Book Reviews

Emotion and Personality. vol. 1, *Psychological Aspects*. vol. 2, *Neurological and Psychological Aspects*. Magda B. Arnold. Columbia University Press, New York, 1960. xiv + 296 pp.; xvii + 430 pp. $7.50 each.

You may have reflected on the subtle retirement of William James from the psychological scene—James with his phenomenology and "test of reason," without the "rigor" of measurement, *t*-tests and *P*-values, information theory, cybernetics, or vacuum tubes. James's panoramic mixture of idealistic, realistic, and pragmatic philosophy, though quite possibly underbudgeted for sex, could, nevertheless, anticipate reverberating circuits and cell-assemblies (whatever value these may have in understanding the brain) without denigrating man. James is still very much alive. The scholarship, method, and rhetoric of Magda Arnold's volumes are Jamesian throughout.

Theorists ranging from theologians to physiologists have long pondered the causal relation between perceived object, emotional experience, and associated bodily changes. In general three main solutions have been advocated: that perception arouses emotion and then emotion causes bodily changes; that perception induces bodily changes which are felt directly as emotions; that perception arouses both emotion and bodily changes. Arnold offers a fourth solution to this classical problem. She holds the view (based upon a tightly reasoned argument) that emotions are aroused (experienced subjectively) not by perception directly but by an instantaneous appraisal of what we perceive; that emotion is a tendency to some sort of action appropriate to this appraisal, accompanied by a pattern of physiological alterations in body state.

Volume 1 presents a scholarly review and critical examination of past and present thought on the subject of emotions. It also educes a four-factor model: perception-appraisal-emotion-action based in part upon laboratory and clinical studies of human behavior. I sense some convergence in this model with recent laboratory analyses of thinking behavior in terms of phase sequences and other constructs. This is perhaps not surprising since the "same" brain subserves both cognition and conation.

Volume 2 examines the known physiological and neurological evidence and attempts to demonstrate that the theoretical formulation presented in volume 1 is consistent with and supported by such data. Here the argument is less than compelling. For example, emotion is a relatively prolonged state and there is little known neurophysiology to account for such states. Furthermore, the assumption is made, but not examined, that all modulating influences in the brain are reflected directly in neural transmission. Memory traces are heavily implicated in the appraisal aspect of the new theory and may or may not fit this assumption. Arnold suggests that the instantaneous appraisal is mediated by the "limbic system" of the brain, which is defined to include the subcallosal, cingulate, retrosplenial and hippocampal gyri (entorhinal cortex and adjacent presubiculum), and the island of Reil. The effects of selective ablation and of specific psychopharmacological agents on this system are examined in some detail.

Prologue to the Science of Emotion

It is noteworthy that Arnold addresses this communication to scientists. Walter Miles once told me of receiving a letter from Sigmund Freud expressing surprise that anyone would ever take his propositions to the laboratory for testing. Students of brain-behavior relations will welcome the departure from the theorists' usual procedure, which has been to start with neurological findings and speculate as to what these findings could mean. In the words of Arnold: "Such an approach overlooks the fact that we must know the exact sequence of psychological processes before we can identify the structures that mediate it." In any event, our *appraisal* of Arnold's theory must in important respects be quite different from the scientific assessment of its validity for brain functioning. These volumes represent a timely prologue to a science of emotion.

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Smithsonian Treasury of Science. Webster P. True, Ed. Simon and Schuster, New York, 1960 (in cooperation with the Smithsonian Institution). xvi + 1208 pp. Illus. 3 vols., boxed, $15.

These volumes contain 50 essays on popular science, selected from the 3000 that have been published since 1846 in the *Annual Reports* of the Smithsonian Institution. The essays run the gamut of a century of science and of speculation about science, and for the most part they are well written and enticing, sober yet informative articles written for the intelligent layman. Whenever possible, with those articles that have been recently outdated, the editor has prevailed on the author or on another expert to provide a suitable addendum. For each essay, the editor has also added a short introductory note, explaining the essay's importance and saying something about the author.

However, all the addenda and pious introduction cannot conceal the fact that this is a rehashing job, hardly worthy of being enshrined in three volumes (boxed) and put out as a popular conspectus of the whole of science. Though it contains writings by Einstein, Pierre Curie, H. G. Wells, and Marconi, it is but an anthology from a noncommercial, scientific, annual publication, and few of its articles have the status of masterpieces of the art of science writing. They were not intended to be that. As Leonard Carmichael remarks in his introduction, the Smithsonian's function of the "diffusion of knowledge" has always been accomplished through its scientific publications; but only *to a limited extent* have its publications been directed towards the general public. The limited extent has always been well performed by the Smithsonian's own lights; no one

would be more delightful than I if the Smithsonian found it mete and proper to open a new and less-limited program of providing the authoritative yet readable popular articles demanded in this scientific age. Unhappily, these volumes are not a sign of the Smithsonian throwing its limitations to the winds; they are merely a regurgitation of the old style, and one must be disrespectful of Messrs. Simon and Schuster for aiding and abetting the process.

