**Annotated Bio-Bibliography of Mineralogy and Crystallography 1469-1919

by Curtis P. Schuh (1959-2007)**

****

 **DANA, James Dwight**

**(1813 - 1895)**

(**Born:** Utica, New York, U.S.A., 2 February 1813; **Died:** New Haven, Connecticut, U.S.A., 14 April 1895) *American mineralogist & geologist.*

Dana was born into a merchant's family of modest means. Through determination and a zeal for learning he was able to enter Yale college where he came under the influence of Benjamin Silliman, professor of chemistry. It was this close association that nurtured Dana's interest in natural history and most particularly mineralogy and geology. Upon his graduation from Yale in 1833, Dana accepted the post of instructor to midshipmen aboard the U.S.S. Delaware. In 1836, two years after his return home, Silliman was able to offer Dana an assistant-ship in the chemical laboratory at Yale. In this position, Dana made many scientific contacts and doubtless this lead to an invitation to join the Wilkes expedition of 1838-1842. This enterprise is one of the great episodes in the history of American science. The purpose was to circumnavigate the globe, charting and conducting natural history surveys in Polynesia and confirming the existence of the Antarctic continent. Dana shipped out as a geologist, and when the expedition's conchologist was dismissed at Sydney, Dana took on the role of marine biologist as well. For four years the world was his laboratory, an experience that gave "Dana a competence in natural history matched in his own day only by Darwin's on the *Beagle*" [DSB]. Upon his return to New Haven, Dana commenced publishing his observations made on this remarkable voyage. This appeared as *Zoöphytes, Crustacea and Geology*, a work that although very specialized was none the less very popular reading among the general public. His global experience also gave great merit to his arguments in support of Darwin's theory of evolution. When a position opened, he was made professor of mineralogy and geology at Yale. In 1844, Dana married Henriette Frances Silliman [1823-1907], daughter of his Yale collaborator, Benjamin Silliman. Together they had four children, one of whom, **Edward Salisbury Dana** also became a renowned mineralogist. Subsequently, James Dwight Dana became editor of the *American Journal of Science*, which had been founded by Silliman in 1818. Through this oracle, as well as teachings, many articles and books, Dana devoted his life to the expansion of scientific knowledge. Dana held membership in every important scientific throughout the world. He was the recipient of both the Copley Medal (Royal Society of London) and the Wollaston Medal (Geological Society of London), a feat few others have accomplished. In 1866, the silicate mineral "Danalite" was named in his honor by J.P. Cooke.

Biographical references: ABA: I 396, 216-238. **•** *American Journal of Science*: 3rd Series, **4** (1895), 329-56, portrait. **•** Barr, *Index to Biographical Fragments*, 1973: 61. **•** *Catalogue of Portraits of Naturalists*: 336 [1 portrait listed]. **•** Cleevely, *World Palæontological Collections*, 1983: 96. **•** DAB: **3**, 55-6 [by G.P. Merrill]. **•** Dall, W.H., *Spencer Fullerton Baird, A Biography including selections from his correspondance with Audubon, Agassiz, Dana, and others*. Philadelphia: Lippincott, 1915. [i]-xvi, [1]-462 p. **•** DSB: **3**, 549-54 [by W. Stanton]. **•** Elliott, *Biographical Index*, 1990: 57. **•** Elliott, *Biographical Dictionary*, 1979: 71. **•** *Encyclopaedia Britannica*, 11th edition. **•** Fleener, F.L., "Dana of the Dana's", *Mineralogist (Formerly the Oregon Mineralogist)*, **13**, (1945), no. 1, 3-4. **•** Gilman, D.C., *The life of J.D. Dana, scientific explorer, mineralogist, zoologist*. New York, 1895. 409 p. **•** *ISIS, 1913-65*: **1**, 306. **•** Lambrecht & Quenstedt, *Catalogus*, 1938: 103. **•** Poggendorff: **1**, cols. 516-7, **3**, 323 & **4**, 294-5. **•** Prendergast, M.L., *James Dwight Dana: The life and thought of an American scientist. Ph.D. Dissertation*. Univeristy of California, Los Angeles, 1978. 640 p. [Univeristy Microfilms, Ann Arbor, Michigan, order no. 79-01390]. **•** Sanford, W.F., "Dana and Darwinism", *Journal of the History of Ideas*, **26**, (1965), 531-46. **•** Sarjeant, *Geologists*, 1980: **2**, 809-12, Suppl. 1 (1986), **1**, 364 & Suppl. 2 (1995), **1**, 542-3 [other refs.]. **•** Stafleu & Cowan, *Taxonomic Literature*, 1976-88: **1**, 595. **•** WBI. **•** Wilson, *Benjamin Silliman and his circle*, 1979. **•** *World Who's Who in Science*: 405.

The Life of James Dwight Dana, Scientific Explorer, Mineralogist, Geologist, Zoologist, Professor in Yale University. By Daniel C. Gilman ... (New York and London, 1899).
*See under:* **Gilman, Daniel Coit.**

***System of Mineralogy***



System of Mineralogy, 1837

**1. English, 1837** [First edition].
A | System Of Mineralogy: | Including An Extended | Treatise On Crystallography: | With An Appendix, Containing The | Application Of Mathematics | To | Crystallographic Investigation, | And A | Mineralogical Bibliography. | With Two Hundred And Fifty Wood Cuts, And Four Copper Plates, Containing One | Hundred And Fifty Additional Figures. | By James Dwight Dana, A.M. | [...4 lines of titles and memberships...] | [rule] | "Hæc studia nobiscum peregrinantur, rusticantur." | [rule] | New Haven: | Published By Durrie & Peck and Herrick & Noyes. | Hitchcock & stafford, Printers. | [rule] | 1837.

