

BOOK REVIEWS

FESTBAND BRUNO SANDER: TSCHERMAKS MINERALOGISCHE UND PETROGRAPHISCHE MITTEILUNGEN, Dritte Folge, Band IV, Heft 1-4, 463 pp., Springer-Verlag, Vienna (1954).

Friends and former students of Professor Bruno Sander have dedicated this attractive Festschrift to him on the occasion of his seventieth birthday. The volume was put out with Dr. Josef Ladurner, Innsbruck, as cooperating guest editor.

It is appropriately introduced by a six page article written by Prof. R. von Klebelsberg and with a portrait of Prof. Sander, entitled "Prof. Dr. Bruno Sander und die Universität Innsbruck." There follow 46 technical papers by 51 authors. The subject matter ranges from descriptive mineralogy and stratigraphy through structural, economic, igneous, and metamorphic geology to petrofabrics and structural petrology. Twenty-six of the papers are in the last two categories, to the development of which Prof. Sander has contributed so largely from his pioneering paper, *Über Zusammenhänge zwischen Teilbewegung und Gefüge in Gesteinen* (1911), in which many of the important concepts in this field were presented.

There are in this volume more original articles concerning *Gefügekunde der Gesteine* than have ever appeared together in a single book or journal. It is recommended to all who would like to keep abreast of what is happening in this important and interesting field.

EARL INGERSON,
U. S. Geological Survey, Washington 25, D. C.

GEOLOGIE, MINERALOGIE UND LAGERSTÄTTENLEHRE, by PAUL KUKUK; 2nd edition, xvi+334 pages; 406 figures. Springer-Verlag, Berlin, 1955. Price, DM 28.50.

The second edition follows exactly the outline of the first one (see *Am. Mineral.*, **37**, 350-351, 1952, for scope and discussion of the earlier edition.) No new topics or headings have been added but some sections have been revised and brought up to date, so that both text and illustrations have been increased by approximately ten per cent.

The bibliography has been much more drastically revised than any other part of the book. In the first edition it contained only 30 references, two of which were later than 1949. In the new edition 51 references with dates 1950-54 and 25 older ones have been added. The index has been enlarged by about 25 per cent.

All of the remarks made in the review of the first edition still apply, including those concerning a half dozen shortcomings and inadequacies of the book.

EARL INGERSON,
U. S. Geological Survey, Washington 25, D. C.

GEOLOGY AND MINERAL DEPOSITS OF BARSTOW QUADRANGLE, SAN BERNARDINO COUNTY, CALIFORNIA, by OLIVER E. BOWEN, JR., with a report on THERMAL PROPERTIES OF CERAMIC MATERIALS from BARSTOW QUADRANGLE, CALIFORNIA, by JOSEPH A. PASK AND OLIVER E. BOWEN, JR. *Division of Mines, Bull.* 165, 208 pages, geologic map, structure sections; San Francisco, 1954, price \$3.00.

This bulletin gives a rather thorough account of the geology and geologic history (118 pages), metallic (22 pages), and non-metallic (40 pages) mineral deposits, and brief notes about water and petroleum possibilities in almost a thousand square miles of the structurally complicated and interesting Mojave Desert area of Southern California.

It has a colored topographic-geologic map of the region and larger scale geologic maps of some of the more important and interesting areas. The report is well illustrated with numerous photographs and a few line drawings.

The short section (14 pp.) on thermal properties of ceramic materials includes 23 differential thermal analysis curves of ceramic (clay) materials and individual minerals.

The whole bulletin will be very useful to everyone interested in the geology and minerals of the Barstow area and surrounding parts of the Mojave Desert.

EARL INGERSON,

U. S. Geological Survey, Washington 25, D. C.

CATALOGUE OF METEORITES, with special reference to those represented in the Collections of the British Museum (Natural History) by G. T. PRIOR and revised and enlarged by MAX. H. HEY. Printed by order of the Trustees of the British Museum, 432 pages, published 1953, £ 3; 10; 0.

