

ing intellect is a power of death as well as a power of life." Those who are engaged in the business of educating talented young persons are carving human souls; sometimes with skill, sometimes not; sometimes with substantial knowledge of what they are doing, sometimes without. For such persons, this volume, which consists of the papers presented at the 1958 Institute on Exceptional Children held by the University of Minnesota, provides a useful summary of information on the nature of human abilities, some of the psychometric approaches to the study of talent, crucial factors in the life histories of talented persons and in the development of scientists, some of the means by which schools attempt to give special treatment to exceptionally able students, and the treatment of individual differences in Russian schools. Also included are brief reports of several exploratory studies concerning bright students and their school and postschool careers.

The book is mostly synthesis and review with relatively little new information. An exception is Catherine Cox Miles' study of the life histories of 100 prominent Americans who died during the period 1936–1940 and the comparison of their early life histories with those of 300 geniuses who constituted the subjects of her earlier study. Choosing among the papers is partly a matter of personal interest. I liked best John E. Anderson's good review of the nature of human ability and Anne Roe's brief summary of studies that she and R. D. McCurdy conducted on the school and home influences that make a scientist.

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Oxford Regional Economic Atlas of the Middle East and North Africa. Economist Intelligence Unit. Oxford University Press, New York, 1960. viii + 56 pp. + 64 maps and gazetteer (15 pp.). Cloth, \$10; paper, \$5.25.

This atlas, the second of what promises to be an extremely useful series (intended eventually to cover the world), touches on many facets of the physical and economic-social phenomena characterizing the Middle East and North Africa. C. G. Smith of Oxford University served as geographical adviser, and the volume was prepared by the Econo-

mist Intelligence Unit (a research group of the British periodical *The Economist*) and the cartographic department of the Clarendon Press.

The scale of the maps varies; about half of the sheets presented are on a common base map of the entire area and are shown at a scale of 1:19 million (300 miles to the inch). The detailed regional sheets are shown on scales ranging from 1:10 million (176 miles to the inch) for the Sudan, Ethiopia, and Iran to 1:6 million (95 miles to the inch) and 1:4.25 million (67 miles to the inch) for the other countries. The maps lack a graphic scale with distances actually drawn on the map and the reader must carry his own ruler if he is to determine distances. The regional maps are easily read. The elevation tints are unobtrusive and consist of warm shades of greens and browns with soft gradation from one to another. There is coverage of the geology which gives the geological period—Cretaceous, Jurassic, and so forth—of the surface rocks with short notes about the characteristic relief developed in each case. The treatment is as detailed as the scale of 1:19 million will allow. Relief is shown at the same scale. Here a plastic relief effect is achieved by the now common device of imposing mountain or hill shadows on the elevation tints. This gives a gross indication of the relief and is useful as a heuristic technique, but there is a serious objection. The map gives an impression of roundness to some extremely jagged landscapes. I cite the arid zone scarp of the north side of the Qattâra depression in Egypt, the walls of the great rift as it bisects Ethiopia, and the rough moon-like landscapes of the Hadramout and Yemen coasts of southern Arabia. Relief can be symbolized more realistically, though less colorfully, by the black-and-white diagrammatic technique developed by Irwin Raisz.

The soil and vegetation maps are generally well handled, though the categories used in describing the vegetation of the more tropical areas are not sufficiently specific. The sheets covering rainfall and water balance are the most sophisticated I have seen in a general atlas. Annual rainfall is shown, as well as rainfall temperature diagrams for 19 representative stations. The diagrams show the usual average monthly progression of rainfall and temperature against a background of the actual rainfall received each month for the past 25 years. This shows the dispersion which, in much of the dry tropics, is

so great that averages have little meaning. A further sheet shows irrigated areas and their proposed extensions, oases, and dams. This map has water balance diagrams (after C. W. Thornthwaite) for the same stations covered by the rainfall-temperature diagrams. The water balance diagrams are explained clearly and give some understanding of growing seasons and their lack. These two sheets contribute to the reader's understanding of the critical water problem in North Africa and the Middle East. There is a detailed strip map, with monthly river flow diagrams, of the Nile Valley and a similar map for the Tigris and Euphrates Valley.

There are further maps dealing with agriculture, minerals, industry, transport, population density, state of topographic mapping, and a historical survey.

The degree of detail on the agricultural maps varies with the available data. The Magreb, Egypt, Iraq, the Levant, and Turkey are covered by dot maps showing principal crops. Unfortunately, several of these maps are hardly readable, because they attempt to show on one sheet as many as three crops having largely overlapping distributions. This is a gross violation of the grammar of economic map making. There is a useful and less detailed sheet for the Sudan and only a listing of commodity production totals (from the Food and Agricultural Organization of the U.N.) for Iran, Ethiopia, Somalia, and the countries of the Arabian Peninsula.

There are maps showing oil production and producing fields as of 1957 and oil concessions as of 1958; a detailed map shows oil production in the Persian Gulf as of 1957. Over 20 industries are treated on five sheets in sufficient detail to bring out the meaningful regional differences. Air, rail, and water transport are handled on separate sheets. There is a detailed sheet of the Suez Canal and a flow diagram indicating the relationship of the canal to world shipping.

Population is treated by a dot map (one dot per 20,000 people) with names of peoples and principal tribes (Kurds, Nuer, and so forth) listed in their home areas. Urban areas are also indicated.

