Vaccinating against yellow fever in Brazil.

The difficult art of giving

William H. Schneider reflects on the centenary of the Rockefeller Foundation, which began the postdoc and the grant, and led to the World Health Organization.

The board of John D. Rockefeller's eponymous foundation met for the first time 100 years ago this month, in May 1913. The size and mission of the Rockefeller Foundation were unprecedented. With its initial pot of US\$100 million (equal to \$2.3 billion today), it aimed to "promote the well-being of mankind throughout the world".

Rockefeller focused his philanthropy on health, following the recommendation of his first adviser, Frederick T. Gates. "Disease," said Gates, "is the main source of almost all other human ills, poverty, crime, ignorance, vice, inefficiency, hereditary taint, and many other evils."

The influence of the Rockefeller Foundation on the history of science and medicine has been profound. It has supported research by leading international scientists, helped to create and modernize the world's major medical schools and established the infrastructure and model of global-health programmes to combat disease. In the first half of the twentieth century, the foundation set the standard for big philanthropy, invented the grant proposal and implemented a worldwide system of fellowships

to train junior researchers.

Although the Rockefeller Foundation is now eclipsed in scale by a growing number of public and private major funders, its legacy continues to be felt. Today, it focuses on transforming cities, revaluing ecosystems, securing livelihoods and advancing health.

INSPIRING MEN

Two things helped the foundation to dominate scientific research for its first four decades: the changes wrought by the First World War and an innovative group of foundation officers. The war decimated European dominance in science, offering an opening for the Rockefeller Foundation to rebuild and develop medicine and public health internationally as the US government pursued a policy of isolationism.

Of the coming of peace in 1918, John D. Rockefeller Jr, son of the founder and first president of the foundation, wrote, "In this commerce of culture, science, sympathy, and idealism, the Rockefeller Foundation desires to put its policies, personnel, and resources at the service of the world."

The height of the foundation's influence

was in the 1920s and 1930s. After making a 5-year, \$500,000 grant to the US National Research Council in 1919 for postdoctoral fellowships in chemistry and physics, the Rockefeller Foundation began funding its own fellowships for scientists to train at established centres worldwide.

The rationale and strategy for the fellowships were proposed in 1916 by Wickliffe Rose, who headed the foundation's International Health Board. Rose found that there was a shortage of good people working in international health. His solution was to "locate the inspiring productive men" and provide fellowships "for the international migration of select students" to train with them — as long as the students agreed to return to their own countries afterwards. He also proposed giving some assistance "in the more backward countries, to enable the returned scientists to establish themselves".

Between 1917 and 1950, the Rockefeller Foundation funded 6,342 fellowships. Almost half were in medical education and the sciences. Nobel-prizewinning physicist Robert Millikan, who was heavily involved, wrote in his 1950 autobiography that the fellowships were "the most effective agency in the scientific development of American life and civilization ... in my lifetime". To identify mentors, foundation officers and field staff surveyed major schools and research labs around the world. Reports of medical education alone were written for 30 European countries between 1920 and 1931.

Another main goal was reform of medical education. Beneficiaries included Johns Hopkins University in Baltimore, Maryland; Harvard University in Cambridge, Massachusetts, and the University of Toronto in Canada. Among the European recipients were University College London and the medical school at the University of Brussels. The Peking Union Medical College in Beijing was lavishly funded (a total of \$45 million was given by 1947) with the explicit goal of creating the 'Johns Hopkins of Asia'. The foundation also gave major grants to medical research institutes in the United States (such as Yale University in New Haven, Connecticut), Canada (to McGill's Montreal Neurological Institute) and Europe (to the Institute of Physiology in Copenhagen and the Tavistock Clinic in London). Funding of the Max Planck Institute of Psychiatry in Munich, Germany, and the Kaiser Wilhelm Institute of Anthropology, Human Heredity, and Eugenics in Berlin, which conducted eugenic research during the rise of Nazism in the 1930s, brought opprobrium at the time and since¹.

A third major area of support was tens of millions of dollars in grants to international and public health, notably to establish schools at Johns Hopkins (designed to be the model for US universities), Harvard and

the London School of Hygiene and Tropical Medicine. The foundation gave lesser grants to establish public-health laboratories in the newly created countries of eastern Europe² and at the Oswaldo Cruz Institute in Rio de Janeiro, Brazil.

The resulting global network of public-health institutions paved the way for the creation in 1948 of the World Health Organization (WHO), a United Nations specialized agency. The WHO built on the worldwide Rockefeller Foundation campaigns against diseases such as hookworm, yellow fever and malaria, leading to the launch of the WHO Global Malaria Eradication Programme in 1955, a precursor to its landmark smallpox eradication campaign, which began a few years later.

