AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Cooksey, T. 1897. The Nocoleche Meteorite, with catalogue and bibliography of Australian meteorites. *Records of the Australian Museum* 3(3): 51–62. [Published 17 November 1897].

http://dx.doi.org/10.3853/j.0067-1975.3.1897.1130

ISSN 0067-1975 (print), ISSN 2201-4349 (online)

Published by the Australian Museum, Sydney

The NOCOLECHE METEORITE,

With CATALOGUE and BIBLIOGRAPHY of AUSTRALIAN METEORITES.

By T. Cooksey, Ph.D., B.Sc., Mineralogist.

(Plates xii., xiii., xiv.)

The iron, which has been named the "Nocoleche" Meteorite, was presented to the Trustees of this Museum by Mr. George Raffel, in October, 1896, from whom the information was gleaned that it was found lying upon the surface of stony ground at a spot five miles south-west of Nocoleche Station, near Wanaaring, N.S. Wales. The specimen received was the whole of the mass found. Its existence was known twelve or eighteen months previously, but there is no record of any meteorite or meteoric showers having occurred in the district. The total mass weighed 20,040 grams (equal to 44·18lbs. avoirdupois). Its external form is of a pronouncedly rugged character, and the iron is raised into points and ridges, the latter trending mostly in a uniform direction. This character is shown in Pl. xii. At B (Fig. 1) is a projecting rugged nob, connected to the main mass by a neck which is almost penetrated at one point by a deep hole, very probably at one time containing a nodule of troilite. A similar hole, but considerably smaller, is situated in the large cavity at the opposite side. (Pl. xii., Fig. 2). The remains of a black magnetic coating are found in many places, where it is mostly thin, but in protected positions, patches remain which in places have a thickness of 2·5 mm. The external appearance, on arrival, however, was rusty and up to a certain level the colour was fresher than that above, suggesting that the iron was partially buried at the time of its removal. The form of the mass is no doubt partly due to weathering. The length from A to B (Plate xii., Fig 1) is twelve and three-quarter inches, from C to D eleven and a half inches, and greatest thickness, leaving out of account the projecting nob, five and a half inches. The specific gravity was found to vary slightly from place to place. One piece of the iron weighing 5·5824 grams, and visibly free from troilite, had a specific gravity of 7·721 (uncorr.); while another piece weighing 2·2798 grams., had a specific gravity of 7·796 (uncorr.) The specific gravity of a large piece weighing just over seventeen ounces, and containing small nodules of troilite (apparently a fair sample of the whole mass) was taken at the Royal Mint, Sydney, and found to be 7·69.

The meteorite was cut by Prof. H. A. Ward, of Rochester, U.S.A., and the surface shown in Plates xiii. and xiv., etched to

within a quarter of an inch from the edge. The plates are about two-thirds of the natural size and represent the Widmanstätten figures as seen under different aspects of reflected light. The markings consist of bands of beam iron (kamacite), running in three directions, which cross each other approximately at angles of 60°. Under the glass the bands themselves shew usually two, and sometimes three series of finely-etched parallel lines, crossing at varying angles. Troilite is freely distributed throughout, occurring in nodules (Pl. xiii., right-hand top corner), and in the smaller patches and cracks. The latter are numerous, and mostly separate the bands of beam iron from each other. The largest nodule observed was one and a half cmm. long and one cm. wide, and possessed a dark bronze-like metallic lustre. The nodules are lined by a darker substance, usually forming a very thin layer, which is thickened in places and continued into the cracks. The iron immediately surrounding the nodules is somewhat more brilliant than that further removed, but no defined line is generally to be seen separating this brighter iron from the remainder. The etched iron shews in places a very fine irregular mottling, forming occasionally more or less regular lines; but this formation appears to be independent of the crystalline structure. Very small specks and strings of bright particles are very sparingly distributed throughout the iron, and in a relatively larger quantity occur with the troilite. By dissolving 6·2114 grms. of the iron in hydrochloric acid in the cold, a residue containing ·0386 grm. of a black powder and ·0014 grm. of bright metallic particles was left undissolved. The latter under the microscope were seen to consist of a mixture of brilliant grains and needles of a steel grey colour. The mass of the iron is almost entirely a mixture of beam iron (kamacite) and troilite, but taenite and plessite do not appear to be developed. The bright grains and prisms are no doubt a mixture of the phosphides of iron and nickel (schreibersite and rhabdite), and the black powder of carbon and carbide of iron. I hope, however, to have a further opportunity of more closely examining this residue. The small quantity of residue insoluble in boiling acids consists mainly of carbon.