The general arrangement is essentially that of Prior's 1923 catalogue. The alphabetical listing of the known meteorites in the 1923 catalogue required 195 pages but in the 1953 catalogue 416 pages were required. The introduction contains a classification of meteorites; list of "paired" falls; a history of the British Museum's Collection; two tables in which the numbers of the meteorites "seen to fall" and "found" are given for the world and for those in the British Museum's collection. Another table gives a geographic distribution of the meteorites for the world.

The author should be complimented for these tables because they contain useful data. However, it would be less confusing if some minor editorial changes had been made. Also the totals given are not in every case the summation of the figures listed, e.g. the total known meteorites including "paired" falls is given as 1702 while the figures total 1734.

Although the information in the tables is useful, this reviewer believes that the catalogue would have been improved if the author, in place of listing the numbers of certain types of meteorites, had given the names of these meteorites. It surely would be more helpful to have the names of the 17 eucrites than merely to learn that there are 17.

The main part of this catalogue is the alphabetical listing of the meteorites. Here the synonyms, date of fall or find, type, known weight, distribution of the important specimens, references and weights of the specimens in the British Museum are given. Following that are 8 pages of the "reasonably authenticated" meteoritic craters and a list of the casts of meteorites and thin sections of meteoritic stones in their collection.

This book is a catalogue of meteorites in the British Museum and is not a text on meteorites. However, this volume will serve as a source book of information for those interested in meteorites because it is more than a listing of the specimens in the British Museum. If the name of a meteorite is known, it is possible to get considerable information about it from this book, so all persons interested in meteorites will need this book in their library.

The author has listed many "paired" falls in the introduction but these possibly related meteorites are not always associated as paired falls in the text. Ex. Accalana, Artracoona, Carraweena are "paired" falls but in the text under Accalana it says "possibly from the same fall as Carraweena, which is five miles away" but no mention is made that it may be related to Artracoona. However, under the latter name the reader finds it is related to Accalana and Carraweena. The LaLande is also listed as a "paired" fall but in the text the author says, "the B.M.'s specimens of the LaLande and Melrose appear to be distinct."

This reviewer did not make a point of searching for mistakes but a few are given. Some of these are listed with mental reservations because many readers of this review probably will think it is not proper to cite errors which were copied from the literature, especially since, in some cases, the British Museum's collections did not have a sample of the meteorite for Dr. Hey to confirm the information, and also a catalogue may not be the place to make corrections to published records. Actually this reviewer carefully went through this cata-

logue to compare it with his records and more corrections were found in my records than are cited as errors to be corrected in Hey's new catalogue.

This volume is one of the most frequently used books in the reviewer's library. Only one who has tried to keep this type of data up-to-date can appreciate the time and labor that must go into the preparation of such a catalogue. Since the literature relating to meteorites is replete with inaccurate statements, it is easy to innocently perpetuate old mistakes.

CORRECTIONS

1. Arcadia, Neb., is a chondrite and not an achondrite.
2. Aurora, New Mex. is a chondrite and not an achondrite.
3. Bogoslovka, Russia, is a stone, chondrite, found Aug. 5, 1948, weight 2.21 kgs. was omitted. (Prioroda No. 10, Oct. 1949, p. 43).
4. Bennett County, South Dakota, is a hexahedrite not a octahedrite.
5. Boelus, Howard Co., Nebraska, was found in 1941, stone chondrite, weight 730 gms. (Listed in *U. S. Nat. Museum Annual Report*, 1942, p. 56).
6. Drum Mountains, Utah, iron was 529 kgs. not 52 kgs.
7. El Simbolar, Argentine, iron, coarse octahedrite, was omitted. (*Pub. Museo Mineral. Geol. Facultad de Sci. Ex. Fix. Nat. 3-13, 1940*).
8. Haven. Reon Co., Kansas. Stone chondrite, weight 2948 gms. was omitted. (*Earth Science Digest*, 6, No. 2, pp. 331-334, 1952).
9. Kunashak, Russia, stone, fell June 11, 1949, was omitted. (*Priroda*, Aug. 1950, p. 26-33, *Meteoritica Acad. Sci.*, 1952, No. 10, pp. 42-56).
10. Mikmoto Jima, Japan. Iron was omitted. (*Sci. Rept. Yohohama Nat. Univ.*, Sec. 2, No. 1, 1952).
11. Minnesota Iron, also Minnesota Stone—were omitted. (*Nininger Collection of Meteorites*, 1950).
12. Newton, Conn. Iron is a pseudometeorite (*private communication*).
13. Palchatchie, Miss. The town is spelled Pelahatchie so the meteorite should have the same spelling.
14. South Strafford, Vermont. A pseudometeorite. Tested and found to be cast-iron.
15. Willamette, Oregon. Listed as a medium octahedrite but all samples of this iron are granulated and none show a Widmanstätten pattern.

