Asian Development

In recent years shelfloads of literature have come forth on social change and economic growth. Norman Jacobs' addition, **The Sociology of Development: Iran as an Asian Case Study** (Praeger, New York, 1966. 459 pp. $17.50), while probably not a landmark in the field, certainly should be selected from the plethora of writings on development and thoughtfully read and digested by all those concerned with the vital questions he poses: Why have some societies been able to develop economically, while others—especially continental Asian societies—have not? How can the situation be improved?

This book attempts to answer these vital questions by means of a study in depth of one such society, Iran. Jacobs investigates barriers to economic growth in the form of well-established attitudes, customs, and habits and finds that development is seriously hampered by factors in the social environment in which the development is to take place. More than half of the book is an incisive, if not concise, description of the Iranian social structure, showing how it has become a balanced and integrated system incorporating economic patterns, family, educational, religious, and military elements, and interpersonal relationships—all of which operate to maintain the status quo. For example, Jacobs points out that the educational system does what is intended—it prepares students to live in their contemporary culture. Yet such an education is inadequate for a hoped-for modern industrialized society. Like the educational system, each component of the culture fits more or less comfortably in with the others.

This portion of the book will enlighten any Western adviser (as it did the reviewer) who has struggled to understand and help the Iranian in his often-stated purpose of bringing economic development to his country. It may not gain such quick acceptance, however, by the Iranian reader, who may disagree with the frank descriptions of Iranian behavior. But thoughtful readers from both the West and the East will gain from Jacobs' observations concerning conflicts between Iranian aspirations for social and economic advancement and the rigid social structure.

Unfortunately, the second part of the book, except for the important concluding pages, is somewhat clouded by the very logic used for clarification. A model of a hypothetical Asian society which was used as a framework for data collection is now used for drawing tentative conclusions. Results are compared with an alternative model derived from the developed societies of both the West and Japan. These refined conclusions are further examined in the light of "myths of underdevelopment," myths assumed to be true by Iranians, their Western advisers, or both. While much of this discussion of methodology will be helpful for many readers, only members of the model-builders' priesthood will fully appreciate all of it.

For many U.S. readers, the meat of Jacobs' work will be found in its final pages, though these pages cannot be appreciated fully without an understanding of the whole. Here Jacobs suggests practical ways in which foreign advisers can encourage the changes in certain of the Iranian's attitudes that must be made as a prerequisite to economic development. He suggests cooperative efforts to help release the paralyzing grip of traditional cultural factors. In a few pointed words he outlines a potentially effective approach to foreign aid for Iran. Perhaps the most important contributions of Jacobs' study lie in this concluding chapter. In sum, this book may be profitably read by the million Americans concerned with underdeveloped economies.

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Marine Geology

Although forever hidden from view in the watery depths, submarine canyons are the most magnificent erosional scars on the face of the earth. They furrow the 2½-mile-high continental slopes, whose boldness is equaled only by the Himalayan rampart. It is eminently appropriate that Francis P. Shepard (professor emeritus at the Scripps Institution of Oceanography) and Robert F. Dill (U.S. Navy Electronics Laboratory, San Diego) should collaborate in writing a book on **Submarine Canyons and Other Sea Valleys** (Rand McNally, Chicago, 1966. 397 pp., illus., maps. $9.75). For 35 years Shepard, the recognized father of submarine geology, has specialized in the study of the submarine canyons. In fact, until the postwar years, his dominance in the new discipline seemed to make marine geology and the study of submarine canyons synonymous. Dill is perhaps the most experienced scientific scuba and DRV (deep research vehicle) diver in the country. The book is a fine addition to the literature of marine geology.

Submarine canyons have long intrigued the scientist, the mariner, and the fisherman alike. Where they deeply incise the shelf, they have been assigned some interesting names such as "The Swatch of No Ground" near the mouth of the Ganges River or "Trou sans Fond" off Abijan. Only one canyon actually invades the coastline—the Congo Canyon, which enters the estuary of the Congo River. Unlike the Nile, this greatest of the African rivers has no delta, so that all of its sedimentary load must bypass the continental shelf, cascading down the canyon into the deep sea.

Shepard and Dill's book is largely a descriptive account of submarine canyons around the world. The "domesticated" La Jolla Canyon, which obligingly originates just a George Washington's stone's throw off the Scripps Institution of Oceanography, is taken as the type example. The first half of the book is a *tour du monde* describing numerous canyons from all continental slopes. This provides useful information, but it is rather tedious reading. Data on lengths, tributary patterns, longitudinal profiles, canyon walls, and other parameters are conveniently summarized in an appendix.

The basis on which certain deep embayments, such as the Bering Canyon and the Tongue of the Ocean Canyon, are classified as canyons seems doubtful to me. The Tongue of the Ocean is certainly occupied by a sea valley, but to identify its wall height as a record 14,000 feet seems like referring the wall height of the Sacramento River valley to the top of the Sierra Nevada Mountains.

The methodology and techniques for exploring submarine canyons have come a long way since, in the late 1930's, I assisted Shepard in his surveys with nothing more than a rowboat, a sounding lead, and a sextant. This is a field of oceanography to which scuba has made an important contribution. An important new sampling device is the so-called box corer, which recovers a large block of undisturbed sediment and thus permits the study of graded beds and other sedimentary structures. Sub-bottom acoustic profilers

are also proving to be a powerful tool by delineating the sub-bottom strata with "x-ray vision." Their impact is just now being felt.