Analysis.—To obtain an average sample for analysis, about twenty grams of small chippings were cut off from portions visibly free from troilite.

I. 3·0702 grams of the above were dissolved in hydrochloric acid, and after separating the residue and precipitating the trace of copper present, the method of analysis was that adopted by Stanislas Meunier.* From the solution acidified with acetic acid, the nickel, cobalt and part of the iron were precipitated by

* Stanislas Meunier, Encyclopédie chimique, ii., 1884, App. 2, Météorites, p. 26 *et seq.*

sulphuretted hydrogen. The remaining portion of iron was then thrown down by making the solution alkaline with ammonia.

II. 3.0086 grams were separately dissolved in a mixture of nitric and hydrochloric acids to estimate the sulphur and phosphorus.

III. 2·5045 grams were dissolved in hydrochloric acid, the residue and copper separated, the filtrate made up to 500 cc., and 50 cc, of this taken to estimate the iron, nickel, and cobalt. The iron was separated from the nickel by precipitation with ammonia.

IV. A small piece of very bright iron, shewing brilliant cleavage surfaces, and weighing ·3733 gram, was analysed for iron. It was obtained from the vicinity of a troilite nodule.

	I.	II.	III.	IV.
Residue	·09	...	·07	...
Copper	·07	...	·03	...
Iron	97·09	...	96·65	97·05
Nickel	2·91	...	3·69	...
Cobalt	·21	...		...
Phosphorus ...	...	·12	...	...
Sulphur	...	·11	...	...
	100·37		100·44	

The iron is active towards acids and sulphate of copper.

Troilite.

The material for analysis was obtained from a nodule, the specific gravities of two pieces of which, weighing ·3746 gram, and 1·3704 grams, were found to be respectively 5·50 and 5·442. On powdering and treating with a concentrated solution of sulphate of copper, a copious precipitate of metallic copper was very quickly formed. To remove all the iron the powder was boiled with a concentrated solution of sulphate of copper for a quarter of an hour.* A black product was finally obtained after washing, which had a specific gravity of 4·66, and was found to be sulphide of copper containing only 6·94 per cent. of iron. An attempt was then made to separate the troilite from impurities by repeatedly washing and separating the lighter and heavier portions. A product was in this manner obtained which curiously had a specific gravity of 4·788, but on analysis was found to contain 20·32 per cent. of sulphur and 73·49 per cent. of iron. The iron must therefore be intimately mixed with the troilite. It was finally ascertained that the iron could be removed by standing for some hours with a solution of either sulphate of copper or

* Stanislas Meunier, Encyclopédie chimique, ii., 1884, App. 2, Météorites, p. 57; W. Crookes, Select Methods in Chemical Analysis, 1886, p. 201.

chloride of mercury in the cold, the sulphide of iron being unacted upon under these circumstances. The latter method of purification was chosen. ·18 gram of iron was extracted from ·52 gram of the original powdered sulphide by allowing the latter to stand for twenty-four hours with a concentrated solution of mercuric chloride in the cold. This is equal to 34·6 per cent.

The purified troilite had a specific gravity of 4·645 (uncorr.), and an analysis of ·2408 gram. gave :—

Residue	trace.
Iron	62·01
Nickel and Cobalt...	·89
Sulphur	38·28
	101·38

From the analysis of the iron it will be noticed that the quantity of nickel present is unusually small. It is not exceptionally so, for several irons have been previously analysed containing about a similar or even smaller quantity.

