

**The Past and the Future of Research in the History of Science, Medicine
and Technology at the Rockefeller Archive Center**

by Darwin H. Stapleton
Director, Rockefeller Archive Center
15 Dayton Avenue
Sleepy Hollow, NY USA 10591
phone: 914-631-4505
fax: 914-631-6017
e-mail: stapled@rockvax.rockefeller.edu

Presented at FIOCRUZ, Rio de Janeiro, Brazil, July 1998

The Rockefeller Archive Center is a unique research institution with a valuable collection of documents for the study of science, medicine and technology in the 20th century. It holds the archives of the Rockefeller family, of the Rockefeller Foundation (RF) and associated organizations, and of The Rockefeller University, as well as of approximately 30 other philanthropic institutions. Because of the global reach of Rockefeller philanthropic activity, and because the strategy of Rockefeller philanthropy was to associate itself with innovation and change, the documentation at the Archive Center provides insights into many of the developments that have shaped the 20th century. A partial list of these includes the Green Revolution, the promotion of experimental medicine, the social sciences, and the visual arts. I will review each of these areas briefly.

The Green Revolution

One of the earliest areas of Rockefeller philanthropic activity was the promotion of improved farming practices in the southern United States in the first decade of this century. In the 1920s and 1930s, when European agriculture seemed to be in trouble, the International Education Board and the RF brought many European agronomists, plant pathologists and

agricultural engineers to the U.S. for education in American methods. In 1941, after 30 years of experience in promoting agricultural innovation, the RF was prepared to respond when the former Vice President of the U.S., Henry Wallace, suggested that the Foundation find a way to aid the depressed Mexican agricultural sector.

Beginning in 1943 in Mexico the Rockefeller Foundation's Agriculture Division experimented with the development of hybrid varieties of maize and wheat that would be more productive and could be grown successfully under a broader range of conditions than existing varieties. Mexico was chosen as the site of this work because it had excellent agricultural land but was an importer of food. By the end of the 1940s the RF project, led by Norman Bourlag and George Harrar, had introduced dramatically improved hybrid varieties of maize. In 1950 the RF created a second center for the development of plant hybrids in Colombia, working on beans, potatoes, rice, and barley in addition to maize, and in 1952 it initiated the Corn Improvement Program throughout Central America. Within a few years the Green Revolution had spread to India and Southeast Asia.¹

The Promotion of Experimental Medicine

In 1901 John D. Rockefeller founded the Rockefeller Institute for Medical Research in New York, the first institution in the U.S. devoted to full-time laboratory research on disease and

¹Robert S. Anderson, "The Origins of the International Rice Research Institute," *Minerva* 29 (Spring 1991), pp. 61-89; Deborah Fitzgerald, "Exporting American Agriculture: The Rockefeller Foundation in Mexico, 1945-53," *Social Studies of Science* 16 (1986), pp. 457-483; John H. Perkins, "The Rockefeller Foundation and the Green Revolution, 1941-1956," *Agriculture and Human Values* 7 (Summer and Fall 1990), pp. 6-18; E.C. Stakman, Richard Bradfield, Paul C. Mangelsdorf, *Campaigns Against Hunger* (Cambridge: Belknap Press/Harvard University Press, 1967).

human physiology.² Of course the Pasteur Institute in France and the Koch Institute in Germany were preceding models for the Rockefeller Institute (now known as Rockefeller University), but in two decades the Institute became the source of trained staff for laboratories of experimental medicine that the RF funded throughout the world.

These laboratories were elements of the medical schools that the RF helped to establish in the 1920s in areas as far apart as Beijing, Bangkok, London, and Cambridge (MA). Grants for upgrading laboratory equipment usually followed a few years later. Often the RF lent its staff to these schools to help with the start-up years, and in virtually all cases it provided fellowships to promising students to give them specialized training at U.S. or European centers. Its international network of connections also made it possible for it to assist some of the staff of these Rockefeller-related institutions to go to even more advanced laboratories elsewhere for months or even years to become skilled in the latest techniques.

In addition to the archives of Rockefeller University and the documentation of Rockefeller support of institutions and individuals throughout the world, the Archive Center holds the archives of the Memorial Sloan-Kettering Cancer Center in New York City, which is a Rockefeller-related institution because of the massive funding it has received from John D. Rockefeller Jr. and his son Laurance Rockefeller.

It is difficult to estimate the impact on experimental medicine of Rockefeller philanthropic activity, but any survey of acknowledged leaders in this field in the 20th century, such as a list of Nobel prize winners in medicine or physiology, will turn up a significant portion with some Rockefeller connection.

²George W. Corner, *A History of The Rockefeller Institute, 1901-1953: Origins and Growth* (New York City: The Rockefeller Institute Press, 1964).