8° in 4s: π3 B4 1-184 19\*4 19-564 572 χ4 App.-B-App.-O4; 297*l*.; [i]-xiv, 1-144, \*145-152\*, [145]-452, [1]-119, [1] errata p., 4 folding plates, about 250 text woodcuts, biblio., index. ***Page size:*** 224 x 138 mm.

Contents: [i-ii], Title page, verso "[rule] | Entered, | According to Act of Congress, in the year 1837, by | Durrie & Peck and Herrick & Noyes, | ..."; [iii]-vi, "Preface."-dated 1 May 1837.; [vii]-xiv, "Contents."; [1]-4, "Introduction."; [5]-70, "Mineralogy. | [rule] | Part I. | Crystallology, | Or, The Science Of The Structure Of Minerals."; [71]-86, "Part II. | Physical Properties Of Minerals."; [87]-91, "Part III. | Chemical Properties Of Minerals."; [92]-104, "Part IV. | Taxonomy."; [105]-152\^\*, "Part V. | Determinative Mineralogy."; [145]-444, "Part VI. | Descriptive Mineralogy."; [445]-452, "Supplement."; [1]-80, "Appendix A. | Mathematical Crystallography."; [81]-88, "Appendix B. | Chemical Classification."; [89]-106, "Catalogue | Of | Works On Mineralogy."; [107]-119, "Index."; [1 pg], "Errata."; [At end], Four plates.

Very scarce. One of the most significant contributions to American mineralogy and the science as a whole was made when Dana, at the youthful age of 24 published his *System of Mineralogy*. Benjamin Silliman reviewing the work, wrote: "On the whole, we believe this to be decidedly among the best treatises upon this subject that have ever been circulated in the United States, and we are of the opinion that even a slight examination of it, will be sufficient to commend it to the favor of every cultivator and lover of mineralogy." The text is a very complete and readable compendium of all mineralogical data available to that time. Thus this book is a fitting first entry into an extraordinary publishing history that would see the *System's* fourth edition define modern systematic mineralogy and see the *System's* sixth edition become arguably the greatest mineralogy ever published as a single volume.

The body of the text is divided into six distinct parts. Part I, titled "Crystallology" treats all manner of crystallographic subjects including primitive forms, systems of crystallization, nomenclature, and notation for lettering crystal drawings. A section on the theoretical aspects of crystals begins with a brief history of the science, after which Dana unfolds his own original views about the internal structure of crystals. A brief chapter on the practical aspects of "Crystallogeny" concludes this section. Part II, treats the physical characters of minerals. These include light, electricity, magnetism, specific gravity, hardness, type of fracture, color, and odor. Part III, which purportedly covers the chemical properties of minerals in essence only contains directions for the use of acids and the application of the blowpipe. In 1837, with a flood of data becoming available about the chemistry of minerals, it is surprising that more is not written about that topic in this work. Part IV treats the classification and nomenclature of minerals. Within this exposition are discussed the relative importance of crystallographic, physical and chemical properties in identifying a mineral species. Dana also discusses in detail the classes and orders of his natural classification, for which genra and species are described in the sixth section. Part V, "Determinative Mineralogy" contains two tabular classifications the objective of which is to enable the unaided student to arrive at the correct name of a mineral. The first table is arranged according to the system of crystallization as described in part I. The second table, independent of crystallographic data, distributes the minerals according to metallic or nonmetallic luster and their colored or uncolored streak. The species in these subdivisions are then arranged in the order of their hardness.

The largest portion of the book is devoted to part VI, "Descriptive Mineralogy." This portion relies very heavily upon the system and information contained in **Fredrich Mohs** *Grundriß der Mineralogie* (2 vols., Dresden, 1822-24; English transl., 3 vols., Edinburgh, 1825). It begins with a tabular view of the natural classification that lists the mineral species under the appropriate class and order. Next comes the detailed description of the species, with information on synonyms, nomenclature, crystallization, localities with particular attention paid to American occurrences, and references to the mineralogical literature. Appendix A titled "Mathematical Crystallography" begins with the basics of geometry and relates this study of points, lines and planes to its practical application in crystallography. Appendix B gives brief remarks on the chemical classification of minerals. An important though error riddled mineralogical bibliography follows the appendices. A good general index and an errata page conclude the work. Through out the book and on four copper plates are figured over 250 woodcut crystal figures.

Bibliographical references: *American Journal of Science*: 1st Series, **46** (1844), 362-87 [review by B. Silliman, Sr.]. **•** Dana's 7th (Bibliography): 69. **•** *Freilich Sale Catalog*: no. 147. **•** Hazen & Hazen, *American Geological Literature*, 1980: no. 2798. **•** Hoover Collection: no. 247. **•** NUC: **132**, 180-90 [ND 0024180]. **•** Pabst, A., "Dana's system of mineralogy", *Rocks & Minerals*, **19**, (1944), no. 12, 379-87.

**2. English, 1844** [2nd edition].
A | System | Of | Mineralogy, | Comprising The | Most Recent Discoveries: | With Numerous Wood Cuts And Four Copper Plates. | By James D. Dana, A.M. | [rule] | "Hæc studia nobiscum peregrinantur, rusticantur." | [rule] | Second Edition. | New York And London: | Published By Wiley & Putnam. | [rule] | 1844.

