companies invested significantly in apparently 'basic research', although in more recent times long-term investments in science have become much less attractive to industry. In analysing trends in the US, N. Myhrvold, in an essay in *Science* (1998, **282**, 621) notes: 'At the government level science has not been recognized as the wellspring of the technology miracle, and as a consequence support is cut, or worse, is subjected to a protracted dissection and review to see if it is "relevant" to short-term economic goals. This puts government funding bodies in the awkward position of second-guessing both the research and the market place.' Ironically, in discussing the drop in defense funds, which most notably supported the long-term development of ARPANET, the precursor of the Internet, Myhrvold ruefully adds: 'Peace has not been good for science'. But, even as discussions on the directions for public funding of science have continued in the West, private philanthropy has been on the rise. About three years ago, *Science* carried a news focus entitled 'Philanthropy's Rising Tide Lifts Science' (*Science*, 1999, **286**, 214). This report placed the annual funding by private foundations worldwide at about

\$ 2 billion on science, out of a total spending of \$ 20 billion. Over the period 1990–1998 spending by private foundations doubled. While the funding by the US National Institutes of Health (NIH), the National Science Foundation and Department of Energy is almost 10 times larger for science, the philanthropic bodies appear to be gaining importance in their abilities to direct and promote research in specific areas.

For a little over a decade, the Howard Hughes Medical Institute (HHMI) has been a major force in funding biomedical research in the US. Awash with funds generated by the sale of stocks in the Hughes Aircraft Company, HHMI may be the most lasting legacy of the famously reclusive and eccentric aviator, Howard Hughes. In 1999, the assets were estimated at over \$ 12 billion, with over \$ 400 million distributed as direct science funding to researchers carefully chosen for their excellence in diverse fields of modern biology and medicine. In the UK the Wellcome Trust, established by a pharmaceutical company founder, Henry Wellcome, has become a major force in science funding as the charity's assets have touched nearly \$ 20 billion. Focused largely on biomedical research, Wellcome has been a driving force in propelling genomics research, by its investments in the Sanger Centre. The most recent, high profile entrant into the area of private, philanthropic support for science is the Bill and Melinda Gates Foundation, whose 1999 assets are estimated to rival those of its better-known predecessors. The list of foundations and charities which promote science, some in specialized niche areas, in the US is impressive. The Rockefeller Foundation, which played such a key historical role in charting the course for private philanthropy, focuses only modestly on direct research support in areas like reproductive health, agriculture and vaccines. In addition to direct funding of research, Foundations play an important role in providing fellowships, travel support and international exchange and in 'linking policy leaders with the scientific community to consider the factual and analytical basis for decision making in science policy' (Hamburg, D. A., *Science*, 1999, **284**, 259). Private donors have also contributed enormously to the growth of American universities, many of which have launched major new programs using resources generated by campaigns to add privately to their coffers. The long-term partnership between public organizations and private philanthropy has served to establish academic science in the West on a firm footing.

Private enterprise and individual vision catalysed the founding of two of India's most prestigious institutions, the Indian Institute of Science (IISc) in 1909 and the Tata Institute of Fundamental Research (TIFR) in 1945. In the case of IISc, the catalysing vision was that of Jamsetji Tata, while the practicalities of formation required not only the initiatives of his successors but also involvement by the governments of India and the State of Mysore. For TIFR, the initial seeds were sown by the Sir Dorabji Tata

Trust and the Government of the Bombay province. Both the institutions today are funded almost entirely by government sources, with little by way of private, philanthropic support for science. The almost complete dependence of our universities and research institutions on government support has resulted in a mushrooming of a number of public agencies and departments which dispense research support. The bureaucracy has now acquired a stranglehold on the functioning of departments charged with the responsibility of nurturing science education and research. Mechanisms for funding individual investigators have become ponderous and inefficient. Government agencies are often at odds with one another in futile games of bureaucratic one-upmanship, which leave scientists bewildered and confused. Even simple issues like fixing fellowships for research students and post-doctoral associates (*Curr. Sci.*, 2002, **83**, 358) have become contentious matters, as concerned Ministries and agencies work at cross purposes. In this environment, foreign funding agencies like the Wellcome Trust have begun to support a few chosen investigators. These organizations will identify people and projects based on their own perceptions and needs, sometimes tying researchers to areas and problems in long-term commitments, which may conflict with local imperatives. Private funding offers considerable operational flexibility, making this kind of support, eminently desirable. At present, private funding for research and development in India is limited to direct 'consultancy' interactions between individual scientist and private industry. There is little by way of broad based, visionary private support. Earlier this summer, one of India's most successful entrepreneurs, K. Anji Reddy addressed an evening gathering at the mid-year meeting of the Indian Academy of Sciences. His title was provocative: 'Science for profit is profit for science'. His thesis was clear; research and innovation could pave the way for great financial success. When he concluded, a questioner asked whether he would support basic research from a share of the profits generated, which were, presumably, the fruits of science. The answer was quick in coming: 'If it tickles my fancy'. Perhaps the time may be ripe to promote new initiatives for supporting science and the institutions where it is practised. In a country, which is slowly emerging into the brave new world of a liberalized economy, the creation of a foundation based on a partnership between government and private bodies may provide a means of nurturing science, unencumbered by the constraints that seem to be shackling government agencies. But, we might reflect that the Rockefeller Foundation's spectacular early successes relied not only on the munificence of its donor but also on the commitment to the public good of men like Warren Weaver.

P. Balaram