

BOOK REVIEWS

RECENTLY PUBLISHED GUIDE BOOKS TO MINERAL COLLECTING LOCALITIES IN NORTH AMERICA

Essential to the success of mineral collecting by individuals and groups are good guide books giving descriptions and locations of mineral occurrences. They are indispensable aids in planning and executing field trips in addition to providing information on source localities where mineral samples for study or display may be obtained. Too, some occurrences described may suggest mineralogical problems that warrant investigation.

Very often individual guide books to mineral localities are reviewed by and advertised in the various "rockhound" and lapidary magazines, but very rarely is reference made to them in the professional geological and mineralogical journals. Too often a title such as *Gem Trails* misrepresents the mineralogic value of the book. Many desirable guides are privately published and not widely advertised.

The annotated list below includes 24 currently available guide books to localities in the United States, Canada, and Mexico which have been published in the past five years (with the exception of one). To list guide books published prior to 1965 would be repetitious inasmuch as a list of these has already been published by W. H. Matthews, III [*Selected Maps and Earth Science Publications*, Ref. Ser. RS-4, Earth Science Curriculum Project, American Geological Institute, Boulder, Colo., 1965].

Obviously the list is not "complete"—such a list could always be enlarged. On the other hand, it is not "fragmentary". The author has contacted well over 100 rock and mineral shops and lapidary suppliers throughout the country to compile this composite list of their recently published standard offerings.

During the past few years many of the individual state geological surveys have published guides directed toward various age groups and levels of education. References to these may readily be found in the latest editions of lists of publications of the surveys and consequently, with the exception of one reference, have been omitted from this annotated list.

WYOMING COLLECTING LOCALITIES. By BERRY AND SAILER. 1965, with more recent editions. Privately published. Available from Bosler Rock Shop, Bosler, Wyoming 82051, \$2.00.

Collecting guide for Wyoming, especially for jade, agate, and artifacts.

ROCK COLLECTING GUIDE—BANCROFT AND MADOC AREA. By C. P. BOSLAK. 2nd ed., privately published, 1968. Available from Princess Sodalite Mine, P.O. Box 84, Bancroft, Ontario, Canada, \$1.00.

100 mineral occurrences are described and located in the Madoc—Bancroft—Wilberforce area of Ontario. Includes index map.

MINERAL COLLECTING IN VERMONT. By R. W. GRANT. Spec. Publ. No. 2, Vermont Geological Survey, 1968. Available from Vermont State Library, Montpelier, Vermont 05602, \$3.00.

Descriptions of 42 mineral localities are arranged alphabetically by county. The guide includes an index map of the state's mineral localities and is profusely illustrated with pictures and topographic maps.

WHERE TO LOCATE MINERAL SPECIMENS—SIXTY FIVE MAPS. By J. H. HILLER. Privately published, 1968. Available from John Hiller, Jr., 194 Minerva St., Derby, Conn. 06418, \$3.00.

130-page book of maps with verbal directions to 57 areas in Connecticut, arranged alphabetically according to town localities, and 8 additional areas in New York, New Hampshire, and New Jersey. For each locality a few of the more available species are mentioned.

THE MINERALOGY OF WESTERN CONNECTICUT AND SOUTHEASTERN NEW YORK STATE. By R. E. JANUZZI. 4th ed., The Mineralogical Press, Brewster, N. Y. 10509, 1967, \$2.50.

Text is arranged in two parts—the first containing brief notations with localities on over 200 minerals arranged alphabetically and the second containing directions and maps to some classic mineral localities in western Connecticut and southeastern New York.

WESTERN GEM HUNTERS ATLAS. By H. C. JOHNSON. 7th ed., Cy Johnson, Box 288, Susanville, Calif. 96130, 1966, \$3.00.

92 pages of detailed maps to collecting areas, campsites, and rock shops in 17 western states and British Columbia.

A FIELD GUIDE TO THE GEMS AND MINERALS OF MEXICO. By P. W. JOHNSON. Gembooks, Mentone, Calif. 92359, 1965, \$2.00.