Social Sciences

The first large Rockefeller academic institution, the University of Chicago, founded in 1889, was the birthplace of modern academic sociology in the United States, and the Laura Spelman Rockefeller Memorial, created by John D. Rockefeller in 1918, was the first substantial source of funding for social sciences in the United States. The Memorial helped to create the Social Science Research Council in the U.S., and similar coordinating organizations for social science funding in Australia and Canada. It also gave substantial grants for social science research in Germany, Britain, and France. In 1928 it was merged with the RF and the Foundation's social science program became global, emphasizing economics theory, but supporting other areas. This support diminished in the 1960s, but the RF continues to be a funder of the Social Science Research Council in the U.S.

It is important to note here that the Archive Center also holds the archives of the Russell Sage Foundation, founded in 1907, which was the first American philanthropy to fund social science research, and one that continues that mission today.

The Visual Arts

The Rockefeller family has been one of the great patrons of the visual arts in the world. Perhaps the most notable act by a family member was Abby Rockefeller's co-founding of the Museum of Modern Art in New York in 1928.³ Her sons John D. Rockefeller 3rd, Nelson A. Rockefeller, and David Rockefeller continued the family's patronage of that institution.

³ Bernice Kert, *Abby Aldrich Rockefeller: The Woman in the Family* (New York: Random House, 1993).

Nelson Rockefeller was also deeply interested in folk art, particularly Mexican folk art, and collected immense amounts. Museums in Texas and California hold substantial collections of his work. The Archive Center holds the papers of Nelson Rockefeller, amounting to about 3000 cubic feet of records, which include extensive documentation of his interest in art.⁴

What the Archive Center Is and Is Not

I have sketched out these various areas in order to give you a sense of the scope of the Archive Center's collections — because I think it is important at the outset to remember that it is not JUST an archive of the Rockefeller family, or JUST the archives of the Rockefeller Foundation, or JUST the archives of the Center's home institution, The Rockefeller University, but all of these, and more — the archives of the General Education Board, the International Health Board, the International Education Board, the China Medical Board, the Bureau of Social Hygiene, the Commonwealth Fund, the Social Science Research Council, and, the papers of Nelson A. Rockefeller, an undersecretary of state, governor of New York and Vice-President of the United States.⁵

Let me briefly summarize the history of the Archive Center that brought these collections together in one place. John D. Rockefeller, the founder of the Standard Oil Company in 1870 and thus of the family fortune, was a very careful record-keeper.⁶ He was a trained accountant, and he

⁴Marion Oettinger, Jr., *Folk Treasures of Mexico, the Nelson A. Rockefeller Collection* (New York: Abrams, 1990); Carlos Espejel with Annie O'Neill and Ann Rockefeller Roberts, *Nelson A. Rockefeller Collection of Mexican Folk Art: A Gift to the Mexican Museum* (San Francisco: Chronicle Books and the Mexican Museum, c.1986).

⁵Emily J. Oakhill and Kenneth W. Rose, comps., *A Guide to Archives and Manuscripts at the Rockefeller Archive Center* (North Tarrytown: Rockefeller Archive Center, 1989). Note: an updated version of the *Guide* appears at <<http://www.rockefeller.edu/archive.ctr>>.

⁶Ron Chernow, *Titan, A Life of John D. Rockefeller, Sr.* (New York: Random House, 1998).

was a devout Baptist who believed that his wealth was given to him by God and it was his responsibility to use it properly. He could not have a clear conscience unless he kept a careful record of every cent expended, and unless he gave the biblically-required one-tenth to charity. He also had to be assured that one-tenth of his income was well-spent on people or organizations that genuinely needed assistance. Our records therefore begin in 1855 with John D. Rockefeller's personal and office account books, which list every dime expended; the number of account books dramatically increases after 1879 when he set up a personal staff to manage his affairs. The tradition of keeping account books has been passed down to at least the fourth generation of Rockefellers.

The pattern of record-keeping was reinforced about 1910 when the Standard Oil monopoly was under attack in the American courts, and it became necessary for the Rockefeller office to be able to locate documents easily. An index system was created then that later was a model for other indexes that controlled information in the records of the new Rockefeller philanthropies. Those indexes, which are held at the Archive Center, are still useful tools for locating information in the archives.

The Archive Center was formed in 1974 because it was recognized by historians that this tradition of creating organized records had resulted in an outstanding body of documentation of important individuals, institutions, and events from the last quarter of the 19th century to the present, and because John D. Rockefeller 3rd and David Rockefeller, grandsons of John D. Rockefeller, took the view that researchers should have access to such a collection of records.⁷ The particular genius of the founding of the Center was joining the records of the Rockefeller

⁷John Ensor Harr and Peter J. Johnson, *The Rockefeller Conscience: An American Family in Public and in Private* (New York: Charles Scribner's Sons, 1991), pp. 487-90.

family with the philanthropic organizations it had created, so that a researcher can follow the development of ideas and actions from one body of records to another.

