

process engineering and product recovery. Although not overly technical, these chapters give a complete overview of the available technology, reviewing economic considerations and the advantages and disadvantages of various designs. A well-referenced section on examples of innovation in biochemical engineering at the end of chapter 13 illustrates the potential for new developments in the field through the interdisciplinary approach to problem solving.

The handbook contains a few typographical errors and omissions. For example, dates are missing from references on p. 569, and the structure of adenine (p. 82) suffers from a lack of bonds. The loose definition of the double-reciprocal plot of the Monod equation (called a Lineweaver-Burke plot on p. 208) should, strictly speaking, apply only to the Monod equation. The Lineweaver-Burke designation applies to the reciprocal form of the enzyme kinetic hyperbolic model and not to a cell growth model.

It would be helpful if definitions, such as one for the yield equation,

were included in the discussions on p. 116 and pp. 132-137. The inclusion of graphic descriptions without the mathematical expressions close at hand can leave the reader confused when the meaning of the data in the figures is changed. For example, Figures 4 and 5 on p. 117 depart from the definition of cell concentration when they use bacterial dry weight as the ordinate, with concentration at time zero equal to zero. Difficulties obviously develop when figures are drawn from several sources.

The book is expensive at \$97.00 and may meet with some competition from more comprehensive volumes, such as "Methods in Enzymology," in which some sections of this handbook are available.

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## CORPORATE FUNDING FOR UNIVERSITY RESEARCH

*A Guide to Corporate-Sponsored University Research in Biotechnology: Issues, Contracts, Models, and Personnel.* Edited by Dennis J. Murray and Patrick J. O'Connor. Pp. 341. ISBN 006-878-1 (McGraw-Hill, Washington, D.C.: 1983) \$187(U.S.), \$287(Outside U.S.).

**F**unding of university research by private, rather than public, capital has been a topic of increasing concern. Numerous symposia have been well attended by scientists, lawyers, and university administrators, attesting to this concern. This is not a new phenomenon: research in physics, chemistry, and chemical engineering has been supported by private funding for many years, and professors have balanced their academic obligations with corporate interests. Indeed, the Massachusetts Institute of Technology (MIT) traditionally has been regarded as a recruitment center for industrial scientists.

So what is new about private funding of academic research in biotechnology? First, the size of the allocations of capital to a particular department or professor has increased. Second, it is the first time that the life sciences are being recognized as potential profit-makers. When Edwin Whitehead donates \$120 million to fund a biomedical research institute, it is bound to have some repercus-

sions not only within a department but also in the institution as a whole. The availability of private capital raises two issues. One is the status of the traditional freedom of information and exchange of materials and ideas that characterized academic research. The second issue is patenting—when the source of funding for long term projects changes, which institution receives benefits from the patent?

*A Guide to Corporate-Sponsored University Research in Biotechnology*, by Dennis Murray and Patrick O'Connor of Genetic Sciences International (Milbrook, NY), is an attempt to guide a layperson through these issues. It is unclear who the intended audience is, but the book seems to be written for readers without any knowledge of either biotechnology or corporate-university contracts.

There are six parts to this mimeographed work. The first part provides a brief explanation of academic life, describing what a contract means to both the university and the corporation. The book fails to differentiate between the corporate relationships with universities and with the individual scientists.

Public funding consists primarily of grants to individual researchers, with overhead money assigned to the university or research institution. The book largely ignores this type of interaction, focusing on corporate

grants to institutions rather than to scientists, such as the 1982, \$23.5 million grant from the Monsanto Corporation to Washington University.

That *A Guide to Corporate-Sponsored University Research in Biotechnology* fails to deal with opportunities to fund individual scientists is puzzling, particularly since one section of the book focuses on scientists, and the last part of the book lists individual researchers arranged by area of specialty. Also lacking is any mention of the issue of what happens when publicly funded research becomes private, and private patents are issued on what used to be in the public domain. This was, and continues to be, a major issue in the MIT-Whitehead Institute contract, for example.

The bulk of the book analyzes the processes used in selecting and financing private research in universities or research institutes. This financing is elementary by most standards. The authors discuss funding strategies: various combinations of grant money, facilities, and staff. I found this to be common sense and cannot see how any corporate or academic planner would not be aware of the obvious.

The book also makes quite liberal use of clauses from "typical agreements," but the same information can be had by reading the *Journal of the Licensing Executives Society*. *A Guide to Corporate-Sponsored University Research in Biotechnology* is intended for neophytes and may be useful for these individuals.

**Marcel Faber, Ph.D., Research Editor of BIO/TECHNOLOGY and Chairman of the Section of Science & Public Policy, New York Academy of Sciences, has organized a symposium on the subject.**

## BOOK REVIEWS

**P**ublishers whose lists include titles of interest to biotechnologists are invited to submit review copies of their books and serials. Please address all correspondence to Dr. Marcel Faber, Research Editor, **BIO/TECHNOLOGY**, 15 East 26th St. New York, NY 10010 4 Little Essex St. London WC2R 3LF, U.K.