In addition to being a guide to hundreds of gem and mineral localities in Mexico, the text contains information on food, maps, driving, border rules, etc. It also includes an English-Spanish and Spanish-English glossary of terms relating to minerals, gems, and mining.

N. W. GEM FIELDS AND GHOST TOWN ATLAS. By R. N. JOHNSON. Cy Johnson, P.O. Box 288, Susanville, Calif. 96130, 1969, \$2.00.

44 pages of maps to mineral collecting localities in Washington, Oregon, Idaho, Montana, Wyoming and parts of North Dakota, South Dakota, and Nebraska. Includes also sites for fossils, Indian artifacts, ghost towns, camping, and rock shops.

100 MINERAL LOCATIONS IN SOUTH EASTERN ONTARIO. By HARLEY LEACH. 2nd ed., Privately published, 1968. Available from Harley Leach, 82 Ellerbeck St., Kingston, Ontario, Canada, \$1.25.

Directions are given verbally and by maps together with specific details of 100 of the better mineral locations within the area of southeastern Ontario which is bounded by Brockville, Belleville, Haliburton, and Eganville.

ROCKS AND MINERALS—A GUIDE FOR COLLECTORS OF THE EASTERN UNITED STATES. By H. H. NICOLAY AND A. V. STONE. A. S. Barnes and Co., Inc., Cranbury, N. J. 08512, 1967, 255 p., \$8.50.

Gives directions to locations of mines and mineral occurrences in 17 eastern states—from Maine to Florida. Occurrences are arranged alphabetically by state, by county, and by town. Profusely illustrated with both black and white and color photographs of minerals and their locations. Also has section on lapidary equipment and a list of accommodations and camping areas convenient to mineral locations.

EASTERN GEM TRAILS. By FLOYD OLES, AND HELGA OLES. Gembooks, Mentone, Calif. 92359, 1967, \$2.00.

A guide to the more attractive and productive gem and mineral collecting areas in the central Atlantic States—Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, and Washington, D. C.

COLORADO GEM TRAILS AND MINERAL GUIDE. By R. M. PEARL. 2nd revised ed., The Swallow Press, Inc., 1139 S. Wabash Ave., Chicago, Ill. 60605, 1965, \$3.95.

This 223-page hardbound book gives detailed descriptions and directions with sketch maps and mileage logs to both noted and little-known mineral localities in Colorado, especially in the central part and the Denver area.

ROCK HOUND'S GUIDE TO CONNECTICUT. By K. H. RYERSON. The Pequot Press, Inc., Stonington, Conn. 06378, 1968, \$1.75.

Text is in two parts—the first gives directions with maps to 56 mineral and fossil sites throughout Connecticut and the second a description of Connecticut minerals and their occurrences.

ROCKS AND MINERALS FOR THE COLLECTOR—NORTHEASTERN NOVA SCOTIA, CAPE BRETON, AND PRINCE EDWARD ISLAND. By A. P. SABINA. Paper 65-10, Geological Survey of Canada, Ottawa, Ontario, 1965, \$0.75.

Occurrences of minerals, rocks, and fossils are described for 75 easily accessible localities.

ROCK AND MINERAL COLLECTING IN CANADA, VOL. II, ONTARIO AND QUEBEC. By A. P. SABINA. Miscellaneous Report 8, Geological Survey of Canada, Ottawa, Ontario, 1965, \$2.00.

This voluminous guide gives descriptions and precise locations, often with topographic maps, of hundreds of mineral occurrences in Ontario and Quebec.

ROCKS AND MINERALS FOR THE COLLECTOR—EASTERN TOWNSHIPS AND GASPE, QUEBEC, AND PARTS OF NEW BRUNSWICK. By A. P. SABINA. Paper 66-51, Geological Survey of Canada, Ottawa, Ontario, 1967, \$2.00.

Occurrences of minerals, rocks, and fossils from 165 localities.