8° in 4s: [1]-804; 320*l*.; [1]-633, [1] blank, [1] errata, [1] blank p., index, biblio., 4 plates (2 folding). ***Page size:*** 222 x 138 mm.

Contents: [1-2], Half title page, verso blank.; [3-4], Title page, verso "Entered | according to Act of Congress, in the year 1844, by | ..."; [5], Dedication to Benjamin Silliman.; [6], Blank.; [7]-10, "Preface."-dated March 1844.; [11]-14, Contents.; [15], "Abbreviations In Names Of Authors."; [16], Blank.; [17]-20, "Introduction."; [21]-101, "Mineralogy. | [ornate rule] | Part I. | Crystallology, or The Science Of The Structure Of Minerals."; [102]-117, "Part II. | Physical Properties Of Minerals."; [118]-136, "Part III. | Chemical Properties Of Minerals."; [137]-188, "Part V. | Determinative Mineralogy."; [189]-534, "Part VI. | Descriptive Mineralogy."; [535]-548, "Catalogue | Of | American Localities Of Minerals."; [549]-576, "Part VII. | Chemical Classification."; [577]-593, "Part VIII. | Rocks Or Mineral Aggregates."; [594]-616, "Part IX. | Mineralogical Bibliography."; [617]-618, "Addenda."; [619]-633, "Index."; [1 pg], Blank.; In a very few, rare copies there is in this position the 80 page appendix (see commentary for details) [1]-80, "Appendix A. | Mathematical Crystallography."; [1 pg], "Errata."; [1 pg], Blank.; [At end], Four plates.

Very scarce. The *System's* first edition of 1837 had sold out by 1842. A new edition had to be prepared and for this Dana retained the original format and updated the text with the latest discoveries. This increased the size of the work only slightly. The long appendix on "Mathematical Crystallography" was dropped in most copies. However, the most important change was in the appendix dealing with chemical classification. It has been increased from 6 to 23 pages and it now includes a chemical formula for each species. Strangely, chemistry is omitted from the descriptive part. Also introduced in the second edition and a part of all subsequent nineteenth century editions was a "Catalogue of American Localities of Minerals." The first one ran to 13 pages and included localities in 25 states.

This edition was published by Wiley and Putman as the "Second Edition" in 1844. A note in the preface to the fifth edition of Dana's *System* (New York, 1868) says it: "This edition, failing to find a publisher in New York, was printed at the expense of the author." However, this appears to have been a misstatement. In the early 1840s, Dana was not in a position to finance the publication of the second edition. Instead, Dana might have misremembered the circumstances. He did finance the reprinting of an 80 page mathematical appendix that had appeared in the 1837 edition, and had it bound up in a very few copies of the second edition of the *System*. Mention of this is made in the *American Journal of Science* review: "The mathematical appendix of the first edition is omitted in most of the present one; only a few are bound up with it for the satisfaction of those who wish to pursue that portion of the subject." The expanded work is otherwise identical to the more common issue, which is described above.

Bibliographical references: *American Journal of Science*: 2nd Series, **??**, ?? [review]. **•** Dana's 7th (Bibliography): 69. **•** NUC: **132**, 180-90. **•** Pabst, A., "Dana's system of mineralogy", *Rocks & Minerals*, **19**, (1944), no. 12, 379-87.

**3. English, 1850** [3rd edition].
A | System | Of | Mineralogy, | Comprising The | Most Recent Discoveries: | Including | Full Descriptions Of Species And Their Localities, Chemical Analyses | And Formulas, Tables For The Determination Of Minerals, | And A Treatise On Mathematical Crystallography | And The Drawing Of Figures Of Crystals. | Illustrated By Numerous Wood Cuts And Four Copper Plates. | By James D. Dana, A.M. | [...2 lines of titles and memberships...] | [ornate rule] | "Hæc studia nobiscum peregrinantur, rusticantur." | [ornate rule] | Third Edition, | Rewritten, Rearranged, And Enlarged. | New York and London: | Published by George P. Putnam. | [rule] | 1850.

4°: [1]-711, [1] p., 4 plates, illus.

Scarce. This, the third edition of the *System*, is a transitional work, clearly marking the end to the eighteenth century ideas that relied on a "natural history" method to organize mineral species, and bringing to light the use of chemistry in a modern classification scheme. Not beating around the bush, Dana announced this break in his preface: "To change is always seeming fickleness. But not to change with the advance of the science, is worse; it is persistence in error; and therefore, notwithstanding the former adoption of what has been called the "Natural History System," and the pledge to its support given by the author, in supplying it with a Latin Nomenclature, the whole system, its classes, orders, genera, and Latin names, have been rejected; and even the trace of it, which the synonymy might perhaps rightly bear, has been discarded."

This cleared the slate for another classification, which would rely heavily on a mineral's chemistry for ordering the species. Dana was well aware of the difficulties this approach would involve in the middle of the nineteenth century, but he also realized that a better correlation of chemistry and crystallography soon would be possible. Therefore, he offered his new classification "simply as a convenient arrangement."

In accord with this fundamental revision, Dana made many other changes. Chemical formulas, derived principally from the work of Rammelsberg, were included in each of the species descriptions. The crystallization descriptions based on Haüy were removed, although the Naumann indices remained, as did the stated crystal system. The extensive mineralogical bibliographies found in the first and second editions was replaced by a short list of major works in the subject. But some references to the original literature was still included in the species descriptions. Reading the text, it is clear that Dana had not yet settled in his own mind all the points of this new method, but the basic foundation was laid in this work.

