himself and profoundly affected all the social sciences and the humanities. As Freud grew older, however, and understood better the problems and vagaries of human relations and interactions, he turned his attention more and more from the unconscious depths of the mind to the conscious surface, from the id to the ego. In fact, it was this very turning to the problem of integration of the entire personality that moved Freud to describe the mind as three interlocking structures, the id, the ego, and the superego. The early discoveries charted the id; his later work, which laid the foundation for all modern psychoanalysis, charted the ego. The later work was far less dramatic and was the result of painstaking concern, not just with what pushes a man, but with how the pushes, the pulls, the should's, and the sensible reasons are connected. Here Freud was foremost among many workers, not a giant alone. Robert gives only one page (337–38) to ego psychology and never even mentions *Analysis Terminable and Interminable* (1937), which many consider one of Freud's most important papers and which was a crucial influence on several important followers, Erik Erikson among them.

This neglect of the ego not only minimizes the totality of Freud's achievement but also indicates a certain lack of understanding about what makes Freud's work both so important and so difficult. Robert points out clearly and correctly that Freud's thought fundamentally resisted straight-line interpretation; in his insistence on various dualisms he presented psychoanalytic theory in terms of the balance of many forces. She does not perceive the natural evolution of this complexity into the concept of mental structures where the ego maintains discharge thresholds, perceptual capacities, thought, affect, and internalized rules of evidence simultaneously in contact with impulse, drives, and their culturally determined opposites. Freud's constant insistence upon human ambivalence and its complicated resolution makes it hard for him to be accepted by scientists who think of research as a straight-line pursuit of an answer. Freud's work makes the search for a specific, certain end point difficult if not impossible. Robert, like many others, tries to explain this inherent complexity by ascribing some aspects of Freud's work to a conflict between Freud as a scientist and Freud as a literary man, even a poet. The fact that the first great prize Freud received was the Goethe award in literature has been used again and again to indicate not just that he was a fine writer who cared about style and language, but that his work should be ranked as an artistic rather than a scientific achievement. Freud, while greatly pleased by the recognition afforded by the Goethe prize, always felt himself to be a scientist. Robert points out how much he suffered from the comparatively low scientific standards of many of his early pupils. But she quotes writers like Schnitzler to argue that their recognition of the importance to them of Freud's work proves it to be more imaginative than scientific.

It is true that much of Freud's work was highly speculative and entered realms not generally considered to be in the purview of science. But in his own view he was an experimenter, applying a rational, analytic method—kept as free as possible of moralistic, theological, and other unscientific influences—to a new science where, unfortunately, no experiments could be exactly repeated. It is a mistake, I think, to place a low estimate on Freud's own view of the matter; or perhaps the mistake lies in minimizing the power of the imagination to further the scientific study of the mind.

Robert takes us through the great suffering of Freud's later life and describes how this stern and, above all, rational man relinquished none of his convictions as he drew close to death. She brings out more directly than Jones the influence of poverty on Freud throughout his life and also its effect upon the psychoanalytic movement. By this attention to his fortitude and courage, both moral (in the early days of psychoanalysis) and physical (during his many operations and hospitalizations), she draws a human, if restricted, portrait. She knows little about his actual family life and relationships, just as he had planned that she should not, but she manages to make this lack seem not to be a serious handicap. Her lively discussion of the famous dissents and dissenters differs slightly from Jones's and presents a somewhat different picture of Jones himself in the controversies. In spite of her attempts to explain Freud's work as the outcome of his inner conflicts, she manages to show that he admitted mistakes and learned from them, that he was never satisfied and never felt that he had reached an unmodifiable conclusion.

In only one respect would I accuse her of personal bias, and that comes from her pleasure, as a Frenchwoman, in Freud's anti-Americanism. She contrasts European psychoanalysis with American to the discredit of the latter, even though she makes much of the existence in Europe of an analytic orthodoxy far more rigid than Freud well before the time of the great controversies with Adler, Jung, and Rank. Admittedly, Freud doubted that America would understand him any better than he understood America. But Robert goes further and says that in America psychoanalysis "concerned itself less with making an individual an integrated person than making him conform to social standards, thereby bringing him down to the common level."

If Robert meant only to call attention to the American capacity for preoccupation with fads, she has a valid point. But that was not Freud's fear. Freud mistrusted the self-conscious materialism of America, and he expressed his bitterness towards both sides of the Atlantic by saying, "I learned that the Old World is ruled by authority as the new is ruled by the dollar." There was no evidence that he felt, or needed to, that in America psychoanalysis per se would abandon what Heinz Hartmann calls its fundamental task, "the study of social deception and its motivations," and would become an instrument for social engineering for no matter what goal.

Erikson says of Freud, "Psychoanalysis had, to all appearances, sprung from his head like Athena from Zeus'." It is the quality of fierce originality and creativity that eludes Marthe Robert, as I think it will all of Freud's biographers.

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A Great Synthesizer

James Hutton—The Founder of Modern Geology. EDWARD BATTERSBY BAILEY. Elsevier, New York, 1967. 173 pp. $9.