ROCKS AND MINERALS FOR THE COLLECTOR—KINGSTON, ONTARIO TO LAC ST. JEAN, QUEBEC. Paper 67-51, Geological Survey of Canada, Ottawa, Ontario, 1968, \$2.00.

Occurrences of minerals, rocks, and fossils from about 140 localities, mostly on the north side of the St. Lawrence River.

NEW MEXICO GEM TRAILS. By B. W. SIMPSON. Revised ed., Gem Trails Publishing Co., P.O. Box 828, Bowie, Texas 76230, 1965, \$3.00.

A guide with 40 maps to 65 locations for minerals, fossils, and Indian artifacts in New Mexico. The revised edition contains 15 new maps to 20 new locations.

GEM TRAILS OF ARIZONA. By B. W. SIMPSON. Revised ed., Gem Trails Publishing Co., P.O. Box 828, Bowie, Texas 76230, 1967, \$3.00.

A guide with 40 maps to 55 locations for minerals, gems, fossils, and Indian artifacts in Arizona.

GEM TRAILS OF TEXAS. By B. W. SIMPSON. 2nd revised ed., Gem Trails Publishing Co., P. O. Box 828, Bowie, Texas 76230, 1967, \$3.00.

A guide with 40 maps to 45 locations for minerals, fossils, and Indian artifacts in Texas. The revised edition contains 25 new locations and 21 new maps.

DESERT GEM TRAILS. By M. G. STRONG. Gembooks, Mentone, Calif. 92359, 1966, \$2.00.

A detailed guide to over 140 of the gem, mineral, and fossil collecting localities of the Mojave and Colorado Deserts of California and adjacent areas in Owens Valley, Nevada, and Arizona.

MIDWEST GEM TRAILS. By J. C. ZEITNER. 3rd ed., Gembooks, Mentone, Calif. 92359, 1964, \$2.00.

A field guide to the gems, minerals, and fossils of 12 midwestern states—South Dakota, Michigan, Illinois, Iowa, Wisconsin, Ohio, Kansas, North Dakota, Nebraska, Indiana, Missouri, and Minnesota. Text includes collecting localities and is profusely illustrated with pictures and maps.

APPALACHIAN MINERAL & GEM TRAILS. By J. C. ZEITNER. *Lapidary Journal*, Inc., P. O. Box 2369, San Diego, Calif. 92112, 1968, \$3.95.

Covers the important gem and mineral localities in New Jersey, Pennsylvania, Maryland, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, and Florida, with areas pinpointed on 53 maps. Includes maps of the Blue Ridge Parkway access roads and maps of the Shenandoah and Great Smoky Mountains National Parks. 134 p.

WALTHER M. BARNARD

State University College, Fredonia, N. Y.

THE PHYSICAL PROPERTIES OF GRAPHITE. By W. N. REYNOLDS. Elsevier Publishing Co., New York, 193 p., 1968, \$11.00.

This is an excellent, up-to-date summary. Scope is indicated by the chapter headings: structure, mechanical properties, thermal properties, the electrical and optical properties, surface and physico-chemical properties, point defects, and high-flux neutron damage.

M. GENE SIMMONS

Massachusetts Institute of Technology

MICROSTRUCTURES OF SURFACES USING INTERFEROMETRY. By S. TOLANSKY. American Elsevier Publishing Co., Inc. 1968. 65 pages. \$8.00.

Multiple beam interferometry has become, for the last two decades, an increasingly important and powerful weapon for unmasking the subtle microtopographies on natural as well as treated surfaces, useful in industry and technology.

The author of the book, Professor Tolansky, F. R. S., is an always readable and world-renowned author of literature on several branches of science including spectroscopy, atomic physics, crystal surface topography, diamonds, interferometry etc. A series of books and articles written by him on interferometry and its applications are widely read. The present book is a brief, popular but accurate account of basic principles and application of multiple beam interferometry, and is a welcome addition to the existing literature on the subject.