**Supplements:** Published in the *American Journal of Science, 2nd Series* were separate "Mineralogical Notices" that supplemented the text of the third edition. The following list provides details.

|  |
| --- |
| **11** (1851), pp. 225-234 |
| **12** (1852), pp. 205-222 & pp. 387-397 |
| **15** (1853), pp. 430-449 |

Bibliographical references: Dana's 7th (Bibliography): 69. **•** NUC: **132**, 180-90. **•** Pabst, A., "Dana's system of mineralogy", *Rocks & Minerals*, **19**, (1944), no. 12, 379-87.

**4. English, 1854** [4th edition].
A | System | Of | Mineralogy | Comprising The | Most Recent Discoveries: | Including | Full Descriptions Of Species And Their Localities, Chemical Analyses | And Formulas, Tables For The Determination Of Minerals, | With A Treatise On Mathematical Crystallography | And The Drawing Of Figures Of Crystals. | Illustrated By Numerous Wood Cuts. | By James D. Dana, A.M. | [...3 lines of titles and memberships...] | [ornate rule] | "Hæc studia nobiscum peregrinantur, rusticantur." | [ornate rule] | Fourth Edition, | Rewritten, Rearranged, And Enlarged. | Volume I. [-II.] New York: | D. Appleton & Co., 346 & 348 Broadway. | London: 16 Little Britain. | 1854.

2 vols. [Vol 1] 4°: [1]-320 p., illus. [Vol 2] [1]-533, [1] errata p., illus.

Contents: [Vol 1] [1-2], Half title page, verso blank.; [3-4], Title page, verso "Thomas J. Stafford, Printer."; [5]-8, "Preface."; [9]-12, "Table Of Contents."; [13]-16, "Abbreviations."; [17]-20, "Introduction."; [21]-161, "... Crystallogy..."; [162]-183, "Part II. | Physical Properties Of Minerals."; 183-240, "Part III. | Chemical Mineralogy."; 241-255, "Part IV. | Taxonomy."; [256]-320, "Part V. | Determinative Mineralogy."

[Vol 2] [1-2], Title page, verso "Thomas J. Stafford, Printer."; [3]-6, "Introductory Remarks."; [7]-516, "Part VI. | Descriptive Mineralogy."; [517]-533, "General Index."; [1 pg], "Errata And Addenda."

Scarce. Four years after the appearance of the prior edition, the fourth edition of the *System* was published. In it, Dana introduces the classification of minerals which in its major divisions is followed to this day, and is commemorated with the description, "Dana Classification." It is based upon a combination of chemical and crystallographic information, with the major divisions of species determined by their chemistry, while ordering within these divisions is determined either by isomorphism or similarity of chemical formula or both.

As a necessary component of this system, the crystallographic descriptions have been overhauled. Although Naumann indices for crystal forms were mentioned in the previous editions, the method of designating forms by indices was not employed in the mineral descriptions. In this edition for the first time, Dana has included extensive information on the forms of crystals. For species rich in crystal forms, a diagrammatic summary of the observed forms is provided.

Also included in the descriptions were extensive chemical information. Much of this data was based upon the studies of Rammelsberg's *Handwörterbuch des chemischen Theils der Mineralogie* (Berlin, 1841; 5 supplements, 1843-1851), but, the chemical studies of Dana, Genth, and Shepard can also be found in the mineral descriptions.

**Other issues:** The work was reissued in 1855 and 1858 with no changes to the text.

**Supplements:** There appeared in the *American Journal of Science, 2nd Series* a series of supplements to augment the fourth edition's text. So far as is known, they were never published separately. The following list provides details.

|  |
| --- |
| **19** (1855), pp. 353-371 |
| **21** (1856), pp. 192-213 |
| **22** (1856), pp. 246-263 |
| **24** (1857), pp. 107-132 |
| **25** (1858), pp. 396-416 |
| **26** (1858), pp. 345-364 |
| **28** (1859), pp. 128-144 |

Bibliographical references: Dana's 7th (Bibliography): 69. **•** NUC: **132**, 180-90. **•** Pabst, A., "Dana's system of mineralogy", *Rocks & Minerals*, **19**, (1944), no. 12, 379-87.

**5. English, 1868** [5th edition].
A | System | Of | Mineralogy. | [rule] | Descriptive Mineralogy, | Comprising The | Most Recent Discoveries. | By | James Dwight Dana, | [...3 lines of titles and memberships...] | Aided By | George Jarvis Brush, | Professor Of Mineralogy And Metallurgy In The Sheffield Scientific School Of Yale College. | [rule] | "Hæc studia noviscum peregrinantur....rusticantur." | [rule] | Fifth Edition. | Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. | New York: | John Wiley & Son, Publishers, | No. 2 Clinton Place. | 1868.

8°: [A]-C8 [1]-518 526; 438*l*.; [i]-xlviii, [1]-827, [1] p., 617 text illus., index, biblio. ***Page size:*** 232 x 143 mm.

Contents: [i-ii], Title page, verso blank.; [iii]-vi, "Preface"-signed James D. Dana, 30 April 1868.; vi-viii, Prefaces from previous editions.; [ix]-x, "Table Of Contents."; [xi]-xlviii, "Introduction."; [1]-764, Text.; 765-791, "Catalogue Of American Localities Of | Minerals."; [792], Blank.; 793-806, "Supplement."; [807]-827, "Index."; [1 pg], Blank.

Scarce. Assisted by **George Jarvis Brush** with regards to the blow pipe characteristics, the fifth edition of the *System* has a form that is familiar to present day mineralogists. The previous editions had included an extensive introduction describing the various phases of mineralogical and crystallographic science in addition to the descriptive mineralogy. In the fifth edition all but the descriptive part was dropped and this was provided with only a short introduction designed to aid the descriptive part. This had now grown to 805 pages, three times the length of the first edition published only 31 years earlier.