This little book provides a useful condensation of the very voluminous and obscure writings of the most important geologist of all time, James Hutton (1726–1797). A much-needed similar service was provided in 1802 by Hutton's friend John Playfair, in *Illustrations of Huttonian Theory.* Bailey's contribution constitutes a 20th-century counterpart now much needed to help

stimulate a revival of concern with Hutton's monumental synthesis of a budding science. For, in my opinion, Hutton has been somewhat eclipsed by a myopic concern with 19th-century workers who, in fact, inherited practically all their geological principles from their Scottish forebear. Bailey's updated source book has advantages over Playfair's *Illustrations* in being a more detached analysis and in being couched in modern geological and compositional style.

The book contains no illustrations or tables and is printed in a modest but readable format. It suffers greatly in lacking an index, and it contains many typographical errors. Most serious, however, is its exorbitant cost. We have come to expect a flood of expensive books from the publisher of this volume, but it is perplexing that this little book should bear a price tag of more than 5 cents a page when American publishers seem satisfied to charge 2 or 3 cents a page for much more complicated scientific books. This seems especially paradoxical when publishing costs are alleged to be significantly smaller abroad.

Bailey presents a brief and reasonably objective biographical sketch of Hutton and then sets forth, at greater length, a more or less chronological account of Hutton's writings, with numerous, well-selected short quotations and abstracts. Probably the greatest value of the book is its clarification of the sequential development and documentation of concepts by Hutton and in showing clearly which other writers most influenced him. Bailey and others have pointed out that Hutton's writings were so cumbersome and verbose that it is extremely difficult to perceive this chronology. Playfair's delightful *Illustrations* did not fully illuminate this point, for it was topically organized. An example of the need for a clear chronological comprehension of Hutton's work is the fact that volume 3 of *Theory of the Earth*, which was not published until 1894 (100 years after Hutton's death), contains detailed accounts of the discovery of the famous angular unconformity at the base of the Old Red Sandstone and of many intrusive granites. Yet it is virtually certain that this volume was written before volume 1, which was published in 1795. Worse still, we find that, like volume 1 of the long version, the early condensed version of his theory published in 1788 contains no inkling that during the preceding three years Hutton had actually observed several clear examples of the angular unconformity and of intrusive granites. Only after these things are sorted out is it possible to assess properly Hutton's own, original contributions.

From Bailey's very readable treatment, Hutton's intuitive genius becomes clearer than ever. His preeminence as the first great synthesizer of the science of geology is unquestioned. He not only hit upon the correct concept of the forceful upheaval of mountainous areas accompanied by faulting, folding, and plutonism as well as by erosional degradation, but he also anticipated the concepts of metamorphism, of past expansion of glaciers, and, according to Bailey, of adaptation and possibly even of evolution of organisms. But Hutton was not perfect. Bailey especially notes his overpreoccupation with the then popular concept of a grand design or purpose in nature. Hutton repeatedly refers to the upheaval of land and its subsequent weathering and erosion as occurring for the sole purpose of providing a "perfect" habitat for plants and animals. From this premise, he developed what Bailey terms a concept of cyclic continuity—a kind of steady-state world. This cyclic concept has had almost incalculable, but not entirely beneficial, influences upon geologic thought right down to the present day.

The many ramifications of Hutton's influence upon the development of geology deserve further investigation, and it surely will be aided by E. B. Bailey's last contribution to geology. This book is a fitting tribute across the centuries from one great Scottish geologist to another.

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Mitotic Phenomenon

International Symposium on the Nucleolus, Its Structure and Function (Montevideo, Uruguay, December 1965). W. S. VINCENT and O. L. MILLER, JR., Eds. National Cancer Institute Monograph 23, Washington, D.C., 1967. 630 pp., illus. $5. Available from the Government Printing Office.

This to the best of my knowledge is the first book to be devoted in its entirety to the nucleolus. It's a thick book that contains the thoughts of some 75 speakers, co-authors, and discussants and considers the nucleolus from most of the possible viewpoints. From this massive amount of information two clear-cut take-home lessons emerge: first, that although nucleoli of different creatures look different by light microscopy, they are all remarkably similar in fine structure, composed as they are of coarse fibers, fine fibers, and granules; and second, that the nucleolus is made by the nucleolar organizer, which we already knew, and that the nucleolar organizer contains the genetic material responsible for the coding of ribosomal RNA.

The first section, on nucleolar structure, contains particularly illuminating sections by L. Chouinard showing, as is generally agreed, that the nucleolus consists of a fibrous network surrounding a more or less structureless center which is full of granules of ribosomal-subunit size. O. L. Miller discusses in detail the multiple nucleoli produced during the development of the *Triturus* oocyte. Each of these several hundred nucleoli, which are unique to the oocyte, contains DNA, apparently circular in configuration (although this is not rigorously proved), in amount sufficient to code for 10 to 100 cistrons of each of the 28*S* and 18*S* ribosomal RNA subunits.

The second section, on nucleolar composition, comes to no clear-cut conclusion. This is due, apparently, to the fact that it is not yet possible to isolate nucleoli with the degree of noncontamination by other nuclear components required for establishment of unique chemical composition. A third section, Nucleolus in the Cell Cycle, contains extensive discussion by D. D. Brown of the appearance of multiple nucleoli during the development of *Xenopus* eggs, and their disappearance at meiosis. It would be more interesting if Brown could tell us why no nucleoli are formed during early embryonic development. This is an important and interesting question concerning the control of the nucleolar organizer, and one that certainly can be approached in *Xenopus* more readily than in most other organisms.

By contrast with the earlier sections, the section Nucleolar Genes provides extensive insight and summarizes much important newly gained knowledge. H.