Collaborations

Academic Scientists and the Pharmaceutical Industry. Cooperative Research in Twentieth-Century America. JOHN P. SWANN. Johns Hopkins University Press, Baltimore, 1988. xiv, 249 pp., illus. $32.50.

Links between universities and industry in the conduct of biomedical research have been well established in recent years, and although their advantages and dangers are much discussed, the history of such relationships has been little investigated. Cooperative biomedical research between universities and the pharmaceutical industry developed in the 1920s and 1930s in the United States, and in this book Swann has selected the most important of these interactions for analysis, delineating how and why collaboration developed, the extent to which the intellectual, technical, and economic needs of the two parties created problems as well as mutual benefits, and the significant results of the collaboration, which included the development of important hormones, anticonvulsants, sedatives, and chemotherapeutic agents. Based largely upon manuscript collections of pharmaceutical companies and papers of academic scientists who pioneered in establishing ties with industry, Swann's case studies inform these themes while contributing to an understanding of the growth of pharmacology in America between the two world wars.

During the 1920s and 1930s pharmaceutical companies engaged what Swann calls general consultants, who had broad impact on programs of research, and specialist-consultants, who had narrower influence. Roger Adams, a distinguished organic chemist at the University of Illinois, served as a general consultant to Abbott Laboratories from 1917 to the late 1960s. In the same role, Alfred Newton Richards, a professor of pharmacology at the University of Pennsylvania, consulted with Merck and Company from 1930 to 1959. Adams and Richards helped to develop company in-house research programs, served as liaisons with the academic community, fostered close relationships between their universities and the companies, and kept the companies current on research in related fields. Richards was a particularly strong influence on the direction of Merck's research and played an important role in the transformation of Merck into a research-oriented firm. Swann provides rich details of the interactions of academic scientists with pharmaceutical companies, conveying a sense of what the consultantships meant to both parties, financially and professionally.

Specialist-consultants influenced pharmaceutical research in more specific ways. Firms often relied upon specialists' expertise to overcome particular deficiencies in their own research staffs and to take advantage of fast-breaking developments. For academic scientists these consultantships were sources of graduate fellowships and research support. Moreover, royalties from the sale of drugs provided money for individual scientists and university laboratories for years in those cases where provision was made for them. As examples of this type of relationship Swann examines the microbiologist Selman Waksman's consultantship with Merck on antibiotics and industrial fermentations, the pharmacologist Chauncey Leake's investigation of arsenicals for Parke-Davis and Company, and the medicinal chemist Lyndon Small's work on the preparation of morphine derivatives for Merck, E. R. Squibb and Sons, and Mallinckrodt. All three cases illustrate the many benefits to the scientists (raw materials, technical advice, and funds for their research) and the growing awareness that firms had to maintain contact with outside experts in fields that held promise for the development of new drugs.

Swann also deals with collaboration aimed at developing specific therapeutic agents following their initial discovery. The examples given are ones that had great effects upon public health and the parties involved. They also illuminate the disagreements that arose because of differing priorities and interests. The collaboration between researchers at the University of Toronto and Eli Lilly and Company in 1922 and 1923 for the development of insulin is well known. It transformed Lilly into a major drug firm and provided the university with scientific recognition and about $8 million in royalities from patents. Despite the overall success of the project, confrontations developed as the two sides struggled to appreciate each other's objectives. The chief issue of contention was Lilly's wish to monopolize or at least have a commercial advantage with respect to insulin. Less well known is Lilly's work with two university medical schools to develop commercial extracts from liver. In 1927–1928 Lilly researchers collaborated with scientists at Harvard University to produce an extract useful against pernicious anemia. Following this, Lilly arranged for the University of Rochester to conduct clinical evaluations of various fractions for activity against secondary anemia. This collaboration did not lead to confrontations over the issue of monopolization as had the insulin collaboration, chiefly because Harvard and Rochester preferred informal arrangements rather than contractual agreements.

Today, as universities and industries are eager to develop research contracts on a wide scale, we need to reflect on the issues that arise in such relationships. Swann has identified many of these and documented them carefully, and his book presents them in clear historical perspective.

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Immunological Networks

Anti-Idiotypes, Receptors, and Molecular Mimicry. D. SCOTT LINTHICUM and NADIR R. FARID, Eds. Springer-Verlag, New York, 1988. xii, 322 pp., illus. $65. From a symposium, Quebec, Canada, June 1986.

The elaboration of the idiotype network theory 15 years ago by Niels Jerne created a context for the examination of a singular and remarkable feature of the immune system: namely, that its receptors and specific secreted products, or antibodies, not only recognize the external world of antigenic determinants (epitopes) but also recognize antigenic determinants on the immune receptors themselves (idiotopes). Ten years earlier, in 1963, J. Oudin's and H. G. Kunkel's groups had identified the set of such idiotopes on single immunoglobulin molecules as the *idiotype*, which, it is now realized, represents unique idiotopes as well as those shared with antibodies of related or unrelated specificity for antigen. Jerne characterized the immune system as a web of immunoglobulin variable-region domains, a concept that when taken to its extreme might embrace all immune receptors in the organism.

Jerne's network theory also included the corollary that within the reflective symmetries of idiotopes (Ab1), anti-idiotopes (Ab2), and anti-anti-idiotopes (Ab3, and so forth) formed within the organism's immune system would be found representatives (internal images) of most or all of the epitopes of the external universe. In fact, as a