As a hypothetical case, one could track a Latin American epidemiologist's career from the granting of a graduate fellowship by the International Health Board in the 1920s for study at Johns Hopkins University, to evidence that he accepted a post-doctoral appointment at a Johns Hopkins laboratory funded by the Rockefeller Foundation, to his six-month visit at the Rockefeller Institute for Medical Research to study particular laboratory techniques, to his acceptance of a post at a medical school in Latin America, to his successful application in the 1930s for a Rockefeller grant to establish a new laboratory to continue his research, to contact with the sanitary program of the Office of Inter-American Affairs headed by Nelson Rockefeller in the early 1940s, to the epidemiologist's own graduate students receiving Rockefeller Foundation fellowships in the 1940s to commence their own studies at Johns Hopkins, Harvard, or Michigan.

Similar interconnections allow researchers to track not only the histories of individuals, but also of institutions, and of scientific, medical and technological developments. For a recent paper that I prepared I was able to trace important facets of the early history of DDT testing from 1942 to 1952 through the archives of the Rockefeller Foundation, including the records of the Virus Laboratory that it operated in New York City, the Malaria Experiment Station in Tallahassee, Florida that it funded, the operations of the Rockefeller Foundation Health Commission in newly-liberated North Africa and southern Italy, and a program of typhus and malaria control in Mexico.⁸

⁸Darwin H. Stapleton, "The Dawn of DDT and its Experimental Use by the Rockefeller Foundation in Mexico, 1943-1952," *Parassitologia* 40 (1998): 149-158.

This wealth of records is what has brought over 3000 researchers to the Archive Center in its 23 years of operations, resulting in over 1000 publications citing the Center's collections. I will now turn to a review of some of this scholarship, referring in particular to Latin American matters.

The Past of Research in Science, Medicine, and Technology

Science

Much of what has been done at the Archive Center in the history of science has traced the institutionalization of science or the careers of particular scientists who were heavily funded by Rockefeller philanthropies. Robert Kohler's *Partners in Science* (1991) well represents the state of scholarship regarding Rockefeller philanthropy and science.⁹ Kohler focused on the interaction between the staff of the Rockefeller philanthropies and leading research scientists in the 1920s and 1930s which did much to shape science as we know it today.

Kohler's emphasis was on the development of biology. He pointed out that Rockefeller money pushed biology away from its descriptive strategy, and focus on the organism, toward studies in chemistry and physics that were more objective and mathematical — leading directly toward the interest in molecular biology and genetics that characterizes biology today. Kohler noted that Warren Weaver, the Rockefeller officer most responsible for directing the funding of this transformation of biology, was a mathematician who believed that science in general needed to become more exact.

⁹Robert E. Kohler, *Partners in Science: Foundations and Natural Scientists, 1900-1945* (Chicago: The University of Chicago Press, 1991).

One of Kohler's points that I think deserves greater emphasis is that one of Weaver's strategies was to promote the use of sophisticated laboratory instruments for research, partly in the belief that instruments demanded the precise results that he wanted, but also because sophisticated instruments tended to draw together scientists from different disciplines in order to effectively analyze the results. Biologists met physicists at the cyclotron, and chemists at the ultracentrifuge and the spectroscope.

The Rockefeller philanthropies helped to fund the creation of these instruments, as well as the differential analyzer (which was a mechanical computer of the 1930s), the Van de Graaff generator (which was important for atomic analysis), and the Tiselius electrophoresis apparatus for protein separation.¹⁰ At the Rockefeller University a number of instruments were invented or developed, including the protein synthesizer in the 1960s.

In a paper I presented two years ago at the Society for the History of Technology I showed that one of the unintended consequences of Rockefeller support of the development of instruments in the 1930s was that several became cornerstones of the research leading directly to the creation of the atomic bomb.¹¹ Many of the people we associate with the Manhattan Project, such as Robert Oppenheimer, John von Neumann, and Eugene Wigner, had been supported in their graduate or post-graduate studies, or in their laboratories, by the General Education Board,

¹⁰Lily E. Kay, "The Intellectual Politics of Laboratory Technology: The Protein Network and the Tiselius Apparatus." In *Center on the Periphery: Historical Aspects of 20th-Century Swedish Physics*, ed. by Svante Lindqvist, Uppsala Studies in History of Science, Volume 17 (Canton, Massachusetts: Science History Publications/USA, 1993), pp. 398-423; Larry Owens, "Vannevar Bush and the Differential Analyzer: The Text and Context of an Early Computer." *Technology and Culture* 27 (1986), pp. 63-95.

