presentation for many generations to come.

If all eight volumes of this mathematical collection maintain the high level achieved in volume 1, Whiteside will have found his hope fulfilled that the present edition might be "a small step toward that long-overdue monument to a man who in so many areas of human thought himself took a giant's leap."

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On Science and Scientists

The Art of the Soluble. P. B. MEDAWAR. Methuen, London; Barnes and Noble, New York, 1967. 160 pp. $4.50.

The most descriptive single word for this book is one more often found in crossword puzzles than in book reviews: it is an olio, or hodgepodge. As the author notes, this miscellany is recurrently concerned with the nature of science and of scientists, but there is little unity beyond the fact that the diverse bits are all products of the same mind—a brilliant one, whose least products can never be called trivia. An even more recurrent theme is that of Medawar's dislikes, so outspokenly attacked as to be diverting even for those who do not share them.

Adverse opinions that this reviewer does share are that Teilhard's *The Phenomenon of Man* and Koestler's *The Act of Creation* are two of the very worst books ever hailed as masterpieces. To be sure, Medawar in his introduction does somewhat modify his reprinted review of Teilhard's book, now feeling that it is only "a dotty, euphoristic kind of nonsense" with "no real harm in it." We can hope, but hardly believe, that this second thought is justified.

The two character sketches reprinted in the book are acts of hero worship, but do not wholly ignore feet of clay. Herbert Spencer is considered worthy of rescue from current obscurity, and yet he exemplifies the silly confusion that results from calling all directional processes "evolution" and from assigning a single direction to organic evolution. He thus anticipated one of the many weaknesses of Teilhard and some other more recent evolutionists who are definitely not heroes to Medawar. D'Arcy Thompson was a gentleman and a scholar, fascinating in both roles, but his highly readable masterpiece, *On Growth and Form*, admittedly has had almost no direct effect on modern biology. Reading between Medawar's lines, one must conclude that this is just as well and that Thompson's indirect influence has been overestimated.

A brief essay on Darwin's chronic illness is a vehicle for Medawar's distrust of psychoanalysis, further expanded in his introduction. A Biological Retrospect, originally a presidential address before an unnamed group, is notable especially as completely belying the astounding and indefensible statement, twice made elsewhere in this book, that "the physical sciences and mathematics offer us the only pathway that leads to an understanding of animate nature."

The Two Conceptions of Science (title of another essay), reduced to the simplest terms, are those of pure and applied science or, as others might prefer to say, just science and technology. There can be little quarrel with the view that neither concept of science is justified or operable alone and in its extreme form. It is an interesting thesis that the concept of pure science and its overvaluation are by-products of Anglo-Saxon snobbery.

Finally, the essay Hypothesis and Imagination is an attack on induction as scientific method (another of Medawar's pet dislikes) and a history, as far as concerns the United Kingdom, of the preferred "hypothetico-deductive system." This system is assigned "unquestionably" to Karl Popper, another hero, but the historical notes fascinatingly demonstrate that what is undoubtedly valid in the system was already a commonplace before Popper was born. There is also here an echo of Medawar's famous broadcast "Is the Scientific Paper a Fraud?" (not here reprinted as such), and again one must disagree with his conclusion that it is somehow fraudulent in the art of writing a report on research not to follow exactly the noninductive steps involved in that research. It is diverting to think what would become of other arts, such as poetry, painting, or music, if the final product had to incorporate the steps by which it was achieved.

The other meaning of *olio*, from the Spanish *olla*, is that of a tasty, spicy, varied dish. Medawar's book is an olio in that sense, too. By the way, Medawar's somewhat cryptic title comes from his review of Koestler, in which he refers to scientific research, a practical-minded affair, as the art of the soluble. It is insistence on practicality that underlies Medawar's whole attitude toward science and scientists and that sparks most of his dislikes. That after all does lend unity to the olio and is a contribution to common sense.

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The Therapist and the Researcher

Clinical Judgment. ALVAN R. FEINSTEIN. Williams and Wilkins, Baltimore, 1967. 422 pp., illus. $9.50.

This is an important book, and one prays that its messages will be read and heeded. Feinstein is a clinician, and proud of it. He finds the universe of diseased patients exciting and challenging. The complexity and infinite variety are reasons for rejoicing, not despair. But since Feinstein is also a research scientist, he is unwilling to be frustrated by the ambiguities and imprecision that too often characterize clinical research. In addition, he is a philosopher, a fact which gives the book a distinctive flavor.

The writing is neither aseptic nor telegraphic. Rather, it is leisurely and personal. If a point needs to be driven home with three or four examples instead of one, so be it. If repetition seems to reinforce the message, the author rephrases the idea in several different ways. (This is not to imply that the book is larded with literary fat; one of the problems with the book is that much of it is tightly written, so that the reader has to work and cannot browse or skip.) The volume is written not simply to explain, but to convince.

Since "the care of a patient is the ultimate, specific act that characterizes a clinician," Feinstein laments the common relegation of problems of therapy to inferior status in the hierarchy of values in academia. *Clinical Judgment* was written to revise the belief that therapy is almost automatically "subscientific," and to reorient clinical de-

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 material 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-