The subject matter is divided into 11 chapters. It begins with a chapter describing the simplicity of the multiple beam interferometry and factors governing its resolving power. This elegant but cheap technique is compared with the versatile but expensive electron microscope, and their relative achievements and limitations are fully assessed. Chapter 2 is a lucid and vivid description of how multiple beam interferometry can measure height, steepness, profile etc. of surface microstructures. It is shown that multiple beam interference fringes offer considerable resolution and magnification in up-down direction. In chapter 3 are discussed conditions for sharp, narrow, high contrast fringes. Dependence of dispersion of these fringes on the wedge angle is assessed.

The next four chapters deal with microtopographical studies of surfaces of crystals like diamond, quartz and silicon carbide. Beautiful interferograms are presented to study the depth, orientation, origin and morphology of extremely shallow trigons and etch patterns on diamond surfaces and to study various properties of quartz oscillating plates. Application of high-contrast crossed fringes for a three-dimensional study of a surface, and decoration technique to enhance the visibility of extremely thin growth layers of spiral growth hillocks, are briefly dealt with.

The next two chapters deal with the use of multiple beam fringes to study indentation hardness, variation in directional hardness, estimation of abrasion hardness and impact at high speeds.

Chapter 10 includes the comparison of the quality of machine-polished metal surfaces with that of fire-polished glass surfaces. Two-beam interferometric examination of domestic surfaces like a painted surface, the surfaces of tomatoes and other biological materials is explained. The book concludes with a chapter illustrating multiple-beam fringes of exceptionally high dispersion, surprisingly high definition and formidable magnification of about 10^6 , which can measure, it is claimed, ups and downs on a surface up to about 5 \AA .

Geologists, mineralogists, metallurgists, industrialists, technologists and those interested in the study of surface structures and growth of crystals cannot afford to ignore the detailed examination of surfaces of their specimens, and hence this handy book should prove useful, specially because of the clarity of subject-presentation, lucidity of the language used and above all the exceptionally high quality multiple beam interferograms illustrated.

M. S. JOSHI
Sardar Patel University
Vallabh Vidyanagar, India

THERMODYNAMICS OF METAMORPHIC MINERAL HYDRATION. By A. A. MARAKUSHEV (Academy of Sciences, U.S.S.R., Institute of Solid State Physics, Laboratory of Experimental Mineralogy). Nauka Publishing Organization. Moscow, 1968. 200 pages, 62 illustrations, price 91 kop [in Russian].

Not much more than two years ago in a review of another important Russian book ("Thermodynamics of the Silicates," by A. A. Babushkin, G.M. Matveev, and O. P. Mchedlov-Petrosyan, Moscow 1962; German Translation, by Akademie-Verlag, Berlin, 1965; cf. *Amer. Mineral.* 51, 251–253) we had an opportunity to appreciate new and systematic applications of thermodynamics to mineralogical-petrological problems. The previous book emphasized the formation of hydrated silicates and aluminates by setting reactions of hydraulic binders, but the new publication by Marakushev is a theoretical and experimental treatment of the fundamental problems of mineral genesis, particularly in metamorphic systems.

The introduction goes beyond the usual "introductory remarks" in conventional textbooks on metamorphism and metasomatism, by introducing not only the classical parameters of enthalpies, entropies, and free energies, but also the Korzhinskii potential $Z^m = f(T, P, n_1, n_2, \dots, n_i, \mu_1, \mu_2, \dots, \mu_i)$, and its differential. This theoretical treatment of every reaction type occurring in metamorphic systems is immediately displayed in elementary diagrams for the specific heats (C_p), entropies (S), and isobaric potentials, e.g., for characteristic mineral associations of metamorphic rocks. In the same way, application of the potential concepts for mineral equilibria of hydration-dehydration reactions is demonstrated, combined with a tabulation of the relative chemical potentials of water over wide ranges of temperature and pressure, after Pistorius and Sharp (1960), and other data and graphs for calculation of metamorphic reactions.

The First Section concerns hydration equilibria with participation of minerals having a variable composition. After a more general formulation of the classical Phase Rule, well-chosen examples are presented of: minerals with variable water contents, crystalline solutions in the mica group, and distribution of Mg and Fe²⁺ in rock-forming silicates. A detailed analysis follows of the effects of external variables of state on the mineral composition, with special consideration of hydration-dehydration equilibria.