¹¹Darwin H. Stapleton, "The Rockefeller Foundation, Refugee Scientists and Atomic Technology," read at the 23rd Symposium of the International Committee for the History of Technology, Budapest, Hungary, August 7-11, 1996.

Rockefeller Foundation or the International Education Board.¹² The development of the cyclotron, the Van de Graaff generator, and the ultracentrifuge, all supported by Rockefeller grants, were critical to the creation of the atom bomb.

Medicine

The history of medicine is well-represented in the existing scholarship coming out of the Archive Center. Much has been made of the Rockefeller philanthropies' implementation of the recommendations in Abraham Flexner's 1911 report on medical education in the United States — a report, by the way, that was funded by the Carnegie Corporation.¹³ Flexner recommended that American medical education be improved by strengthening better institutions, providing sufficient salaries for faculties so that they could work full-time, and would not find it necessary to carry on private practice at the same time, and by making clinical and laboratory research standard elements of medical schools.

For thirty years this strategy informed Rockefeller support of medical education not only in the U.S., but globally, and researchers have given us histories of this process in the U.S., Canada, Britain, Australia, China, and Mexico.¹⁴ But what seemed important for American medicine in 1911 was seldom so important for other nations: the “full-time” employment of

¹²Darwin H. Stapleton, "The Rockefeller Foundation, Refugee Scientists and Atomic Technology," in George Marx, ed., *The Martians: Hungarian Emigre Scientists and the Technology of War and Peace* (Budapest: Eotvos University, 1997), pp. 51-58.

¹³Steven C. Wheatley, *The Politics of Philanthropy: Abraham Flexner and Medical Education*, (Madison: University of Wisconsin Press, 1989).

¹⁴Paul A. Bator, *Within Reach of Everyone: A History of the University of Toronto School of Hygiene and the Connaught Laboratories, Volume 1, 1927-1955*; (Ottawa: Canadian Public Health Association, 1990); Howard S. Berliner, *A System of Scientific Medicine: Philanthropic Foundations in the Flexner Era*, (New York: Tavistock, 1985); Donald Fisher, "The Rockefeller Foundation and the Development of Scientific Medicine in Great Britain," *Minerva* 16: 1 (Spring 1978), pp. 21-41; James A. Gillespie, *The Price of Health: Australian Governments and Medical Politics, 1910-1960*, (Cambridge: Cambridge University Press, 1991); Qiusha Ma, "The Rockefeller Foundation and Modern Medical

faculty, which was difficult enough to implement in the U.S., proved difficult to impose elsewhere.

Rockefeller's slavish following of the Flexner mandate created many cases of cross-cultural conflict. The judgment of which institutions were the best was diligently undertaken by Rockefeller officers after site visits; all of the officers were Americans, and they brought their full cultural baggage, including a strong ethnocentrism, to bear on their conclusions.¹⁵

In Latin America they tended to dismiss any aspect of medical schools that demonstrated French influence, and they were highly critical of any medical training that did not include extensive hospital and clinical experience. This much we know, but more research is needed into the degree to which Rockefeller funding changed Latin American medical schools, and the degree to which they kept their own courses.

In addition to histories of institutions, many scholars at the Archive Center have looked at specific areas of medical research, such as tuberculosis, yellow fever, polio, and drug addiction. The induced disease of radiation illness has also been the subject of some recent publications based on Archive Center materials from the Atomic Bomb Casualty Commission that studied the long-term effects of radiation at Hiroshima and Nagasaki.¹⁶

Education in China, 1915-1951," Ph.D. dissertation, Case Western Reserve University, 1995; Marilyn B.

Ogilvie, "The Rockefeller Foundation, China, Western Medicine, and PUMC," in *Philanthropy and Cultural Context, Western Philanthropy in South, East, and Southeast Asia in the Twentieth Century*, Soma Hewa and Philo Hove, eds., (Lanham, Maryland: University Press of America, Inc., 1997), pp.21-37; Armando Solorzano, "La Influencia de la Fundacion en la Confirmacion de la Profesion Medica Mexicana, 1921-1949," *Revista Mexicana de Sociologia* (January 1996); Steven C. Wheatley, *The Politics of Philanthropy: Abraham Flexner and Medical Education*, (Madison: University of Wisconsin Press, 1989).

¹⁵Marcos Cueto, "The Rockefeller Foundation's Medical Policy and Scientific Research in Latin America: The Case of Physiology," *Social Studies of Science* 20 (1990), pp. 229-254.