E. P. HENDERSON,
U. S. National Museum, Washington, D. C.

CLAYS AND CLAY TECHNOLOGY, edited by JOSEPH A. PASK AND MORT D. TURNER, *Division of Mines, Bull. 169*, 326 pp. CALIFORNIA DEPT. OF NATURAL RESOURCES, SAN FRANCISCO, July [March] 1955, \$4.50. (*Proc. First Nat. Conference on Clays and Clay Technology, Berkeley, July 21-25, 1952.*)

This cloth-bound volume contains an introduction and seven parts, namely: (I) Geology and mineralogy of clays, (II) Properties of clays, (III) Methods of identifying clays and the interpretation of results, (IV) Clay technology in soil science, (V) Clay technology in soil mechanics, (VI) Clay technology in ceramics, and (VII) Clay technology in the petroleum industry. Twenty-five papers were contributed by 26 different authors, the asterisk (indicating an author) belonging with the name, C. G. Dodd, apparently having been inadvertently omitted. An additional 37 "contributing authors" are listed because of participation in the discussions.

Although certain papers, such as "Physical-chemical properties and engineering per-

formance of clays" by R. C. Mielenz and M. E. King, are closely related to mineralogy and geology, only those included in parts I to III will be considered here.

In the introductory remarks, R. E. Grim discusses the reasons for interest of the various areas of knowledge in clay minerals. P. F. Kerr discusses "Formation and occurrence of clay minerals" and G. F. Brindley considers "Structural mineralogy of clays" in part I. These authors have contributed numerous papers on these subjects in other places.

Four papers make up part II, namely: (1) "Electrochemical properties of clays" by L. E. Davis, (2) "Ion exchange reactions of clays" by D. R. Lewis, (3) "Adsorption and swelling properties of clay-water system" by I. Barshad, and (4) "Interlamellar sorption by clay minerals" by D. M. C. MacEwan.

Part III contains nine papers, on particle size distribution, interpretation of chemical analyses, petrographic study, identification by dye adsorption, infrared spectroscopy, x-ray diffraction, electron microscopy and differential thermal analysis. Although some of the authors' names are familiar to most mineralogists in connection with the topics discussed, particularly those of R. E. Grim, G. W. Brindley, T. F. Bates and R. A. Rowland, a few are either persons who have specialized extensively during a brief period or persons who are discussing topics outside their areas of special interest. W. P. Kelley, for example, is an authority on soil science, and it is somewhat surprising that he is so versatile as to be able to contribute to the fundamental concepts of isomorphism and crystal chemistry.

In connection with the latter paper and one or two others, the editors have omitted much critical discussion that had a straightforward bearing on the subjects presented. Another matter of editorial policy involves the submittal of oral statements to contributors for correction prior to printing—something that was not done in this instance, although it is being done in connection with the proceedings of the second conference (Columbia, Mo., 1953).

The proceedings are of great value, bringing together many diverse viewpoints of pure and applied scientists. The elapse of nearly three years prior to their appearance is unfortunate, but probably arises from the gigantic task performed by the editors.