In addition to fundamentally changing the character of the work, many improvements were made in the mineral descriptions. The number of references to the original literature was greatly increased, while the bibliography in the introduction was enlarged. For the first time, optical data was included in the mineral descriptions, but was limited to statements of orientation, optic sign and birefringence, but no indices of refraction were given.

The publication of the fifth edition marked the end of James Dana's active connection with the *System*. The first appendix was brought out in 1872 by Brush. It covered the progress of mineralogy from 1868 to 1872, but was not considered to be up to the standard set by the text of the fifth edition. Dana's son, Edward took over the management of the remaining appendices, and the *System* as a whole in 1875.

**Other issues:** The fifth edition of the *System* was reissued more than a dozen times. In fact, the appearance of the three separate appendices allowed the publisher to bind them with the text and reissue the combined work with an updated title page. This update usually consisted of placing the term "Sub-Edition" on the title, but with the pending publication of the sixth edition of the *System* in 1892, "Fifth Edition" was replaced with ever higher numbering in an effort to entice customers to purchase the remaining stock of what would soon be an obsolete text. The following list indicates the year of issue and the sub-edition number if any.

|  |
| --- |
| 1869 |
| 1870 |
| 1872 |
| 1874, 5th sub-edition, with 1 appendix. |
| 1875, 6th sub-edition, with 1 appendix. |
| 1877, 7th sub-edition, with 2 appendices. |
| 1880, 8th sub-edition, with 2 appendices. |
| 1882, 9th sub-edition, with 2 appendices. |
| 1883, 10th sub-edition, with 3 appendices. |
| 1885, 11th sub-edition, with 3 appendices, also called the 7th edition on the title page. |
| 1888, 11th sub-edition, with 3 appendices, also called the 8th edition on the title page. |
| 1889, 11th sub-edition, with 3 appendices, also called the 9th edition on the title page. |
| 1890, 11th sub-edition, with 3 appendices, also called the 11th edition on the title page. |

Bibliographical references: Dana's 7th (Bibliography): 69. **•** NUC: **132**, 180-90. **•** Pabst, A., "Dana's system of mineralogy", *Rocks & Minerals*, **19**, (1944), no. 12, 379-87.

***Appendices***

First Appendix To The Fifth Edition Of Dana's Mineralogy, by George J. Brush ... Completing The Work To 1872. (New York, 1872).
*See under:* **Brush, George Jarvis.**

Second Appendix To The Fifth Edition Of Dana's Mineralogy, By Edward S. Dana, ... Completing the Work to 1875. (New York, 1875).
*See under:* **Dana, Edward Salisbury.**

Third Appendix To The Fifth Edition Of Dana's Mineralogy, By Edward S. Dana ... Completing The Work To 1882. (New York, 1882).
*See under:* **Dana, Edward Salisbury.**

***Sixth Edition***

The System of Mineralogy of James Dwight Dana 1837-1868 by Edward S. Dana ... Sixth Edition. (New York, 1892).
*See under:* **Dana, Edward Salisbury.**

**6. English, 1842.**
The Natural Classification of Minerals, reprinted from Dana's Mineralogy, and designed to answer the purpose of Labels for Cabinets. Published at Neely's Schoolbook Warehouse, and Mineralogical Depot, 221 Bleeker - Street, New York, 1842.

8°: 58*l*. ***Page size:*** 165 x 95 mm.

Very rare. Another of those curious works designed to be destroyed by the purchaser in labeling his mineral collection. It lists by number Dana's mineral species, following the natural history classification and nomenclature utilized in the first edition of his *System of Mineralogy* (New Haven, 1837). For each mineral the class, order, genus, and species are given in Latin. The text is printed on only one side of the paper and is widely separated vertically to allow buyers of the book to clip out the separate entries as labels for their specimens.

Bibliographical references: NUC [no copy listed]. **•** Peri Lithon, Bookseller: cat. 5 (1972), no. 114.

***Manual of Mineralogy***



Manual of Mineralogy, 1848

**7. English, 1848** [First edition].
Manual | Of | Mineralogy, | including | Observations On Mines, Rocks, | Reduction Of Ores, | and the | Applications Of The Science To The Arts. | With 260 Illustrations. | Designed For The Use Of Schools And Colleges. | [ornate rule] | By James D. Dana, A.M., | [...3 lines of titles and memberships...] | [ornate rule] | New Haven: | Published By Durrie & Peck. | [rule] | 1848.

12°: [i]-xii, 13-430 p., 260 illus., diagrs.

Contents: [i-ii], Title page, verso "Entered according to Act of Congress, in the year 1848, by | Durrie & Peck | ..."; [iii]-iv, "Preface."; [v]-vi, "Table Of Contents."; [vii]-xii, "Glossary & Index Of Terms."; [13]-387, Text.; [388]-414, Tables for the determination of minerals.; [415]-430, "Index."

Very scarce. This volume was designed as a textbook for practical mineralogy, aimed especially at American students. Its first pages treat the mineralogical science with regard to physical and chemical characters. Following this are the descriptions of the mineral species. All American minerals and other species considered important are described, while rarer species are set in smaller type and only briefly noticed. The arrangement adopted, places the ores of the same metal together. The descriptions of the ores of a metal are preceded by a paragraph giving brief general remarks about their characteristics. Information is provided about assay and reduction, the uses of the metal, and facts of a historical and statistical nature. At the end of the text are chapters on rocks, a catalogue of American localities of minerals, a table of weights, measures and coins, and a table for the determination of minerals. For more detailed information on the localities of minerals and their associations, the reader is directed to the author's comprehensive, *System of Mineralogy* (2nd ed., New York, 1844), which contains full lists of synonyms, complete tables for the determination of minerals, a more complete crystallography, and numerous chemical analyses with their authorities.