¹⁶Susan M. Lindee, "Atonement: Understanding the No-Treatment Policy of the Atomic Bomb Casualty Commission," *Bulletin of the History of Medicine* 68 (Fall 1994), pp. 454-490.

We have had a great deal of work on the history of nursing, in part because that has been the subject of Archive Center conferences in 1981 and 1994, but also because nursing was a major area of Rockefeller activity in the 1920s and 1930s.¹⁷ Most of the publications have dealt in one way or another with the professionalization of nursing, including the setting of standards for nursing education. Relatively little of the work has looked at nursing as a public health activity, even though it was the need for professionals in public health work that drew the Rockefeller philanthropies into the field in the first place.

Public Health

Public health, as a sub-field of medicine, has one of the largest literatures based on Archive Center materials. The drama of the campaigns against hookworm, yellow fever, and malaria has excited historians' interest, beginning with Richard Brown's publication of *Rockefeller Medicine Men* in 1979, which advanced the thesis that the Rockefeller Foundation was acting largely in the interest of U.S. imperialism.¹⁸ Some recent scholarship has generally followed that framework, including Armando Solorzano's book on the Rockefeller Foundation's early yellow fever work in Mexico.¹⁹

Other recent scholarship has seen Rockefeller influence less as imperialism than as a matter of cultural hegemony that has been resisted, manipulated and negotiated by those who chose to accept it. Anne Emanuelle Birn's several studies of Rockefeller involvement in

¹⁷Ellen Lagemann Condliffe, ed., *Nursing History: New Perspectives, New Possibilities* (New York and London: Teachers College Press, Columbia University, 1983); Darwin H. Stapleton and Cathryne A. Welch, eds., *Critical Issues in American Nursing in the Twentieth Century: Perspectives and Case Studies* (Guilford: Foundation of the New York State Nurses Association, Inc., 1994).

¹⁸Richard E. Brown, *Rockefeller Medicine Men* (Berkeley: University of California Press, 1979).

¹⁹Armando Solorzano Ramos, *¿Fiebre Dorada O Fiebre Amarilla? La Fundación Rockefeller en México 1911-1924* (Guadalajara: University of Guadalajara Press, 1997).

hookworm, malaria, local health units, and the administration of public health generally in Mexico, have drawn out the subtleties of the cross-cultural relationships.²⁰ Marcos Cueto for Peru; Paulo Gadelha, Ilana Lowy, Luis Castro-Santos and Lina Rodrigues de Faria for Brazil; Paul Weindling for Eastern Europe; Lion Murard and Patrick Zylberman for France; and Soma Hewa for Sri Lanka, have tried to put Rockefeller philanthropy into a cultural context.²¹ The proceedings of a 1991 Archive Center conference on public health and science in Latin America,

²⁰Anne-Emanuelle Birn, "A Revolution in Rural Health? The Struggle over Local Health Units in Mexico, 1928-1940." *Journal of the History of Medicine and Allied Sciences* 53: 1 (January 1998), pp. 43-76; Anne-Emanuelle Birn and Armando Solorzano, "The Hook of Hookworm: Public Health and the Politics of Eradication in Mexico." In *Western Medicine as Contested Knowledge*, edited by Andrew Cunningham and Bridie Andrews. (Manchester and New York: Manchester University Press / St. Martin's Press, 1997), pp. 147-171; Anne-Emanuelle Birn, "Las Unidades Sanitarias: La Fundación Rockefeller versus el Modelo Cárdenas en México." In *Salud, Cultura y Sociedad en América Latina*, edited by Marcos Cueto, ed. (Washington and Lima: Pan American Health Organization / Instituto De Estudios Peruanos, 1996), pp. 203-233; Anne-Emanuelle Birn, "Public Health or Public Menace? The Rockefeller Foundation and Public Health in Mexico, 1920-1950," *Voluntas* 7 (1996), pp. 35-56.

