

partments to research that requires clinical rather than laboratory skills. Feinstein makes an eloquent case for this point of view, and emphasizes that research not specifically related to human disease not only wastes the clinician's talents and the unique material available in the medical center, but also places the clinician at a disadvantage in competing with nonclinical scientists.

The book also indicts the inadequacies in our present taxonomy of diseases. Clinicians have too long forced themselves into the Procrustean mold of morbid anatomy, labeling and classifying disease not by what the clinician observes at the bedside but by what the pathologist sees at the autopsy table. Feinstein argues that to achieve a meaningful change in this state of affairs, we must develop criteria for the diagnosis of diseased states as rigorous as disciplined, competent medical observers can make them. The returns would be substantial, ranging from a more fruitful collaboration between clinicians and pathologists to the efficient treatment of diseases at all stages of their development.

Feinstein devotes considerable space to the application of Boolean algebra to clinical medicine. The spectrum of disease lends itself to analysis in terms of mathematical sets, and the author provides concrete examples of the utility of this approach. His own work on acute rheumatic fever and cancer of the lung speaks dramatically for the prognostic and therapeutic dividends of Boolean analysis. (It is to be hoped that readers will not be put off by a few of the more frightening Venn diagrams, such as figures 32 and 33.)

Along the way, Feinstein takes some good whacks at the school of thought that equates nonclinical research with first-class science, and clinical research with second-class science, a conceit no less irritating because it is so transparently untrue. Just as evolution has occurred not at the level of chemical complexity but at a higher level of integration, so the evolution of our understanding of disease states is not likely to proceed very rapidly if we rely exclusively on the reed of molecular biology.

Those who have followed Feinstein's writings over the years know of his concern for precision in history-taking and physical diagnosis. Those who have not are in for a treat. He rightly bemoans the neglect, in tests for the certification of physicians' competence,

of the assessment of skill in history-taking, just as others have lamented that medical students are graduated without having once performed a complete physical examination under supervision. Surely any core curriculum for medical schools would include physical diagnosis and history-taking—why do we neglect them so?

There are many refreshing sections in the book, including a discussion of the limitations of computers and the Bayesian concept of clinical diagnosis, and a suggestion that the medical student might just as profitably study anthropology, sociology, and symbolic logic as the fine details of cytology, microbiology, and biochemistry.

There are, to be sure, statements over which some readers might cross swords with Feinstein. It hardly seems "an ironic, awesome paradox" that abstract mathematics and digital computers can improve "the humanistic art of patient care," when that is exactly what the stethoscope, the microscope, and the electrocardiograph have been doing for years. The retrospective epidemiologic approach has made too many important contributions to the etiology of disease to be dismissed as invariably invalid. One regrets the failure of the author to recognize the similarity between the problems of the clinical and the nonclinical researcher. (How many animal experiments have been rendered misleading by failure to randomize the animal subjects or to appreciate the importance of the environmental conditions of the experiment?)

It is also hyperbole to rule out clinical trials unless the population can be divided into subgroups having the same prognostic risks. Advances have assuredly been made by means of trials carried out at times when not enough was known to stratify in this way, and they will continue to be made.

I also do not feel that *primum non nocere* should today be "the clinician's sacred law." (Incidentally, why don't we use the original Greek or an English translation of this aphorism?) To observe this advice literally is to deny important therapy to everyone, since only inert nostrums can be guaranteed to do no harm. It is more reasonable to ask doctors to balance the potential gains against the possible harm; would that we could only quantify these probabilities more precisely!

But these are minor carpings. Feinstein has pulled together an extraordinary amount of important related ma-

terial in a logical and convincing fashion. If many of the concepts have been elaborated before, it is doubtful if they have ever been woven into so cogent a story. I wish the book could be made required reading for every medical student and clinical teacher. Anyone planning a new medical school is advised to run, not walk, to the nearest Feinstein and sign him up for the faculty.

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## Island Vegetation

**Plants and Man on the Seychelles Coast.** A Study in Historical Biogeography. JONATHAN D. SAUER. University of Wisconsin Press, Madison, 1967. 148 pp., illus. \$5.

The biogeography of islands is in the news—87 years after Alfred Russel Wallace set the stage with *Island Life*—with recent books by Bowman, Carlquist, Heyerdahl, and others. Jonathan Sauer's contribution to this subject, devoted to the coastal vegetation of the Seychelles, gives an impression of authoritative coverage from the opening sentences (where he reveals that he can spell Wallace's middle name, even though a staggeringly large number of famous authors have failed) through to the appendices and the comprehensive index. Moreover, his book is easily readable.

The granite islands of the Seychelles are remote (as political exiles from the Asantahene of Ashanti to Archbishop Makarios could surely testify) and lay undiscovered by man until 1669, with the first immigrants arriving in 1770. Yet they had been continuously above the ocean surface for an indeterminate period far back into the past. This combination of ancient history with only recent human disturbance makes them especially important in the general study of the biota of oceanic islands. Sauer documents the events and records the results of his survey with admirable clarity. The contributions of both native and introduced species to the vegetational picture are assessed without favor.