Of particular interest in this volume is the classification scheme. The first and second edition of Dana's *System of Mineralogy* (1837 & 1844) had used a natural history method, yet the classification adopted in the *Manual* "throws together ores of the same metals, and associates the earthy species as far as possible in natural groups." Dana writes that he chose this method because "this order is preferred by very many teachers of science, and has advantages which for many purposes counterbalance those of a more perfectly natural system." It is here in the *Manual* then that Dana first breaks away from the prevailing natural history classification systems of mineralogy and begins to develop a chemically based one. Dana would switch to a system based solely on chemistry in the fourth edition of his *System* (New York, 1854), and rewrite mineral classification to the present time.

**Other issues:** The discovery of gold in California in 1849 caused the *Manual* to be in great demand. Many a "forty-niner" carried a copy of Dana's *Manual* in their trek to the California and Colorado gold fields. Subsequently, many reissues of the work appeared. The first was in 1849, which although the title page calls it a "Second edition," it is in fact a reissue of the first edition with the same pagination as the first. These reissues with modified title pages (title editions) also occurred in 1850 ("Third edition"), 1851 ("Fourth edition"), 1853 ("Fifth edition"), 1854 ("Sixth edition"), and 1855 ("Seventh edition").

Bibliographical references: *American Journal of Science*: 2nd Series, **6** (1848), 302 [review]. **•** NUC: **132**, 180-90 [ND 0024070].

**8. English, 1857** [2nd Text Revision].
Manual | of | Mineralogy, | including | Observations on Mines, Rocks, | Reduction of Ores, | and the | Applications of the Science to the Arts, | with 260 Illustrations. | Designed for the Use of Schools and Colleges. | [wavy rule] | By James D. Dana, A.M., | [...3 lines of titles and memberships...] | New Edition, Revised and Enlarged. | New Haven: | Published by Durrie & Peck. | Philadelphia: Peck & Bliss. | [rule] | 1857.

8°: [i]-xii, [13]-454, [2] p., illus., diagrs., index.

Contents: [i-ii], Title page, verso "Entered according to Act of Congress, in the year 1857, ..."; [iii]-iv, Preface to the first and second editions.; [v]-vi, "Table Of Contents."; [vii]-xii, "Glossary And Index Of Terms."; [1]-413, Text.; [414]-440, "Tables for the Determination of | Minerals."; [441]-454, [2], "Index."

Scarce. Due to the great demand for the book, Dana prepared a "New Edition, Revised and Enlarged" that first appeared in 1857. The text was increased by 22 pages mostly dealing with minerals of economic importance, but especially gold and its mineral associations. This "New Edition", which became a standard in schools in The United States, was then reissued with little or no alteration to the text each year from 1858 until 1876.

Bibliographical references: NUC: **132**, 180-90.

**9. English, 1878** [3rd Text Revision].
Manual of mineralogy and lithology containing the elements of the science of minerals and rocks. For the use of the practical mineralogist and geologist, and for instruction in schools and colleges. By James D. Dana. Third edition, rearranged and rewritten. New York, J. Wiley & Sons, 1878.

8°: viii, 474 p., illus., diagrs.

Scarce. This is the third major revision of the basic book that Dana made. The book declares this on the title page with "Rearranged and Rewritten" and correctly calls it the "Third edition." Included was an extensive chapter on rocks (showing the rise in the science of petrology), and the title was changed to *Manual of Mineralogy and Lithology*. As before, the work became popular in classrooms throughout the United States and consequently the book was reissued each year from 1879 through 1886, with varying "Editions" mentioned on the title page.

Bibliographical references: NUC: **132**, 180-90.

**10. English, 1887** [4th Text Revision].
Manual of mineralogy and petrography; containing the elements of science of minerals and rocks. For the use of the practical mineralogist and geologist and for instruction in schools and colleges. By James D. Dana. Fourth edition, revised throughout and enlarged. New York, J. Wiley & Sons, 1887.

8°: [i]-ix, [1], [1]-517, [1] p., illus., diagrs.

Contents: [i-ii], Title page, verso copyright information.; [iii], "Preface."; [iv], Blank.; [v]-ix, "Table of Contents."; [1 pg], Blank.; [1]-3, "General Remarks.; 4-66, "I. Crystallization of Minerals: Crystallography."; 66-85, `II. Physical Properties of Minerals."; 86-102, "III. Chemical Properties of Minerals."; 103-404, "IV. Descriptions of Minerals."; 405-433, "V. Determination of Minerals."; [434]-495, "On Rocks.-Petrology."; 495-496, "Academy Mineral Collection."; 497-517, "General Index."; [1 pg], Blank.

Scarce. In 1887, Dana made his fourth thorough revision of the text bringing it current to 1886, which was reflected with the book being called the "Fourth Edition, Revised throughout and Enlarged." As with the other editions, this volume was aimed toward the needs of miners and practical mineralogists by placing together the ores of the same metal. Reissues of this text with varying edition information printed on the title pages occurred in 1887 ("Fifth edition"), 1888 ("Sixth edition"), 1889 ("Seventh edition"), 1890 ("Ninth edition"), 1891 ("10th ed."), 1891 ("11th ed."), and 1894-1909 ("12th ed.").