DUNCAN McCONNELL,
Ohio State University, Columbus, Ohio

MINERALIEN UND LAGERSTÄTTEN IN OSTBAYERN, by HUGO STRUNZ. Gustav Bosse Verlag, Regensburg, 128 pages, 77 illustrations, Regensburg, Germany 1953. Price bound DM 9.80.

With the introduction and rapid spread of the new physical and chemical techniques in mineralogy, there has been a natural tendency to neglect the preparation of general papers on regional mineralogy. The book under review, written by one of the leading scholars in systematic mineralogy, is therefore an appropriate reminder of the need for more books of this type.

The book opens with a general synopsis of the descriptive and historical geology of the area. The region is divided into two zones—the Moldanubic and the Saxothuringic. The deposits of minerals and rocks within each zone are then succinctly described. This is done in the framework of the geologic setting. Pertinent chemical, mineralogical, and petrological data are cleverly integrated with some historical facts. Each description is illustrated and includes a useful collection of references. Illustrations consist of sketch maps, geologic maps, stratigraphic columns and cross sections, photographs of rocks, and paragenetic charts.

Under the Moldanubic zone are included: Bayerischer Wald und Oberpfälzer Wald als Teile des Moldanubikums; Der Graphit von Passau; Schwefelkies und Magnetkies im Ostbayerischen Grundgebirge. Bodenmais und Lam; Die Ostbayerischen Pegmatite; Der Pfahl; Die Flusspatgänge bei Donaustauf und Wolsendorf.

Under the Saxothuringic zone are included; Nördlicher Oberpfälzer Wald und Fichtelgebirge als Teile des Saxothuringikums; Speckstein, Talkschiefer und Serpentin aus dem Fichtelgebirge; Der Speckstein von Göpfersgrun-Thiersheim; Serpentin und Talkschiefer von Wurlitz; Schwefelkies und Magnetkies im Ostbayerischen Grundgebirge; Die Golderze von Brandholz im Fichtelgebirge; Die Blei-Zinkerze von Erbdorf; Die Juraformation bei Regensburg; Die Danubische Kreideformation; Das Ostbayerische Bruchschollenland; Die Eisenerze von Sulzbach-Auerbach-Amberg; Die Kaoline von Hirschau and Schnaittenbach; Die Bleierze von Freihung; Die tertiären Tone und Braunkohlen der Oberpfalz; Die Ostbayerischen Basalte.

Professor Strunz has written a very interesting and useful book. It should appeal to those working in topographical mineralogy. The museum curator and the advanced collector will find the five-page index of the localities and minerals of Eastern Bavaria of particular value.

GEORGE T. FAUST

DIE OXYDATIONSZONE SULFIDISCHER LAGERSTÄTTEN. S. S. SMIRNOW.
Akademie-Verlag, Berlin, 312 pp. (1954), 17.50 DM.

The preface to this volume states that Smirnow published the first Russian edition in 1936 and that after his death in 1947 a second Russian edition was prepared in 1951 by his co-workers; the present volume is a translation into German of the 1951 edition.

The book is divided into three parts. Part I, pp. 12-66, is on the general properties of the zone of oxidation and the processes that occur in it. Part II, pp. 69-283, is on the geochemical behavior of individual elements in the oxidation zone of sulfide deposits. Part III, pp. 287-304, is on the significance of the oxidation zone in the evaluation, mining, and prospecting for sulfide deposits.

The scope of Part II is perhaps best shown by the contents of the section on one element. Under Copper, there are sections on Hypogene Mineralogy (p. 113), The Oxidation of Copper Sulfides (pp. 113-120), The Migration and Precipitation of Copper in the Zone of Oxidation (pp. 121-124), Mineralogy of Copper under the Conditions of the Zone of Oxidation of Sulfide Deposits (pp. 124-138), Comments on the Zone of Secondary Sulfide Enrichment (pp. 124-138), The Lower Zone of Leaching in the Zone of Oxidation of Copper Ore Deposits (pp. 140-142), The Limonite of the Zone of Oxidation of Copper Ore Deposits (pp. 142-146).