An examination of the Widmanstätten figures shews the iron to be an octahedrite whose width of lamellæ vary from 1mm. to 2·5mm., the greater number, however, lying between the limits of 1mm. and 2mm. Following Dr. A. Brezina* in his provisional system of classification, it would be placed in Group 47, containing octahedrites with broad lamellæ (symbol Og) and therefore classed with the Cranbourne (Victoria) and Youndegin (W. Australia) meteorites more closely, and with the Cowra (N. S. Wales), Moonbi (N. S. Wales), Temora (N. S. Wales), Mungindi (Queensland), and Thunda (Queensland) meteorites as being with them an iron having an octahedral crystalline structure. The Nocoleche iron, however, agrees much more closely with the Murfreesboro one, both as regards crystalline structure and relative proportions of iron and nickel. The two figures given by Dr. A. Brezina† of the latter would very well represent the structure of the former, there being merely a slight difference in the average width of the lamellæ.

The percentages of iron and nickel in the Murfreesboro iron given by de Troost,‡ are as follows :—

Iron	96·0
Nickel	2·4
Residue	1·6
	100·0

* Ann. K. K. Naturhist. Hofmus. Wien., x., 3 – 4, 1895, p. 85.
† *Ibid*, p. 276.
‡ Silliman's Amer. Journ. Sci. (2), v., p. 351, and *ibid.*, xv., p. 6.

Catalogue of Australian Meteorites.

The following Catalogue represents all the Australian Meteorites discovered up to date, so far as known to me. The name of the meteorite is first given, followed by the more important references bearing on it. These are succeeded by the type, locality, finder and date, and the collection in which the stones, or slices, or both, are to be seen. Every effort has been made to obtain accurate details, but gaps in the information must of necessity occur when objects like these, often passing through several hands before coming under the eye of the describer, are being dealt with.

Ballinoo.—H. A. Ward, Supplementary Catalogue of Meteorites, April 1, 1897.
Type.—Siderite ?
Weight.—92lbs.
Loc.—Ten miles S. of Ballinoo, Murchison River, W. Australia.
Finder and Date.—George Denmack, in 1892.
Coll.—H. A. Ward, Rochester, U.S.A.

Baratta, No. 1.—A. Liversidge, Trans. Roy. Soc. N.S. Wales, 1872, p. 97; *Ibid.*, xiv., for 1880, p. 308; *Ibid.*, xvi., for 1882 (1883), p. 31; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3-4, 1895, p. 252.
Type.—Siderolite, classed with the Black Chondrites.
Weight.—145lbs.
Loc.—Barratta Station, thirty-five miles N.W. of Deniliquin, N.S. Wales.
Finder and Date.—F. Gwyne, of Murgah, 1852.
Coll.—H. C. Russell, F.R.S., Govt. Astronomer, Sydney.

Baratta, No. 2.—A. Liversidge, Proc. Austr. Assoc. Adv. Sci., ii., for 1890 (1891), p. 387; H. C. Russell, Journ. Roy. Soc. N.S. Wales, xxiii., 1889, p. 46.
Type.—Siderolite.
Weight.—31lbs.
Loc.—Near Baratta, No. 1.
Finder and Date.—
Coll.—H. C. Russell, F.R.S., Govt. Astronomer, Sydney.

Baratta, No. 3.—A. Liversidge, Proc. Austr. Assoc. Adv. Sci., ii., for 1890 (1891), p. 387; H. C. Russell, Journ. Roy. Soc. N.S. Wales, xxiii., 1889, p. 46.
Type.—Siderolite.
Weight.—48lbs.
Loc.—Near Baratta, No. 1.
Finder and Date.—
Coll.—H. C. Russell, F.R.S., Govt. Astronomer, Sydney.

BINGARA.—A. Liversidge, Journ. Roy. Soc., xiv., 1880, p. 308; *Ibid.*, xvi., for 1882 (1883), p. 35; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3 – 4, 1895, p. 294.

Type.—Siderite, belonging to the Hexahedrite Group.

Weight.—240·7 grams.

Loc.—Bingara, N.S. Wales.

Finder and Date.—1880.

Coll.—Greater portion in the Mining and Geological Museum, Sydney; slice at the Hofmuseum, Vienna; A. Liversidge, F.R.S., University, Sydney.

COWRA.—G. W. Card, Rec. Geol. Survey N. S. Wales, v., 2, p. 51; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3 – 4, 1895, p. 267.

Type.—Siderite, belonging to the Octahedrite Group.

Weight.—12¼lbs.

Loc.—Summit of Battery Mountain, junction of the Burrowa and Lachlan Rivers, near Cowra, N.S. Wales.