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Geologic Evolution of Europe. Roland Brinkmann. Translated from the German by John E. Sanders. Ferdinand Enke, Stuttgart; Hafner, New York, ed. 8 (condensed version of vol. 2), 1960. vi + 161 pp. Illus. $8.50.

Emmanuel Kayser's great *Lehrbuch der Geologie* was one of the cornerstones of a good geological education during the first quarter of this century. It grew into four dryly authentic volumes during the course of seven editions and was full of complicated Teutonic sentences and fossil names. Then Roland Brinkmann cut it in half, expunged unnecessary terminology, and infused it with well-founded, dynamic interpretations to create the new two-volume Kayser-Brinkmann *Abriss der Geologie*, which has now gone through eight editions of its own.

The second volume of the *Abriss* is, in fact, a streamlined account of the geologic evolution of Europe, with notes on other parts of the earth; it is this which Sanders has halved again to make the book here reviewed. He has transformed the original 360 pages of German into 161 pages of English by dropping three chapters entirely, by deleting sections of other chapters that deal with areas outside of Europe or with paleontology, and by condensing discussion and reducing fossil illustrations from 58 to 19 plates. The result is a highly abbreviated, synoptic account of the physical evolution of Europe from the Precambrian to the Recent era, in which Kayser's familiar illustrations of fossils and rocks are about all that remain to indicate its lineage.

American and British geologists should be grateful to Sanders and the publishers for making this book available. Now they can read in English about the historical geology of the European mainland from two up-to-date and complementary master sources: the complete translation of Alpinist Maurice Gignoux's *Géologie Stratigraphique* by Gwendolyn Woodford (Freeman) and this condensation of Variscanist Brinkmann's *Historische Geologie*.

In producing this book, Sanders has carried out well the difficult task of absorbing in one language and rewriting and editing in another which is the function of good scientific translating. There are few infelicities due to the translating and no important alterations of meaning. In the subject matter treated, the book is current with all but the most recent advances (such as those in Precambrian and Danian correlation). My only serious criticism is that the condensation is so drastic that it detracts from the coherence of the treatment and creates a didactic effect which was not conspicuous in the original book. Moreover, the new section, "History of European geology," is too abbreviated to be of much use to a beginner and is unnecessary for the geologist who is already well-enough informed to enjoy the rest of the book. Two curious historical errors should be corrected. H. B. de Saussure did not coin the word geology (page 2); it was used 83 years before his birth in M. P. Escholt's *Geologia Norwegica* (1657). The picturesque founder of the Carboniferous and Cretaceous systems was not J. B. but J. J. d'Omalius-d'Halloy (pages 44, 101, and 114).

We have here, nevertheless, a convenient and readable outline and source book, rich in lively reconstructions of the physical history of Europe. The correlation charts, taken with little change from the *Abriss*, form an excellent supplement to the National Research Council's correlation charts (as yet incomplete) for North America. The enormous structural complexity of Europe is well portrayed in words and sketches. The filling, stripping, and migration of interspersed basins and swells; the growth and eventual stabilization of successive overcrossing fold belts; the zones of flat thrust faulting and gravity sliding; the evolution of diapirically intruded, cratonal, sedimentary blankets—all are brought to life and interrelated. The outlook is that of a man (Brinkmann) who sees a natural syntax and episodic global similarities in rocks and historical events. Quite apart from the fact that this book offers a convenient way to learn about, or to refresh one's memory of, the major features of geological history in Western and Central Europe, it provides a needed counterbalance to the currently ascendant philosophy of gradualism. It is a good book to have around.

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Non-relativistic Quantum Mechanics. An introduction. R. M. Sillitto. Quadrangle Books, Chicago, Ill., 1960. vii + 230 pp. $7.50.

This text was written for the honors course in British schools, a course that does not have a direct counterpart in American colleges. It is a formal introduction to the methods of quantum mechanics but provides only a few illustrative examples and applications of the major techniques. In general, it is quite sketchy and does not contain enough material for use in beginning graduate courses, the level at which quantum mechanics is usually taught. The approach is axiomatic rather than historical; on the whole, the discussions are standard and brief. The topics are also standard, with few of them getting the detailed analysis necessary for their understanding.

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Characteristics of Teachers. David G. Ryans. American Council on Education, Washington, D.C., 1960. 416 pp. $7.50.

This is a volume for researchers. It is as technically careful a report of a study about teachers as can be found. As the prefatory note suggests, it "may well lead to improved selection, training and evaluative procedures for personnel in the teaching profession."

Teacher characteristics, a term used here to mean the classroom behavior of teachers and behavior conditioning factors, are regarded as the clue to the establishment of criteria by which the effectiveness of teachers can be measured.

The search for a reliable set of teacher competencies has often led teacher training institutions, teachers'