In the Second Section are described and displayed some of the most characteristic and basically important metamorphic reactions. Of fundamental significance is the treatment of the water pressure, and its role in metamorphism. The conditions for the formation of lawsonite in metamorphic systems is an example, as are also the equilibrium between analcime and jadeite, the serpentinization process, the genesis of anthophyllite and the hydration of the Al₂SiO₅ minerals. This section ends with a highly fascinating analysis of the effects of pressure acting preferably on the solid phases in a metamorphic system, as a basis for a full understanding of the facies classification of metamorphic associations.

In the Third Section, specific experimental data are treated, from the synthesis and physical-chemical characteristics in the micas, amphiboles, chlorites, chloritoid, the hydrated magnesium silicate minerals, the epidote-zoisite group, and finally the lawsonite-zeolite genesis, closing with a synoptic treatment of problems arising when complex minerals are acting in metamorphic reactions. Application of Korshinskii's coefficients of "silicification" (K_{Si}), and of the Mg-Fe²⁺ distribution of both elements in crystalline solution phases is shown. The concepts of facies and subfacies classification principles of mineral associations are seen from the level of their thermodynamic significance.

The present book gives not only the theoretical principles for a thermodynamic treatment of metamorphism, but also introduces the reader to the numerous Russian-written publications in this field, and to the results of American and German investigators. Beyond that, the author strongly encourages future research by a thorough challenge of complex phenomena of metamorphism, with the powerful tool of thermodynamic calculations. He indicates how analogous methods have advanced the knowledge in metallurgy, in comparison with which theoretical mineralogy and petrology may perhaps give the impression of a rather undeveloped branch of research—in spite of much excellent work done in certain special directions.

In every respect, Marakushev's book invites on a wide stage the application of thermodynamics. A valuable start in this direction is its 37 numerical data tables, combined with 62 instructive text-figures with well-readable, although sometimes rather complex diagrams of typical metamorphic systems, chosen from the international petrological literature

W. EITEL

University of Toledo

PRECIOUS STONES. By DR. MAX BAUER. Translated from the German with additions by L. J. Spencer. Charles E. Tuttle Company, Rutland, Vermont, 1969. 647 pages, 20 plates, 95 figures. \$17.50.

Bauer's "Edelsteinkunde" and Spencer's translation of it have been considered classics in the area of gems and gem materials since they were first published in 1896 and 1903, respectively. As with any book written over 65 years ago, this book contains a great deal of information which is out of date, misleading, or superceded. For this reason this book is not recommended for someone with a beginning interest in gems. The advanced amateur mineralogists and professional mineralogists who have an interest in gems and who can

critically evaluate the material will find this an interesting, enjoyable, and very readable book.

The book is divided into three parts and contains four appendices. The first part is concerned with the general character and methods of identifying precious stones. Sections on cutting, flaws, production of artificial gems, and a classification of gems are also included in the first part.

The second part of the book is a systematic description of precious stones, and is the most interesting and valuable portion of the book. All of the major and most of the minor gem minerals are covered. The only exception appears to be the deletion of serpentine. For most of the minerals there is a description of chemistry, crystallography, varieties, and major occurrences. Trade names applied to different varieties are defined. Many of the locality descriptions are of defunct occurrences outside the United States. For some of these occurrences this book may present the most readily available information.

In the third section, methods of distinguishing similar appearing stones are discussed. With the suggested identification technique the gems are first separated on the basis of transparency, then color, and finally specific gravity. Phenomenal stones are distinguished separately. This section is of limited use because better identifications are now available and there are no provisions for synthetic stones.

Two of the appendices were in the original translation. These are concerned with pearls and coral. Two additional appendices were attached by the present publisher, neither were specifically written for this book. The first of these is concerned with synthetic gems, unfortunately it loses the mood of the book. More emphasis should have been placed on methods of distinguishing between natural and synthetic gems. The second deals with cultured pearls. Although this section is closer to the mood of the original book this section could stand a better job of editing.