The book is well organized and the treatment is clear and comprehensive. The literature coverage was world-wide; more than 70% of the 133 references are to works published in the United States and Canada. Nevertheless, the book was a great disappointment to the reviewer, who had hoped that it would summarize the very large amount of work in this field that has been published in recent years in Russian. It is evident, regrettably, that the 1951 revision must have been very superficial; the latest reference cited is to work published in 1935, and there is no indication of the incorporation into the text of more recent data. As a necessary consequence, discredited minerals are included, new ones are omitted, and many incorrect formulas are given.

A minor irritation, which could have been avoided by more careful editing, is mistaken transliteration, perhaps inevitable when English goes to German through Russian. Examples are biverite for beaverite, janevixite for chenevixite, and hildite for guildite. There are a good many misprints. The lack of any subject index is a serious inconvenience. The book is nicely printed on good paper.

In summary, the book is an excellent account of the subject as of 1935.

MICHAEL FLEISCHER,
U. S. Geological Survey, Washington, D. C.

THE PRINCIPLES OF CHEMICAL WEATHERING, by W. D. KELLER. Size 8½ by 11, 88 pp. including appendix and index, 21 figs. Lucas Brothers Publishers, Columbia, Missouri (1955). Price \$2.75.

This short treatment of chemical weathering evolved from classroom materials at the University of Missouri, and from visiting lectures by Professor Keller at the California Institute of Technology and at the University of Texas. Largely because of this inheritance, the text embodies a strange (to the geological literature) admixture of technical theoretical treatment, and the more philosophical significance of weathering on society and man. This intent is clearly stated in the *Foreword*: "The subject matter that has been incorporated herein has not been restricted to a narrow view of chemical weathering for its own sake. Instead, chemical weathering has been related naturally and freely to other fields of science and into areas of the humanities."

Its success in accomplishing these objectives will doubtlessly vary with the scientific and philosophic experience of its readers. Most mineralogists and geologists will be favorably impressed with the fresh and modern treatment of chemical weathering based upon bonding energies and energy changes of chemical weathering reactions which form the common tone underscoring the discussion of processes and mechanisms. This is the outstanding contribution of the text in that it summarizes modern research and thought from both field and laboratory investigations. It augments, rather than replaces, Reiche's classical treatment of weathering processes and products. The humanistic significance of chemical weathering, while a specific objective of the text, is interesting but not overly impressive as to its appropriateness in the scientific literature. Perhaps the reviewer is so inured by past experience as to expect only the scientific significance of our scientific progress, that it is best for the reader to form his own opinion in this respect.

The following phases are covered in the treatment of chemical weathering: introduction and definitions (Ch. 1-4), processes, agents, and mechanisms (Ch. 5-9), products of weathering (Ch. 10-12), and sociological importance of weathering (Ch. 13-15). It is supplemented with a modern (but not comprehensive) list of references, an appendix of minerals and formulas mentioned in the text, and an index.

Misspelled words are not frequent but more care should have been exercised in checking and integrating references in the text with the "References" at the end of the pamphlet. A few instances will illustrate this point. The date of the reference to Jackson, et al., cited on page 47, is given as 1946, but recorded as 1948 in "References"; the date is omitted in the same reference on page 48. This is confusing as there are two references to Jackson *et. al.* in the "References." The date on page 54 for the Grim article should be 1953, not 1053; the reference to Keller, Westcott and Bledsoe is variously referred to as 1954 and 1955, although 1955 is given in the "References." There are other inconsistencies in bibliographic form and completeness in the "References," which however should not prevent the serious minded student from finding the article referred to.

The Principles of Chemical Weathering is to be recommended to advanced undergraduate students and graduate students as a reference work for classes in petrology, sedimentation, and geomorphology. Teachers will find it equally useful, especially in supplementing the standard texts in these fields.

L. I. BRIGGS,
University of Michigan, Ann Arbor, Michigan