MAKING THE PEAKS HIGHER

Another of the Rockefeller Foundation's key innovations was the research grant. After the financial crash that led to the Great Depression, a 1929 plan of action by the trustees recommended that "the development of medical schools as institutions be lessened and the principle of aid to individuals, groups, and departments in relation to research and advance of medical knowledge be emphasized".

The result was the use of short-term, targeted assistance for new fields such as molecular biology³. Biologist Alfred Kinsey was given a grant for research on human sexuality, which a governmental agency would have been unlikely to fund. The foundation also helped to establish psychiatry as a scientific discipline at major US medical schools such as Yale, Chicago, Harvard and Washington University in St. Louis, Missouri⁴.

To identify the best researchers and evaluate projects, the Rockefeller Foundation relied primarily on its small cadre of long-serving programme officers. They pursued a strategy of 'making the peaks higher', funding people and programmes that were already strong.

This policy signalled the beginning of the grant model of research support, which now dominates science. And although it increased the foundation's flexibility, at least one programme officer presciently recognized its disadvantages.

"We are really in many cases a university playing hide and seek in other universities' buildings," warned Alan Gregg, head of the Rockefeller Medical Sciences Division, in 1937. Gregg, who worked at the foundation from 1919 to 1956, went on: "We select the kind of work to be done (or they sagaciously anticipate our wishes), we choose the personnel and we pay the bill. But we don't accept the responsibility for personnel or for the future." The result, he feared, was "fragmentary and inconclusive" work, "timid

Work funded by an early Rockefeller grant.

and restless" employees, and "uncertain or resentful" universities⁴.

If the First World War fostered the rise of the Rockefeller Foundation, the Second World War did the opposite. After 1945, the US government, following unprecedented investment in science during the war, overtook the Rockefeller Foundation as the major funder of such work. It greatly expanded funds for external research by the National Institutes of Health (NIH) and created a new National Science Foundation (NSF). Grants given in 1953 by the Rockefeller medical and natural sciences divisions amounted to around \$9.2 million; that year, the NIH gave more than \$22 million to extramural medical research. By 1959, the NIH figure reached \$156 million⁵, and the NSF gave \$49 million to basic science research.

In 1949, Gregg reported that the funding policies of the NIH had been derived "more from Rockefeller experience than anywhere else". Ever the critic of small fixed-term grants, he quipped, "the Foundation no longer risks becoming the largest distributor of chicken feed in the country"⁶.

There were noteworthy differences between the Rockefeller and the NIH. To obtain congressional funding, the NIH set out to increase the geographical distribution of grantees. And it relied on peer review, with proposals evaluated by standing committees of experts, divided by research specialities. As early as 1946, there were ten study sections of the NIH that reviewed proposals in fields such as antibiotics, biochemistry, pathology, malaria and syphilis⁷.

At the same time, new foundations were established that equalled and overshadowed the influence of the Rockefeller in private philanthropy, forcing a change in strategy. The Ford Foundation, established in 1936 by car magnate Henry Ford and his son Edsel, gave \$300 million in grants in 1954, and almost double that (\$570 million) the following year⁸. The Rockefeller shifted to funding research in agricultural production and population control, the humanities and arts, and new fields such as international

relations, civil rights and the environment⁹.

Today, a huge philanthropic entity again dominates the funding scene and focuses on health — the Bill & Melinda Gates Foundation, headquartered in Seattle, Washington. It too was established by a man who had made his fortune in business. The Gates Foundation 2011 annual report listed almost \$35 billion in assets, more than three times those of the next biggest US foundation (Ford) and ten times those of the Rockefeller, now the 16th largest. Bill and Melinda Gates' decision to focus on health in poor countries, like Rockefeller's a century ago, shows compassion and is a way to counter criticisms of the business activities that generate wealth. But the Rockefeller spent even more on fundamental research and programmes to reform medicine in advanced countries.

The Gates relies more heavily than the Rockefeller did in its heyday on the academic and scientific community for guidance and review of its funding strategies and activities, in effect, following the NIH model. And it is more apt to partner with other foundations and private businesses, something that the Rockefeller Foundation began to do in only the 1950s. Both foundations have been criticized for an overemphasis on technology to solve problems that have significant political, social and economic roots¹⁰.

When the Gates Foundation celebrates its 100th anniversary in 2094, historians will be better able to compare the successes of these major philanthropic organizations. For now, the Rockefeller legacy bears out what industrialist Andrew Carnegie predicted in 1889 at the dawn of the age of philanthropic foundations: "It is more difficult to give money away intelligently than to earn it in the first place." ■

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