Finder and Date.—Mr. John O'Shaughnessy, before 1888.

Coll.—Mining and Geological Museum, Sydney; small slices at the British Museum (Nat. Hist.), and Hofmuseum, Vienna.

CRANBOURNE (OR BRUCE), No. 1.—W. Von. Haidinger, Sitzungsber. Akad. Wiss. Wien., xliii., 1861, p. 583; *id.*, 1861, xliv., pp. 378 and 465; *id.*, xlv., 1862, p. 63 (*fide* Flight); W. Flight, Phil. Trans., clxxiii., 1882, p. 885; G. Foord, Brough Smyth's Gold Fields and Mineral Districts of Victoria, 1869, p. 424; K. Hauskofer, Journ. Prakt. Chem., cvii., 1869, p. 333; M. Berthelot, Ann. Chim. et Phys., xxx., 1873, p. 419; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3 – 4, 1895, p. 285.

Type.—Siderite, belonging to the Octahedrite Group.

Weight.—3 – 4 tons.

Loc.—Cranbourne, near Western Port, Victoria, Lat. 38° 11′ S., Long. 145° 20′ E.

Finder and Date.—Existence known in 1854.

Coll.—British Museum (Nat. Hist.).

CRANBOURNE, No. 2.—W. von Haidinger, Sitzungsber. Akad. Wiss. Wien., xliv., 1861, pp. 378 and 465; *id.*, xlv., 1862, p. 63; W. Flight, Phil. Trans., clxxiii., 1882, p. 885.

Type.—Siderite.

Weight.—Several hundredweights.

Loc.—Near Cranbourne, 3·6 miles N. of Cranbourne, No. 1, in Lat. 38° 8′ S., Long. 145° 22′ E.

Finder and Date.—Existence known in 1854.

Coll.—Technological Museum, Melbourne.

ELI ELWAH.—A. Liversidge, Proc. Austr. Assoc. Adv. Sci., ii., for 1890 (1891), p. 388.

Type.—Siderolite.

Weight.—33½lbs.

Loc.—Eli Elwah Station, fifteen miles W. of Hay, N.S. Wales.

Finder and Date.—

Coll.—H. C. Russell, F.R.S., Govt. Astronomer, Sydney.

GILGOIN, No. 1.—H. C. Russell, Journ. Roy. Soc. N.S. Wales, xxiii., 1889, p. 47; A. Liversidge, Proc. Austr. Assoc. Adv. Sci., ii., for 1890 (1891), p. 388.

Type.—Siderolite.

Weight.—67lbs. 5ozs.

Loc.—Gilgoin Station, forty miles E.S.E. of Brewarrina, N.S. Wales.

Coll.—H. C. Russell, F.R.S., Govt. Astronomer, Sydney.

GILGOIN, No. 2.—H. C. Russell, Journ. Roy. Soc. N.S. Wales, xxvii., 1893, p. 361.

Type.—Siderolite.

Weight.—74lbs. 5ozs. Most probably part of the same meteorite as Gilgoin, No. 1.

Loc.—Two miles S. of Gilgoin, No. 1.

Coll.—H. C. Russell, F.R.S., Govt. Astronomer, Sydney.

HADDON.—*Illustrated Australian News*, 17th May, 1875, p. 68; W. Flight, Geol. Mag., (2), ix., 1882, p. 107.

Obs.—A meteor was seen on April 14th, at 0·30 a.m., and immediately afterwards an eyewitness thought he saw matter fall near him. Several pieces of melted matter of varying colour were found.

Type.—Aerolite?

Loc.—Haddon, Grenville Co., Vict.

Coll.—

LE GOULD METEORITE.—Le Gould, Geol. Mag., i., 1864, p. 142.

Obs.—An aerolite was found ten inches in diameter, which had struck and broken a tree.

Loc.—Two day's march beyond the Isaacs, the first branch of the Mackenzie River, Queensland.

MOONBI.—J. C. H. Mingaye, Journ. Roy. Soc. N.S. Wales, xxvii., for 1893 (1894), p. 82; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3–4, 1895, p. 268.
Type.—Siderite, belonging to the Octahedrite Group.
Weight.—29lbs.
Loc.—Top of one of the ridges of the Moonbi Range, eighteen miles from Moonbi Township, N.S. Wales.
Finder and Date.—Mr. Langston, in 1892.
Coll.—Technological Museum, Sydney (main mass).