²¹Luis Castro-Santos, "A fundação Rockefeller e o estado nacional (historia e politica de uma missao medica e sanitaria no brasil)," *Revista Brasileira de Estudos de Populacao* 6: 1 (1989), pp. 105-110; Marcos Cueto, "Andean Biology: Scientific Styles on the Periphery," *Isis* 80 (1989), pp. 640-658; Marcos Cueto, "Between Theory and Technology: The Beginnings of High Altitude Physiology in Peru," *Boletin del Instituto Frances de Estudios Andinos* 19 no. 2 (1990), pp. 431-441; Marcos Cueto, "Sanitation from Above: Yellow Fever and Foreign Intervention in Peru, 1919-1922," *Hispanic American Historical Review* 72 (1992), pp. 1-22; P. Gadelha, "Conforming Strategies of Public Health Campaigns to Disease Specificity and National Contexts: Rockefeller Foundation's Early Campaigns Against Hookworm and Malaria in Brazil;" *Parassitologia* 40 (1998): 159-175; Soma Hewa, *Colonialism, Tropical Disease and Imperial Medicine: Rockefeller Philanthropy in Sri Lanka* (Lanham: University Press of America, Inc., 1995); Ilana Lowy, "Eradication de Vecteur Contre Vaccination: La Fondation Rockefeller et la fievre janune au Brésil, 1923-1939," in Anne M. Moulin, ed., *Les Sciences Hors Occident au Xxe Siecle. Vol. 4: Medicines et Sante* (Paris: Editions d'Orstom, 1996), pp. 91-107; Ilana Lowy, "La Fondation Rockefeller: Les Missionnaires de la Fièvre Jaune," *La Recherche* No. 300 (July-August 1997), pp. 88-92; Lina Rodrigues de Faria "A Fase Pioneira da Reforma Sanitária no Brasil: A Atuacao da Fundacao Rockefeller (1915-1930)," Ph.D. dissertation, Rio de Janeiro, Instituto de Medicina Social, 1994; Paul Weindling, "Philanthropy and World Health: The Rockefeller Foundation and the League of Nations Health Organisation," In "Philanthropy and Institution-Building in the Twentieth Century," *Minerva* 35: 3 (Autumn 1997), pp. 269-281; Paul Weindling, "Public Health and Political Stabilisation: The Rockefeller Foundation in Central and Eastern Europe between the Two World Wars," *Minerva* 3.1 (Autumn 1993), pp. 253-267.

edited by Marcos Cueto and published as *Missionaries of Science*, is also an important body of work dealing with cultural hegemony.²²

Technology

One would think there is much on the oil industry and oil refining at the Archive Center, but there is actually very little documentation. We do not hold the Standard Oil corporate archives. Because of Rockefeller investments in other industries, however, there is a scattering of material on U.S. industrial technology, such as railroads, mining, iron and steel, from the 1880s to the 1930s.

What has been almost completely ignored is the role of Rockefeller philanthropic institutions in promoting technological innovation — I believe because few historians associate technological innovation with philanthropy, and because the historians of science and medicine (who logically might take an interest in those innovations) are trained to rank the history of ideas and social history as of greater value than the history of technology.

However, as I noted previously, there has been some work on scientific instrumentation; and some studies have taken into account the technological aspects of public health programs, such as the use of insecticides and the promotion of improved sanitary practices.

The Future of Research in Science, Medicine, and Technology

I now want to turn to possible future research in science, medicine and technology at the Rockefeller Archive Center. I am venturing into doubtful territory, in part because I do not track the scholarly agenda of every researcher coming to the Center (we now have about 270

²²Marcos Cueto, ed., *Missionaries of Science: The Rockefeller Foundation and Latin America* (Bloomington: Indiana University Press, 1994).

researchers a year), but also because the activity of Rockefeller philanthropy is so vast that almost every day we receive inquiries about aspects of the collections that were previously unknown to us.

Moreover, the Center continues to open older material for scholarly research, and to take in new material. It is important to point out that since 1984 the Archive Center has acquired the archives of seven institutions that were not directly associated with the Rockefeller family: the archives of the Commonwealth Fund, a philanthropy that supported medical institutions and medical research, and was active in some aspects of public health in the United States and certain British Commonwealth nations; the archives of the Russell Sage Foundation, the first foundation to support social science research in the U.S.; the Markle Foundation, which supported medical research and medical fellowships until 1969, when it moved into promoting public interest in mass communications; the Culpeper Foundation and the Lucille Markey Charitable Trust, both funders of medical research and medical institutions; the Social Science Research Council, which has managed the allocation of funding in the U.S. social sciences since 1923; and most recently, the Foundation for Child Development, which has been an advocate for child services and a funder of research on children's health. These collections give a researcher the opportunity to do comparative studies in the organization and funding of medicine and the social sciences, among other topics.

At the Archive Center we open new materials according to two standards, first, according to the conditions that the depositing organization has set, and second, according to our level of control. For example, the Rockefeller Foundation has decided that all of its grant-related files are open when they are twenty years old. Before we open material, however, we make sure that it is

properly arranged and that we have suitable finding aids so that we can locate material when it is requested, and properly return it after it is used. At the Archive Center we have a continuing struggle to open material as quickly as possible, but we have had staff who are committed to doing that in a timely fashion.

Scientific Discovery

Researchers at the Center have only begun to sift through the materials we hold that deal with the discovery of DNA and the unlocking of the genetic code, although DNA was identified as the primary genetic code by researchers at the Rockefeller Institute in 1943, and James Watson, the co-discoverer of the structure of DNA, had taken crucial steps in his work while holding a Rockefeller Foundation fellowship. This topic has scarcely been explored in our collections.