In the past Shepard believed that submarine canyons were cut by rivers at the greatly lowered sea levels that resulted from the lockup of water in continental glaciers many times the size usually accepted by Pleistocene geologists. But over the past two decades he has gradually revised this opinion. Shepard and Dill now come to no firm conclusion except to offer that river cutting (in the upper reaches), turbidity currents, various ordinary currents, and mass movements are all important. They question the "extreme confidence placed by so many geologists in turbidity currents as the major or only cause of submarine canyon excavation." They also doubt the reality of the high-velocity turbidity current (up to 55 knots) whose existence has been inferred from cable breaks. The overall results of their synthesis are to de-emphasize the role of turbidity currents, further to de-emphasize the role of river cutting, and to emphasize mass movements. They also suggest that submarine canyons have been cut throughout all geologic time and not only during the Pleistocene while sea levels were lowered, although some intensification of cutting may have occurred then because of an increased supply of sediment. They finally note that much work lies ahead before most of the answers on the origin of submarine canyons will be forthcoming.

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Dormancy

In **Spores, Their Dormancy and Germination** (Harper and Row, New York, 1966. 368 pp., illus. $14) Alfred S. Sussman and Harlyn O. Halvorson have succeeded in their aim of producing a monograph "largely restricted to discussions of dormancy in microbial systems in which biochemical aspects have been analyzed in some detail." Investigators and graduate students will find the volume a handy source of references and a welcome up-to-date résumé of current information strongly reinforced by the generous use of illustrations and tabulations of data from numerous sources. Typographic errors are few, the printing handsome, and the index adequate.

Spores of fungi and, to a lesser extent, spores of other plants are considered, but to an overwhelming extent the book deals with bacterial endospores. This emphasis is attributed to the relatively greater focus of activity in the last decade by biochemists, electron microscopists, and enthusiasts of exobiology on studies of bacterial endospores. Yet this very concentration of interest prevents the volume from representing the thoughtful analysis and general statement of the dormant state in biology that one might have hoped for.

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Peptides

The recent synthesis of insulin by peptide chemists in China, Germany, and the United States represents a high point in the application of an art whose development began with Fischer and Curtius at the beginning of this century. In retrospect, it is clear that the major contribution during the intervening years was the introduction, by Bergmann and Zervas in 1932, of the benzyloxycarbonyl group to protect the amino group of an amino acid while its carboxyl group is being activated for reaction to form a new peptide bond. When, after 1945, important new methods were devised for the activation of carboxyl groups in such reactions and several new protecting groups were added, the stage was set for the laboratory synthesis of complex peptides; these later developments received powerful stimulus from the recognition that many natural substances having pharmacological or antibacterial activity are peptides of moderate size and complexity. In 1953, duVigneaud and his associates proved by synthesis the cyclic nonapeptide structure they had proposed for the hormone oxytocin. By 1963, the available methods permitted the synthesis by Schwyzer of the 39-amino-acid chain of the adrenocorticotropic hormone. Now the hope of many peptide chemists is to apply their art to the unequivocal laboratory synthesis of proteins larger than insulin—in particular, enzymes. The first steps in this direction have recently been taken by Hofmann, who has made the amino-terminal 20-amino-acid sequence of pancreatic ribonuclease. Not only is synthesis important in the proof of a structure deduced from degradative studies; it provides the most reliable known means of modifying structure in a systematic manner, and thus represents the surest road to the understanding of the structural basis of biological function. A potentially valuable by-product of such work is the creation of variants of a natural peptide that are more effective than the parent compound in medical practice.

In **Peptide Synthesis** [Interscience (Wiley), New York, 1966. 304 pp., illus. $9.50], Miklos Bodanszky and Miguel A. Ondetti have provided the best available brief introduction to the present state of the art. After three short introductory chapters, the succeeding sections deal concisely but clearly with protecting groups, the formation of the peptide bond, racemization, the strategy and tactics of peptide synthesis, and the synthesis of biologically active peptides. The authors have been selective in their treatment, and the text is easy to read. The bibliographical citations are numerous, but carefully chosen from the very large literature on the subject. The book is highly recommended to graduate students and to research workers seeking an authoritative review of the problems of peptide synthesis.

Among the peptides found in nature, or derived from proteins by partial proteolysis, is a group of compounds that exert a pharmacological effect in lowering the blood pressure of mammals. Among them are bradykinin, kallidin, kallikrein, gastrin, eledoisin, physalaemin, and substance P. In October 1965, an international symposium was held in Florence, Italy to discuss the chemistry and pharmacology of these substances, and **Hypotensive Peptides** (Springer-Verlag, New York, 1966. 686 pp., illus. $18.60), edited by Ervin G. Erdös, Nathan Back, Federigo Sicuteri, and Anne F. Wilde, gives the proceedings in full. There are over 60 separate scientific contributions, and the 130 or so participants include nearly all the active investigators in the area under discussion. The volume provides an extremely useful source of information about the recent advances in this field.

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