Bibliographical references: *American Journal of Science*: 3rd series, **33** (1887), 243 [review]. **•** NUC: **132**, 180-90.

Dana's Manual of Mineralogy ... (New York & London, 1912).
*See under:* **Ford, William Ebenezer.**

Rudimentary Treatise on Mineralogy. Third edition, to which is added, A Treatise on Rocks and Mineral Aggregates, by James D. Dana. (London, 1856).
*See under:* **Varley, Delvalle.**

Rudimentary Treatise on Mineralogy. Fourth edition, to which is added, A Treatise on Rocks and Mineral Aggregates, by James D. Dana. (London, 1859).
*See under:* **Varley, Delvalle.**

A Text-Book of Mineralogy. With an Extended Treatise on Crystallography and Physical Mineralogy. By Edward Salisbury Dana ... On the Plan and with the Co-Operation of Professor James D. Dana. (New York, 1877).
*See under:* **Dana, Edward Salisbury.**

**11. English, 1844** [2nd edition, issue B].
A | System | Of | Mineralogy, | Comprising The | Most Recent Discoveries: | With Numerous Wood Cuts And Four Copper Plates. | By James D. Dana, A.M. | [rule] | "Hæc studia nobiscum peregrinantur, rusticantur." | [rule] | Second Edition. | New York And London: | Published By Wiley & Putnam. | [rule] | 1844.

8° in 4s: [1]-633, [1] blank, [1]-80, [1] errata, [1] blank p., index, biblio., 4 plates (2 folding). ***Page size:*** 222 x 138 mm.

Contents: [1-2], Half title page, "????", verso blank.; [3-4], Title page, verso "Entered | according to Act of Congress, in the year 1844, by | ..."; [5], Dedication to Benjamin Silliman.; [6], Blank.; [7]-10, "Preface."- dated March 1844.; [11]-14, Contents.; [15], "Abbreviations In Names Of Authors."; [16], Blank.; [17]-20, "Introduction."; [21]-101, "Mineralogy. | [ornate rule] | Part I. | Crystallology, or The Science Of The Structure Of Minerals."; [102]-117, "Part II. | Physical Properties Of Minerals."; [118]-136, "Part III. | Chemical Properties Of Minerals."; [137]-188, "Part V. | Determinative Mineralogy."; [189]-534, "Part VI. | Descriptive Mineralogy."; [535]-548, "Catalogue | Of | American Localities Of Minerals."; [549]-576, "Part VII. | Chemical Classification."; [577]-593, "Part VIII. | Rocks Or Mineral Aggregates."; [594]-616, "Part IX. | Mineralogical Bibliography."; [617]-618, "Addenda."; [619]-633, "Index."; [1 page], Blank.; [1]-80, "Appendix A. | Mathematical Crystallography."; [1 page], "Errata."; [1 page], Blank.; [At end], Four plates.

Very scarce. This is the rare second issue, where the 80 page mathematical appendix that was issued with the first edition of 1837 has been bound up with the text of this edition. Mention of this is made in the AJS review: "The mathematical appendix of the first edition is omitted in most of the present one; only a few are bound up with it for the satisfaction of those who wich to pursue that portion of the subject." The work is otherwise identical to the more common issue, which for a description see the above item.

Bibliographical references: Dana's 7th (Bibliography): 69.

**12. English, 1855** [4th edition, issue B].
A | System | Of | Mineralogy | Comprising The | Most Recent Discoveries: | Including | Full Descriptions Of Species And Their Localities, Chemical Analyses | And Formulas, Tables For The Determination Of Minerals, | With A Treatise On Mathematical Crystallography | And The Drawing Of Figures Of Crystals. | Illustrated By Numerous Wood Cuts. | By James D. Dana, A.M. | [...3 lines of titles and memberships...] | [ornate rule] | "Hæc studia nobiscum peregrinantur, rusticantur." | [ornate rule] | Fourth Edition, | Rewritten, Rearranged, And Enlarged. | Volume I. [-II.] | London: | Trübner & Co., 12, Paternoster Row. | 1855.

[Vol 1] 4°: [1]-320 p.; [Vol 2] [1]-533, [1] errata & addenda p. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**13. English, 1858** [4th edition, issue C].
A | System | Of | Mineralogy | Comprising The | Most Recent Discoveries: | Including | Full Descriptions Of Species And Their Localities, Chemical Analyses | And Formulas, Tables For The Determination Of Minerals, | With A Treatise On Mathematical Crystallography | And The Drawing Of Figures Of Crystals. | Illustrated By Six Hundred Wood Cuts. | By James D. Dana, A.M. | [...3 lines of titles and memberships...] | [ornate rule] | "Hæc studia nobiscum peregrinantur, rusticantur." | [ornate rule] | Fourth Edition, | Rewritten, Rearranged, And Enlarged. | Complete In One Volume. | New York: | D. Appleton & Co., 346 & 348 Broadway. | London: 16 Little Britain. | 1858.

8°: Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**14. English, 1869** [5th edition, issue B].
A | System | Of | Mineralogy. | [rule] | Descriptive Mineralogy, | Comprising The | Most Recent Discoveries. | By | James Dwight Dana, | [...3 lines of titles and memberships...] | Aided By | George Jarvis Brush, | Professor Of Mineralogy And Metallurgy In The Sheffield Scientific School Of Yale College. | [rule] | "Hæc studia noviscum peregrinantur....rusticantur." | [rule] | Fifth Edition. | Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. | New York: | John Wiley & Son, Publishers, | 2 Clinton Hall, Astor Place. | 1869.