Cotton, cinnamon, vanilla, and coconut palms have played their parts in the economic support of the islands, with the last-named, of course, having by far the most powerful influ-

ence on the contemporary coastal landscape. Sauer gives a very useful summary of the probable history of the genus *Cocos* and points to the apparent stability of this near monoculture, which may be related to its establishment entirely on native trees. Attempts to introduce "improved" varieties from Ceylon and other sources have been failures; an analysis of the biological basis of this situation may be of the greatest importance to tropical agriculture.

Although human-induced vegetational changes have been brought about far faster than usual in the Seychelles, the object lessons in these islands do not concern only the past: "the problem of potentially infinite populations and fixed natural resources becomes wonderfully clear on tiny islands that are largely bare granite."

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## Pre-industrial Technology

**The Traditional Crafts of Persia.** Their Development, Technology, and Influence on Eastern and Western Civilizations. HANS E. WULFF. M.I.T. Press, Cambridge, Mass., 1967. 428 pp., illus. \$25.

It is a common complaint among archeologists that ethnographers pay too little attention to the technological details of the societies they study, thus depriving archeology of their essential assistance in the problem of cultural reconstruction. The lack of such documentation is only too evident in the case of modern Iran, a country with still-existing but rapidly disappearing pre-industrial crafts. The appearance of Hans Wulff's volume on the traditional crafts thus fills a double void—that of adequate ethno-technological description of existing techniques and that of auxiliary information for archeological interpretation of past remains. Based on considerable field observation supplemented with library research, the work presents a careful documentation of the basic craft techniques of Iran taken as a whole (with regional usage specified where appropriate, however). The record includes the Farsi terms used by the craftsmen themselves for equipment and processes. The report thus has a linguistic importance as well.

Various specialized crafts included in

the broader categories of metalworking, woodworking, building, ceramic making, textile weaving, leather working, agriculture, and food preparation are all covered in some detail. Each section takes the reader step by step through the basic process, and most are provided with a well-chosen illustration or two (there are 423 figures) showing details of equipment or end products or providing a diagram of working parts. Some of the latter seem cramped as a result of having been reduced to fit the double-column format of the book, but all are clearly legible even so. For Western readers the labeling of the parts of these diagrams in Farsi is somewhat awkward, although all of the terms are explained in the adjacent text or may be looked up in the glossary of Farsi and English technical terms given at the back. There is also a very useful bibliography followed by a section of annotations on the more important sources. The book ends with a small map of Iran showing key place names mentioned in the text.

For anyone interested in Iranian studies, in the ethno-technology of the Near East, in the history of technology in general, or in the technological connections between the Near and Far East by way of Iran this book is an indispensable source. Its one major flaw lies in the author's attempt to give his observations historic depth through the inclusion of prehistoric archeological data. This part of his treatment is somewhat out of focus and out of date, and the reader would be well advised simply to pass over these comments (which constitute but a small part of the total text), especially as applied to metallurgy and ceramics, and go on to the rest of the well-presented material. At the very least he is cautioned to check any archeological statement against current sources.

In view of the serious disruption of World War II, the author is to be congratulated on his perseverance in re-assembling and publishing his important observations. They make a major contribution to the study of Iranian technology. The M.I.T. Press is also to be congratulated for undertaking to publish ethnographic data of great value to the study of the history of technology in general. It is to be hoped that it will continue to do so.

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## Chain Reactions

**Liquid-Phase Oxidation of Hydrocarbons.** NIKOLAI MARKOVICH EMANUEL, EVGENII TIMOFEEVICH DENISOV, and ZINAIDA KUSHELEVNA MAIZUS. Translated from the Russian edition (Moscow, 1965) by B. J. Hazzard. Plenum Press, New York, 1967. 364 pp., illus. \$22.50.

The reactions of organic compounds with oxygen from the air are among the most important of all chemical processes. Respiration and combustion are most familiar, but there are also a host of less spectacular reactions that do not involve complete degradation of the organic material to carbon dioxide and water. Many of these processes occur more or less spontaneously under comparatively mild conditions. The harmful effects of such processes are apparent in the rancidification of edible fats and oils and in the slow deterioration of rubber. The beneficial effects are apparent in the drying of linseed oil paints and, particularly, in the synthesis of many valuable chemicals by the partial oxidation of relatively cheap hydrocarbons derived from petroleum.

The oxidation of hydrocarbons in the liquid phase is a free-radical chain process. Relatively unstable hydroperoxides are generally the primary molecular products, and these decompose slowly to initiate new reaction chains. The overall process is autocatalytic and is referred to as a chain reaction with slow, or degenerate, branching. Although the kinetics is not simple, considerable progress has been made in our understanding of the mechanisms of these reactions. Emanuel and his collaborators at the Institute of Chemical Physics, U.S.S.R. Academy of Sciences, have constituted one of the most active groups in this field in recent years.

The present book represents on the whole a successful attempt to collate a large body of information. The Russian literature is fully covered through 1964 and Western literature through 1961. The occasional references to more recent Western work are not always successfully integrated into the text. The chapter on inhibitors is particularly subject to this fault. Homogeneous oxidations in strong acids and strong bases are not described. The emphasis is on the fundamental reactions involved in oxidations. Mathematical treatments of the kinetics of chain reactions play a major role. Their general success sometimes obscures the fact that agreement