In summary, most mineralogists would find this book of limited professional use, but may find several evenings of enjoyable reading in it.

H. LAWRENCE MCKAGUE
Rutgers University

MANUAL OF PETROGRAPHIC METHODS. By ALBERT JOHANNSEN. (Facsimile of the Second Edition, 1918). Hafner Publishing Company, New York, 1968, 645 pages. \$12.50.

After 50 years this respected book re-appears, unchanged, to continue as a comprehensive review of pre-1918 methods of optical mineralogy. The book's detailed derivation of many of the fundamental equations of optical crystallography will be of value to teachers and advanced students. Its practical use, however, will be limited because much space is devoted to the use and description of now outmoded apparatus. An example is Chapter XI, "Various Modern Microscopes," wherein 1918 vintage microscopes and their adjustments are described in detail. The absence of methods developed since 1918—for example, modern U-stage methods, Emmons' double variation techniques, and spindle stage methods, to name a few—seriously limits the book for use today.

The book embraces a good deal of pertinent optical theory but seeing it re-appear is almost like seeing Jack Demspsey return to the ring after aging 50 years. On the other hand, as Professor Johannsen noted in his original preface, "... methods, once abandoned, may serve as preliminary stages to new lines of thought and further improvements."

F. D. BLOSS
Virginia Polytechnic Institute

INDEX ALPHABETIQUE DE NOMENCLATURE MINERALOGIQUE. Compiled by MADELEINE ABALLAIN, PAUL CHAMBOLLE, FRANCOISE DEREK-POUSSIER, CLAUDE GUILLEMIN, RENÉ MIGNON, ROLAND PIERROT, AND JACQUELINE A. SARCIA with the collaboration of NICOLE LANGLOIS; Bureau de Recherches Géologiques et Minières. Biote Postale 818, Orleans, 45, France, 1968, 386 pp.

The authors compiled this Index while France was engaged in a national inventory of museum mineral collections. Realizing that the small museum curator would experience difficulty with nomenclature, they decided to produce a list of all mineral names, both valid and invalid, noting the status of each.

The compilers have used all the standard references for mineralogical nomenclature: Hey's "Chemical Index of Minerals" and his "Appendix to Chemical Index of Minerals"; Strunz's "Mineralogische Tabellen"; and Fleischer's "Index of new mineral names, discredited minerals and changes of mineralogical nomenclature, in volumes 1-50 of the *American Mineralogist*". Many other references have been consulted as well.

This Index is not supposed to replace any of the excellent works cited above; the authors stress that their book is simply a compilation of all names available up to 31 July, 1967.

Each page in the Index is divided into 5 columns. Column 1 lists the 15,000 entries by name, in alphabetical order. If the name is a valid species or a synthetic substance, it is capitalized. Names which are not capitalized described synonyms, varieties, spelling variants, etc. Column 2 gives the chemical formula for the valid species and synthetics. For the synonyms, varieties, etc., it lists the presently accepted name. Column 3 relates the mineral to its family: for valid species, the group name where applicable; for chemical varieties, the species name. Column 4 lists pertinent comments such as, "a mixture", "doubtful species", or "a poorly defined chemical formula". Column 5 provides a six-character code group for use in computers.

The reviewer has not checked all the entries for accuracy. Nevertheless, a small sampling proved relatively free of errors. The symbol "HY", which appears occasionally in Column 4, was omitted from the list of abbreviations. "HY" designates "a name proposed for a hypothetical mineral". Some minor typographical misprints were encountered. French names for certain species should not cause any great difficulty; *i.e.*, "salmiac" for "sal-ammoniac", "actinote" for "actinolite", "staurotide" for "staurolite", *etc.*

The Index Alphabetique is a paperback, reproduced by photo offset. The printing is very legible. Anyone working with mineralogical nomenclature will want to have this book within easy reach.

J. A. MANDARINO
Royal Ontario Museum