give the patient strength to expel whatever is causing his disease, but to achieve positive health he must also then take white medicaments. Disease or other misfortune caused by sorcery requires the suffocation of a black sheep. A black decoction must be prepared and drunk by all members of the victim's family, then vomited on the sheep; this is repeated for three days, after which the black sheep is buried and a white goat is killed. The family then drink and vomit white medicines for three days, during which flesh of the white goat is eaten and health is restored to the lineage member. In urban areas chickens may be substituted. The various color meanings are too numerous to spell out here, but they clearly design the ceremonies and symbolize their psychological and social significances.

Threaded through all these papers are some refreshing antidotes to the rigidly stereotyped molds into which anthropologists no less than lay writers have all too frequently poured the medical systems of preindustrial peoples. Persons who become seriously ill, as well as relevant others, tend to vary greatly in responding to their misfortune. They may first attempt to deal with the illness themselves, heed the advice of friends and kinsmen, or bear with it until the malady remits. If they consult a diviner they may not accept his or her verdict but often feel free to consult one or more others (provided they possess the wherewithal). Even after accepting the diagnosis they will not necessarily feel compelled to seek the recommended treatment, or they may decide to combine therapies from several healers. Healers and diviners not only compete with each other for the trust and patronage of their clients but differ greatly in their ideas of the nature of disease and the type of treatment needed, and there may be much variability within types of treatments as to methods and substances used. Of course, clients and healers share a core of beliefs without which the medical system could not function, but it is not unusual to find popular theories of sickness differing from those of the elite, and in particular of the professional healers, as Willis and Barnes have shown, no less in non-Western and preindustrial cultures than in Western systems. While these discoveries support Fortes's caution against the notion of the sick person or healer behaving as a serf to custom, they do not obviate studies of the status and role of patient and healer. These may not produce data as rich in human detail as the present studies, but, contra Fortes, they will be needed to bring about reliable transcultural comparisons.

Although the decision of the publisher to reproduce the book in double-spaced typescript doubles its size and diminishes its attractiveness, its contents measure up to the high standards set by earlier A.S.A. monographs, and it will be welcomed by medical anthropologists at home and abroad.

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History of a Machine

Europe's Giant Accelerator. The Story of the CERN 400 GeV Proton Synchroton. MAURICE GOLDSMITH and EDWIN SHAW. Taylor and Francis, London, 1977. x, 262 pp., illus. £13.

This is a description of the construction of the CERN SPS—the Super Proton Synchrotron, completed in 1976—and of the men who built it and the problems they faced and overcame in doing the job. It is a lavishly produced book, with many photographs, some in color, and diagrams. It is intended not for the physicist but for the general public. Written by two experienced science writers, one of whom is head of the CERN Public Information Office, the book irresistibly reminds one of the lavish annuals that the graduating classes of American high schools and colleges used to produce (do they still print them?), faithfully chronicling the doings of the class in photographs and slightly purple, arch prose. Just as all other schools were ignored in such annuals, the Fermilab accelerator, completed five years earlier at less than half the cost, is barely mentioned in the SPS chronicle, as if its mention were in questionable taste; it does not appear in the index.

Clearly, in such a book it would be idle to expect an evaluation of the project in terms of what was new and what borrowed, which design features are elegant and which uninspired. One can expect an adequate account of the circumstances of construction, and that expectation is met. The SPS had a particularly difficult birth. Its existence was despaired of at several junctures, and its survival was the result of inspired political action on the part of the scientists concerned, particularly J. B. Adams, who proposed that the cost of the accelerator be cut in half and that it be built at CERN. The story is here in all the particulars that have been public knowledge; whatever may have gone on behind the scenes is still wrapped in obscurity. And it is a story well worth telling.

The public are certainly entitled to such a description; they have paid enough for it. It is indeed rather a shame that all major accelerators have not been so chronicled. Most of them are major engineering achievements, and many of them are scientific ones as well. The agencies that fund such projects insist on proper scientific documentation of the construction, and they might be well advised to require documentation for the general public as well. Simple self-interest likewise prompts such a course; too much nonsense about science is fed to the public.

Among the inevitable errors that seem to survive the most careful proofreading only one seems worth mentioning. Perhaps significantly, it involves Americans; Robert Hofstadter is misidentified as M. Goldhaber on page 33.

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Synaptic Function

Chemical Pharmacology of the Synapse. D. J. TRIGGLE and C. R. TRIGGLE. Academic Press, New York, 1976. x, 654 pp., illus. $43.75.

Much of the excitement in the study of neurotransmitter receptors during the past few years has centered on attempts to purify and characterize the nicotinic receptor. These efforts have been greatly aided by the availability of a radioactive ligand, α-bungarotoxin, that binds, essentially irreversibly, to this receptor and by the availability of a tissue—the electric tissue found in a group of electric fish and eels—that contains an unusually large concentration of these receptors. (The concentration of nicotinic receptor sites in the electric tissue of *Torpedo marmorata* is about 250 times that found in mammalian skeletal muscle.) More recently, however, with the availability of radioactive agonists and antagonists for a variety of receptors, studies have been initiated on nicotinic, muscarinic, β-adrenergic, dopaminergic, and glycinergic receptors (to name just a few) in many different tissues, including small regions of the central nervous system. In addition to increased knowledge concerning the binding of radioactive ligands to receptors, there has been much progress in characterizing the early responses of

cells following the binding of agonists. Such studies range from investigations of changes in ionic conductance produced by the interaction of acetylcholine with a single receptor in skeletal muscle to measurements of changes in the synthesis of cyclic nucleotides produced by incubating slices of brain with different neurotransmitters.

Chemical Pharmacology of the Synapse provides an invaluable guide to these and other studies in this rapidly expanding field. Triggle and Triggle have accomplished an impressive task in that they recount the history of the major concepts of drug-receptor interaction and discuss many of the most recent findings on the subject. Characteristic of the global approach taken in the book, the first chapter consists of a review of the anatomy of the synapse and the chemistry of transmitter synthesis, storage, release, and inactivation. As it is elsewhere in the book, the full extent of biological diversity is discussed, the differences being presented not as mere curiosities but as indicators of important biological problems. For instance, Triggle and Triggle discuss the implications of the fact that the neuromuscular distance in vascular smooth muscle is much larger than it is in skeletal muscle. (The difference in some cases amounts to two orders of magnitude.)

It is not surprising that in such a condensed review of synaptic morphology and neurochemistry some errors have crept in. For instance, Mueller *et al.* did not show that reserpine induces the formation of tyrosine hydroxylase in vitro, but instead showed that in vivo administration of reserpine produces a delayed increase in tyrosine hydroxylase activity as assayed under optimal conditions in vitro. Such defects are minor, however, and the chapter provides a useful background for the later discussion of the quantitative aspects of drug-receptor interaction. For example, in the discussion in chapters 2 and 3 of dose-response curves and structure-activity relations at adrenergic receptors, Triggle and Triggle discuss at some length the complications introduced in such analyses by the norepinephrine uptake systems.

For each topic considered the authors review the findings from studies of a number of receptor systems and in many cases present the original data in easily readable figures and tables. Equally useful are the extensive bibliographies that follow each chapter and the list of related articles that have appeared since completion of the manuscript.

The book will serve well both as an advanced textbook of neuropharmacology for graduate students and as a reference book for workers in the field. The authors manage to cover a large number of subjects and still deal with most of them in some depth. Along the way they succeed in pointing out to the reader that a variety of fascinating questions remain to be solved.

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(Continued on page 1198)