There is a final map which attempts to give a historical summary. For a land with the complex cultural background of the Middle East and North Africa, one map cannot be adequate. An entire atlas, *A Historical Atlas of the Muslim Peoples* [Roolvink, Cambridge Univer-

sity Press (1957)] has been devoted to the topic.

The supplementary notes and statistics are excellent. For nearly all of the commodities and industries, enough information is given to show production trends.

The title is perhaps modest. The *Oxford Regional Economic Atlas of the Middle East and North Africa* contains the general physical and economic background of the region plus more detailed treatment of the salient physical and economic landmarks. The information is sufficiently comprehensive for the reader to obtain a sound understanding of the principal resource patterns and problems of the Middle East and North Africa.

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Stratigraphic Principles and Practice. J.

Marvin Weller. Harper and Brothers, New York, 1960. xvi + 725 pp. Illus.

With the ever-increasing need for a rational synthesis and integration of the vast store of published factual data in stratigraphy, it is a timely task to review and to reappraise the fundamental principles and major concepts which constitute the stratigraphic discipline. It is also timely to advance the standards in methods and procedures of stratigraphic work in the field and in the office.

Marvin Weller has admirably accomplished this task in his new book *Stratigraphic Principles and Practice*. The text is a welcome contribution to the better understanding of stratigraphic problems, many of which still await solution. The book is well written and places proper emphasis on the application of principles, the consideration of concepts, and the interpretation of basic data; this is a marked contrast to the outmoded catalog-like presentation of the subject.

Controversial issues are treated with an objectivity that provides a stimulating challenge to students to think and to reason things out for themselves. The bibliographic references, given at the end of each chapter, are, for the most part, adequate, but the addition of a few more titles of original sources would be desirable.

The book is divided into four parts: The first, short part contains the "Introduction," "Development of stratig-

raphy," and "Geologic systems"; the second contains "Materials of stratigraphy"; "Stratigraphic bodies and relationships, including classification and nomenclature" is the third part; the fourth, the "Appendix," contains practical suggestions for field work and the preparation of reports. The text is well illustrated, containing 271 figures and many tables.

The historical approach in dealing with the development of stratigraphy is highly commendable, but it should not have been stopped with William Smith. The important contributions made by Lyell and other early investigators during the fruitful years of the middle of the last century are alluded to only briefly at various places in subsequent chapters.

Reference to "zonation" (in association with William Smith's name) as one of the fundamental principles that had been recognized at the beginning of the 19th century may be misleading, unless in this instance the author uses *zonation* to mean something different from the principle which was established during the years 1856-58 by Albert Oppel.

The second part of the book, dealing with the materials of stratigraphy, calls for no special comments. Probably no two stratigraphers would agree on the extent to which the subject of sedimentology and the study of sedimentary rocks should be treated in a text on stratigraphy. The point of view may also vary from institution to institution, depending on curricula.

In general this part of the text is well balanced and well illustrated by drawings and diagrams based on recent original contributions.

The simplification of terminology in the discussion of unconformities, in part 3, is well supported by valid reasoning, although exception may be taken to the definition of an unconformity as a *stratigraphic plane*. *Stratigraphic plane*, if at all applicable, is only one element of an unconformity. An unconformity is a *geologic structure* or a structural relationship between two sets of rocks.

The subject of stratigraphic classification and nomenclature is well presented and is skillfully combined with the essential points of the Stratigraphic Code.

Weller is probably correct in saying that Fuchsel in 1756 was the first to formulate the rudiments of the concept of the formation, but it should be pointed out that Fuchsel *did not* introduce the term *formation*. He had

recognized distinctive lithologic units, such as the Muschelkalk and others, and these he called *series montana* or *Geburge* (probably this should have been spelled "Gebürge"). The misunderstanding, which has been perpetuated in geologic literature for many years, appears to stem from Zittel (1899, page 51) who inserted the term "(Formation)" as his own idea of the equivalent of Fuchsel's *series montana*.

It may be also pertinent to note that the idea of the formation, with a connotation of time, as formulated by Humboldt and by his contemporary Buch, is different from the concept of the formation currently used in the United States and from the concept earlier expressed by Conybeare and Phillips and by Lyell. In the German geologic literature the term formation is applied to the concept which is now called a System, for example, *Die Juraformation*.

The discussion of biostratigraphic units, and, particularly, the distinction between biostratigraphic units and the time-rock units does not entirely clear up the points of contention among different schools of thought on that subject. Any fossiliferous unit is a biostratigraphic unit when it is analyzed for biostratigraphic data, such as composition of fauna (or flora), geologic age, paleoecology, paleobiogeography, dispersal of organisms, and the like. One, therefore, cannot agree with the author that biostratigraphic units "are wholly objective and not dependent upon interpretative considerations. . . ."

The use of the term *Series* for units which should be properly called *Stages* is, perhaps, a reflection of the transitory state of our period of stratigraphic thinking in the United States. The formational units called series in the sense of rock-units are commonly given "an" or "ian" endings and are, thus, "promoted" to time-rock Series. A greater uniformity in nomenclature would be achieved if the term *Series* were retained for subdivisions of Systems, such as Lower, Middle, and Upper.

The chapter on facies is comprehensive in scope and is amply illustrated with diagrams, graphs, and maps.

Some aspects of the limitation of paleontologic correlation, shown by the lack of correspondence in the stratigraphic occurrence of Jurassic ammonites in England and in France (Figs. 215 and 216), should be viewed in the light of more recent studies. The apparent anomaly in the succession (Fig. 215) has been explained by Spath (1938,