The shift of the process of scientific discovery from the individual to the team is an extremely important social transformation of science that was encouraged by Rockefeller philanthropy, in part through the funding of large-scale instrumentation as I have noted earlier, but also simply through the grant process itself. Warren Weaver and others at the Rockefeller Foundation favored group approaches to research, particularly inter-disciplinary approaches, because they believed that teams advanced the frontier of knowledge more rapidly than solitary workers. Much more needs to be done in this area, and as an instance, I would like to know much more about Theodosius Dobzhansky's collaboration with Brazilian researchers in his pioneering work on the genetics of *Drosophila* in the 1940s.²³

²³Robert E. Kohler, *Lords of the Fly: Drosophila Genetics and the Experimental Life* (Chicago: University of Chicago Press, 1994).

We also need to know much more about the Rockefeller involvement in what Marcos Cueto, among others, has called science on the periphery. In a recent article he outlines the strengths and problems of attempting to undertake leading-edge science outside of the laboratories and dense organizations of the United States and Western Europe. Cueto himself has given us examples in his articles on high-altitude physiology in Peru and Bernardo Houssay's hormonal research in Argentina.²⁴ We have some articles on Rockefeller-funded research in Sweden by scholars who identify that nation as on the periphery. The Archive Center has had researchers from China and India in the last year who will give us some perspectives on science in those regions, and we currently have researchers thoroughly investigating our documentation of Rockefeller assistance to science in the Soviet Union, so we can look forward to future publications that may allow us to put the Latin American experience with science on the periphery into comparative perspective. We have not yet had researchers undertake substantial work on science in Africa.

Developments in Medicine and Public Health

In regard to future research in the history of medicine, I believe that the least-studied area of Rockefeller support of medicine, particularly in Latin America, is what is now commonly called health-care delivery. From early on in its work the Rockefeller Foundation demonstrated an interest in the distribution of health care, particularly with the creation of public health dispensaries to test for and combat hookworm and malaria. In the 1930s and 1940s it sponsored the creation of model health units, sometimes called rural health services, for more generalized health care in Argentina, Bolivia, Brazil, Chile, Colombia, Guatemala, Mexico, Nicaragua, Peru,

²⁴Marcos Cueto, "Laboratory Styles in Argentine Physiology," *Isis* 85 (June 1994), pp. 228-246.

Puerto Rico, and El Salvador. There have been some individual studies of these programs, most notably, Anne-Emanuelle Birn's regarding Mexico, but, so far as I am aware, no one has assessed the overall purpose and design of this program, let alone its impact in health care institutions in those countries.²⁵

I also think that studies of medical and public health personnel who received Rockefeller fellowships would be rewarding. The numbers are substantial: just as an example, I counted the national origins of Latin Americans given fellowships from the International Health Division for two different years: in 1930 a total of 24 fellowships were awarded to students from Brazil, Costa Rica, Guatemala, Jamaica, Mexico, Nicaragua, Puerto Rico, El Salvador and Venezuela; in 1945 a total of 49 fellowships were given to students from Argentina, Bolivia, Brazil, British West Indies, Chile, Colombia, Dominican Republic, Ecuador, Mexico, Nicaragua, Panama, Peru, Uruguay, and Venezuela. In addition to these fellowships the Rockefeller philanthropies gave out a number of travel grants, sometimes called traveling fellowships, which were not for formal study, but rather for visiting institutions and field projects, and for obtaining specific training.

The purpose of these fellowships was to support the avowed aims of the International Health Board, International Education Board, and Rockefeller Foundation to create an elite of change-inducing officials in each nation. A passage in the Rockefeller Foundation's annual report for 1930 summarizes this strategy:

Experience in all countries indicates that one of the most important things in public health work is the vision, enthusiasm, and energy of leaders. In nearly every progressive country there are one or two figures that personify the progress in public health. These

²⁵Anne-Emanuelle Birn, "A Revolution in Rural Health? The Struggle over Local Health Units in Mexico, 1928-1940," *Journal of the History of Medicine and Allied Sciences* 53: 1 (January 1998), pp. 43-76.

are supported by a host of younger men less heralded but no less important. One of the factors in bringing about the peaceful social revolution represented by the upswing in public health work... has been the invigorating contacts made by various leaders, young and old, due to fellowships, the travel of health officials, and the interchange of health personnel...²⁶

The Rockefeller officers sent their fellows to what they believed were the most advanced institutions in the world -- usually Johns Hopkins, Harvard, the University of Chicago, Columbia University, or the Rockefeller Institute, but depending on the specialty, sometimes the London School of Medicine and Tropical Hygiene, or the Rockefeller-funded malaria experiment station in Rome. We need to know more about the relationship between the training the fellows received, and the careers they had when they returned home, and the effect they had on the institutions and government agencies they served. We need to know how much the hegemonic thesis applies — to what degree were these fellows conduits for ideas and techniques to or from the periphery?