MOORANOPPIN.—H. A. Ward, Supplementary Catalogue of Meteorites for sale, April 1, 1897.
Type.—Siderite?
Weight.—
Loc.—Mooranoppin, West Australia.
Finder and Date.—An Aboriginal in or before 1893.
Coll.—Perth Museum, Perth, West Australia; H. A. Ward, Rochester, U.S.A.

MOUNT STIRLING.—(Under investigation).
Type.—Siderite.
Weight.—200$\frac{1}{8}$lbs.
Loc.—Twenty-five miles S.E. of Mount Stirling, one hundred and thirty miles E. of Perth, West Australia.
Finder and Date.—Existence known in 1892.
Coll.—Australian Museum, Sydney.

MUNGINDI, No. 1.—G. W. Card, Rec. Geol. Surv. N.S. Wales, v., 3, 1897, p. 121.
Type.—Siderite, belonging to the Octahedrite Group.
Weight.—51lbs.
Loc.—In Queensland, three miles N. of Mungindi Post Office, N. S. Wales.
Finder and Date.—Early in 1897.
Coll.—Mining and Geological Museum, Sydney.

MUNGINDI, No. 2.—G. W. Card, Rec. Geol. Surv. N.S. Wales, v., 3, 1897, p. 121.
Type.—Siderite, apparently part of the same meteorite as Mungindi, No. 1.
Weight.—62lbs.
Loc.—Found with Mungindi, No. 1.
Finder and Date.—Early in 1897.
Coll.—Mining and Geological Museum, Sydney.

NARRABURRA.—H. C. Russell, Journ. Roy. Soc. N.S. Wales, xxii., 1890, p. 81.
Type.—Siderite.
Weight.—70lbs. 14ozs.

Loc.—Narraburra Creek,* twelve miles E. of Temora, N.S. Wales, Lat. 34° 10′ S., Long. 147° 43′ E.
Finder and Date.—Mr. O'Brien, 1854.
Coll.—H. C. Russell, F.R.S., Govt. Astronomer, Sydney.

NOCOLECHE.—T. Cooksey, Rec. Austr. Mus., iii., 3, 1897, p. 51.
Type.—Siderite, belonging to the Octahedrite Group.
Weight.—44·18lbs. (20,040 grams.)
Loc.—Five miles S.W. of Nocoleche Station, near Wanaaring, N.S. Wales.
Finder and Date.—Existence known in 1895.
Coll.—Australian Museum, Sydney; H. A. Ward, Rochester, U.S.A.

ROEBOURNE.—
Type.—Siderite.
Weight.—191½lbs.
Loc.—Two hundred miles S.E. of Roebourne, N.W. West Australia.
Finder and Date.—H. Reginald Hester, in 1892.
Coll.—Perth Museum, Perth, West Australia; H. A. Ward, Rochester, U.S.A.

TEMORA.—G. W. Card, Rec. Geol. Surv. N.S. Wales, v., 2, 1897, p. 52; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3–4, 1895, p. 288.
Type.—Siderite, belonging to the Octahedrite Group.
Weight.—
Loc.—Between Cootamundra and Temora, N. S. Wales.
Finder and Date.—Found by some miners about the year 1890.
Coll.—Fragments:—Mining and Geological Museum, Sydney; Hofmuseum, Vienna; H. A. Ward, Rochester, U.S.A.

THUNDA.—A. Liversidge, Journ. Roy. Soc. N.S. Wales, xx., 1886, p. 73; *ibid.*, xxii., 1888, p. 341; A. Liversidge, Proc. Austr. Assoc. Adv. Sci., ii., for 1890 (1891), p. 387; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3–4, 1895, pp. 272, 283.
Type.—Siderite, belonging to the Octahedrite Group.
Weight.—137lbs.
Loc.—Thunda, Windorah, Diamantina District, Queensland.
Coll.—A. Liversidge, F.R.S., University, Sydney (main mass).

* Mr. Russell tells me personally that Yeo Yeo Creek is its proper locality.

YOUNDEGIN, No. 1.—L. Fletcher, Min. Mag., vii., 34, 1887, p. 121; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3-4, 1895, p. 286.

