ences. The entry "automated histology equipment and techniques" describes only one commercial product, yet others exist, including automatic specimen preparation and microscopy developed in England. The use of cryostats would seem to be worth more than the mere mention it gets in this entry.

The following subjects are not in the index: cinemicroscopy, deep field microscope, EOLM, integrating microscope, leptoscope, light section microscope, phosphorescence microscope, optical staining, Schlieren, television, TICAS, time-lapse, and ultrasonic microscopes, or stroboscopic analysis. Students have asked recently about these and other such subjects.

Gray's book will be of most use to college biologists and biomedical technicians for the material on specimen preparation methods and technics. Entries with reference lists are useful guides to more detailed information. The book is an encyclopedia on a small scale: Selected Topics might be a more descriptive title, because much microscopy and not a few microscopes are omitted. Within its limitations it is a useful work that does fill a need among the many recent specialized books on microscopy.

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Biochemical Tools

Immobilized Enzymes. OSKAR ZABORSKY. CRC Press (Chemical Rubber Co.), Cleveland, Ohio, 1973. xiv, 176 pp., illus. $26.50.

Immobilized enzymes are a subject of extraordinary activity in both academic and industrial circles. This book is primarily an exhaustive (through 1971) review of the literature of this rapidly growing field. It is not, however, simply a compilation of facts and reports. An attempt has been made to introduce some order and to systematize the divergent aspects of the field by definition of terms and categorization of the various topics. Thus the book should be very helpful to established workers in the field as well as to newcomers and the simply curious.

There have been numerous recent reviews on this topic, but few if any are as comprehensive as this and probably none emphasizes methodology more strongly. Partly because of a concern for leaving no major stones unturned, most aspects of the subject are not presented in great detail. This book rather summarizes, quite lucidly, the state of the art. The reader is referred to the original literature for details.

The book presents rather complete tables listing the enzymes that have been immobilized, and these are organized according to code numbers established by the International Union of Biochemistry Commission on Enzyme Nomenclature. A chapter summarizing the various chemical methodologies available for the covalent immobilization of enzymes to various supports is particularly useful. The use of multifunctional (bifunctional) reagents for the intermolecular cross-linking of enzymes, adsorptive methods of enzyme immobilization with reference to the examination of continuous catalytic processes, entrapment of enzymes within the interstitial spaces of cross-linked polymers, and immobilization of enzymes within microcapsules or semipermeable membranes are discussed separately in a systematic and succinct manner. The principal emphasis is on the general principles involved.

Immobilized enzymes are of importance in research on fundamental problems in biochemistry, and the potential value of these materials to the chemical, pharmaceutical, and medical industries is just now beginning to be realized. Enzyme reactors and a variety of immobilized enzymes can, for example, be used for the large-scale chemical processing or synthesis of substrates and foodstuffs (for example, sugars), for analytical purposes, in the therapy of metabolic disorders (for example, through enzyme replacement and removal of poisons), as continuous sources of fuel, and in selective separation procedures. Some of these are discussed by Zaborsky briefly and clearly, and the exciting future which these uses promise comes through well. A subject which is closely related to immobilized enzymes (or enzyme engineering), affinity chromatography (or separations based on biospecific adsorption), is barely mentioned, for the author has tried to limit the subject matter quite strictly to *enzyme* immobilization, especially as it relates to the continuous catalytic process.

Considerable progress must yet occur in the understanding and technology of enzyme immobilization and polymers with biological specificity before the potential theoretical and practical value of these special tools can be realized. The treatise by Zaborsky should help to focus attention, delineate problems, suggest new directions, and summarize the foundations upon which new advances will have to build.

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Metabolic Diseases

Lysosomes and Storage Diseases. H. G. HERS and F. VAN HOOF, Eds. Academic Press, New York, 1973. xxii, 666 pp., illus. $45.

According to accepted dogmas, lysosomal storage disorders are defined by the presence of abnormal deposits within a membrane-bound vacuole and severe deficiency of a specific lysosomal enzyme which is involved in the cleavage of a specific chemical bond in the stored material. This publication attempts to summarize current knowledge of these diseases and their relationship to lysosomes.

Much of the material on the individual diseases has been covered in various books and review articles by these authors or by others. In general, each chapter of the present book includes the clinical description of a disease, its characteristic pathology, the nature of the specific biochemical abnormality, and finally the genetics of and attempts at therapy for the disorder or both.

Four general groups of diseases are covered: (i) The sphingolipidoses, including G_{M1} and G_{M2} gangliosidoses, Fabry's disease, Gaucher's disease, Krabbe's disease, metachromatic leukodystrophy, and Niemann-Picks disease. A lipidosis, Wolman's disease, that is not a sphingolipidosis is also included. (ii) Polysaccharide disorders, namely, the glycogen storage diseases, the mucopolysaccharidoses, and the mucolipidoses. (iii) Mannosidosis, which does not conveniently fall into either of these classes and has been used as an example of a glycoprotein storage disease. Fucosidosis, also covered, at this time must remain unclassified since both glycopeptides and glycolipids containing fucose are present in excessive quantities in the tissues of these patients. (iv) A final category of pathological conditions