Technological Innovations

As I mentioned earlier, the technological aspect of Rockefeller philanthropy has been little examined. There are a number of revealing technological trails that could be followed by historians. For this audience, one of the more interesting would be Nelson Rockefeller's fascination with technological transfer. We hold a portion of his papers documenting his service as Coordinator of Inter-American Affairs from 1940 to 1945, when he was responsible for

²⁶Rockefeller Foundation, *Annual Report, 1930* (New York: Rockefeller Foundation, 1931), p. 105.

maintaining and improving political relations between the United States and Latin America.²⁷ He developed an extensive program of propaganda and aid which included technical assistance for public health programs through a Division of Health and Sanitation, and later through the Institute of Inter-American Affairs, which continued operations until 1953. The bulk of the records of these organizations are in the National Archives of the United States.

After Rockefeller left the Coordinator's office he decided to create philanthropic agencies to continue and expand some of the Latin American programs. First he founded the American International Association for Economic and Social Development (known as AIA), to promote health and social change, and then he created a corporate form, the International Basic Economy Corporation (known as IBEC), to form businesses that he and his advisors conceived of as promoting a better life for Latin Americans. IBEC created a vast range of enterprises, mostly in Brazil and Venezuela, including supermarkets, milk and fish processing and distribution facilities, the manufacture of concrete housing, agricultural equipment rentals, hybrid corn seed production, poultry breeding, and helicopter pesticide spraying. A history of IBEC was published in 1968 which sketched out these operations, but only from a business and economic point of view.²⁸ A relatively unsatisfactory history of AIA also was published.²⁹ Both histories were written long before the documentation in Nelson Rockefeller's papers was available so the numerous fascinating technological stories relating to IBEC and AIA have scarcely been told.

²⁷Peter R. Bales, "Nelson Rockefeller and His Quest for Inter-American Unity," State University of New York, Stony Brook, 1992.

²⁸Wayne G. Broehl, Jr., *The International Basic Economy Corporation* (Washington: National Planning Association, 1968).

²⁹Martha Dalrymple, *The AIA Story: Two Decades of International Cooperation* (New York: American International Association, 1968).

Just after founding AIA and IBEC Nelson Rockefeller began serving as an advisor to U.S. President Truman, and in 1950 Truman made him chairman of the International Development Advisory Board, charged with defining the new Point IV Program of international technical assistance by the United States. We hold the records of Rockefeller's direction of that the Board for several years, although the records of the organization itself are in the National Archives in Washington, D.C.

Another technological trail that could be followed is associated with the Green Revolution. After trials of the new hybrid maize in Mexico and in the latter 1940s, the Rockefeller agronomists found that the new agricultural regime required a wide range of associated technologies in order to be highly successful, including insecticides, fertilizers, and seed storage facilities that kept the seed dry and free from insects and fungus. The records at the Archive Center document thoroughly the attempts to identify and adapt these technologies to each new environment, beginning with Mexico and Central America. Although the Green Revolution has been criticized for being based on sophisticated technology that could only be afforded by the middle class, put the peasant class in debt and radically altered the environment, there has been little research at the Archive Center on these technological aspects of the Revolution.

Another barely studied area of technology represented in the collections at the Archive Center is radio, television, and cinematic technology. The Rockefeller Foundation was deeply involved in studies of radio and film from the late 1930s into the 1940s, primarily because it was interested in how these media were being used to educate the public, or in the case of Germany, Italy, and the Soviet Union, to spread propaganda. Most of these studies were done as a result of grants made to Princeton and Harvard universities, but much of the cinematic work was done at

the Museum of Modern Art. A study of this topic would draw on the Nelson A. Rockefeller Papers, both because he was president of the Museum when the project began, and because when he was Coordinator of the Office of Inter-American Affairs, he directed the use of radio and films to spread information about the war effort of the United States as well as improvements in public health.

Conclusion

The records at the Rockefeller Archive Center represent an enormous resource for historians, a resource for scholarship that will deepen our understanding of the world that has been created in the 20th century. This world, with its ever-heavier reliance on science, medicine, and technology to provide the underpinning for an increasing population, a denser network of communication, and an ever-growing expectation of technological innovation, has been shaped in significant part by the organizations represented in the Rockefeller Archive Center's collections. The door to the Center is open; please come for a research visit.