4°: xlviii, 827 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**15. English, 1870** [5th edition, issue C].
A | System | Of | Mineralogy. | [rule] | Descriptive Mineralogy, | Comprising The | Most Recent Discoveries. | By | James Dwight Dana, | [...3 lines of titles and memberships...] | Aided By | George Jarvis Brush, | Professor Of Mineralogy And Metallurgy In The Sheffield Scientific School Of Yale College. | [rule] | "Hæc studia noviscum peregrinantur....rusticantur." | [rule] | Fifth Edition. | Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. | New York: | John Wiley & Son, Publishers, | 2 Clinton Hall, Astor Place. | 1870.

4°: xlviii, 827 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**16. English, 1872** [5th edition, issue D].
A System Of Mineralogy. ... Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. (4th Sub-Edition, With An Appendix, Bringing The Work Down To 1872). New York: John Wiley & Son, Publishers, 1872.

4°: xlviii, 827, iv, 19 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**17. English, 1874** [5th edition, issue E].
A System Of Mineralogy. ... Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. (5th Sub-Edition, With An Appendix.) New York: John Wiley & Son, Publishers, 1874.

4°: xlviii, 827, iv, 19 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**18. English, 1875** [5th edition, issue F].
A | System | Of | Mineralogy. | [rule] | Descriptive Mineralogy, | Comprising The | Most Recent Discoveries. | By | James Dwight Dana, | [...3 lines of titles and memberships...] | Aided By | George Jarvis Brush, | Professor Of Mineralogy And Metallurgy In The Sheffield Scientific School Of Yale College. | [rule] | "Hæc studia noviscum peregrinantur....rusticantur." | [rule] | Fifth Edition, | Rewritten And Enlarged, And Illustrated With | Upwards Of Six Hundred Woodcuts. | (6th Sub-Edition, With Two Appendixes And Corrections.) | New York: | John Wiley & Son, Publishers, | 15 Astor Place. | 1875.

4°: xlviii, 827, iv, 19, x, 64 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**19. English, 1877** [5th edition, issue G].
A System Of Mineralogy. ... Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. (7th Sub-Edition, With Two Appendixes And Corrections.) New York: John Wiley & Son, Publishers, 1877.

4°: xlviii, 827, iv, 19, x, 64 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**20. English, 1880** [5th edition, issue H].
A System Of Mineralogy. ... Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. (8th Sub-Edition, With Two Appendixes And Corrections.) New York: John Wiley & Son, Publishers, 1880.

4°: xlviii, 827, iv, 19, x, 64 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**21. English, 1882** [5th edition, issue I].
A | System | Of | Mineralogy. | [rule] | Descriptive Mineralogy, | Comprising The | Most Recent Discoveries. | By | James Dwight Dana, | [...3 lines of titles and memberships...] | Aided By | George Jarvis Brush, | Professor Of Mineralogy And Metallurgy In The Sheffield Scientific School Of Yale College. | [rule] | "Hæc studia noviscum peregrinantur....rusticantur." | [rule] | Fifth Edition, | Rewritten And Enlarged, And Illustrated With | Upwards Of Six Hundred Woodcuts. | (9th Sub-Edition, With Two Appendixes And Corrections.) | New York: | John Wiley & Son, Publishers, | 15 Astor Place. | 1882.

4°: xlviii, 827, iv, 19, x, 64 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**22. English, 1883** [5th edition, issue J].
A System Of Mineralogy. ... Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. (10th Sub-Edition, With Three Appendixes And Corrections.) New York: John Wiley & Son, Publishers, 1883.

4°: xlviii, 827, iv, 19, x, 64, xiii, 134 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**23. English, 1885** [5th edition, issue K].
A System Of Mineralogy. ... Seventh [!] Edition, Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. (11th Sub-Edition, With Three Appendixes And Corrections.) New York: John Wiley & Son, Publishers, 1885.

4°: xlviii, 827, iv, 19, x, 64, xiii, 134 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**24. English, 1888** [5th edition, issue L].
A System Of Mineralogy. ... Eighth [!] Edition, Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. (11th Sub-Edition, With Three Appendixes And Corrections.) New York: John Wiley & Son, Publishers, 1888.

4°: xlviii, 827, iv, 19, x, 64, xiii, 134 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**25. English, 1889** [5th edition, issue M].
A | System | Of | Mineralogy. | [rule] | Descriptive Mineralogy, | Comprising The | Most Recent Discoveries. | By | James Dwight Dana, | [...3 lines of titles and memberships...] | Aided By | George Jarvis Brush, | Professor Of Mineralogy And Metallurgy In The Sheffield Scientific School Of Yale College. | [rule] | "Hæc studia noviscum peregrinantur....rusticantur." | [rule] | Ninth [!] Edition, | Rewritten And Enlarged, And Illustrated With | Upwards Of Six Hundred Woodcuts. | (11th Sub-Edition, With Two Appendixes And Corrections.) | New York: | John Wiley & Son, Publishers, | 15 Astor Place. | 1889.

4°: xlviii, 827, iv, 19, x, 64 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.

**26. English, 1890** [5th edition, issue N].
A System Of Mineralogy. ... Eleventh [!] Edition, Rewritten And Enlarged, And Illustrated With Upwards Of Six Hundred Woodcuts. (11th Sub-Edition, With Three Appendixes And Corrections.) New York: JohnWiley & Son, Publishers, 1890.

4°: xlviii, 827, iv, 19, x, 64, xiii, 134 p., illus. Very scarce.

Bibliographical references: Dana's 7th (Bibliography): 69.