Type.—Siderite, belonging to the Octahedrite Group.

Weight.—Four fragments weighing 25¾lbs., 24lbs., 17½lbs., and 6lbs., and broken pieces 17lbs.

Loc.—Three-quarters of a mile N.W. from Penkarring Rock, about seventy miles E. of York, West Australia, Lat. 31° 30′ S., Long. 117° 30′ E.

Finder and Date.—Alfred Eaton, Jan. 5th, 1884.*

Coll.—Two fragments in British Museum (Nat. Hist.).

YOUNDEGIN, No. 2.—J. R. Gregory, *Nature*, 1892, xlvii., 1204, p. 90; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3-4, 1895, p. 286.

Type.—Siderite, belonging to the Octahedrite Group.

Weight.—382½lbs.

Loc.—Youndegin, West Australia.

Finder and Date.—Louis Knoop, in 1891.

Coll.—J. R. Gregory, London.

YOUNDEGIN, No. 3.—*Nature*, 1893, xlvii., 1220, p. 469; A. Brezina, Ann. K.K. Naturhist. Hofmus. Wien., x., 3-4, 1895, p. 286.

Type.—Siderite, belonging to the Octahedrite Group.

Weight.—2044lbs.

Loc.—Youndegin, West Australia.

Finder and Date.—Louis Knoop, in 1892.

Coll.—J. R. Gregory, London.

A CONTRIBUTION TO A BIBLIOGRAPHY OF AUSTRALIAN METEORITES.

ANONYMOUS.—The Meteor of the 14th April [Haddon Meteorite].—*The Illustrated Australian News*, 17th May, 1875, pp. 68 and 74.

,, [Youndegin Meteorite, No. 3].—*Nature*, 1893, xlvii., 1220, p. 469.

BERTHELOT (M.)—Nouvelles contributions à l'histoire des Carbones, du Graphite et des Météorites.—*Ann. Chimie*, 1873, xxx., p. 424.

,, Nouvelles Contributions à l'histoire du Carbone.—*Compt. Rend.*, 1871, lxxiii., p. 494.

* Catalogue of Exhibits in the Western Australian Court of the Colonial and Indian Exhibition, London, 1886, gives 1883 as the date of discovery.

BREZINA (A.)—Die Meteoritensammlung des K. K. naturhistorischen Hofmuseums am 1 Mai, 1895.—*Ann. K. K. Naturhist. Hofmus. Wien*, 1895, x., 3 – 4, pp. 235, 252, 267, 268, 272, 273, 285, 294, 301, 305, 306, 307, 340, 341, 344, 355.

BUCHNER (O.)—Die Meteoriten, etc., pp. 202 (8vo. Leipsig, 1863). [Cranbourne Meteorite, p. 198].

CARD (G. W.)—On the Occurrence and Classification of some New South Wales Meteorites.—*Rec. Geol. Surv. N.S. Wales*, 1897, v., 2, p. 49.

„ Mineralogical and Petrological Notes, No. 6.—*Rec. Geol. Surv. N.S. Wales*, 1897, v., 2, p. 121.

COOKSEY (T.)—The Nocoleche Meteorite, with Catalogue and Bibliography of Australian Meteorites.—*Rec. Austr. Mus.*, 1897, iii., 3, p. 51.

FLETCHER (L.)—On a Specimen of Meteoric Iron found at Youndegin, West Australia, in 1884.—*Min. Mag.*, 1887, vii., No. 34, p. 121.

„ An Introduction to the Study of Meteorites.—*Brit. Mus. (Nat. Hist.) Guides*, 1886, pp. 45, 67.

FLIGHT (W.)—A Chapter in the History of Meteorites.—*Geol. Mag.*, 1875, (2), ii., pp. 264, 552.

„ Supplement to a Chapter in the History of Meteorites.—*Geol. Mag.*, 1882, (2), ix., pp. 107, 448; *Ibid.*, 1883, (2), x., p. 59.

„ Report of the Examination of the Meteorites of Cranbourne in Australia, of Rowton in Shropshire, and of Middlesborough in Yorkshire.—*Phil. Trans.* for 1882 (1883), clxxiii., p. 885.

FOORD (G.)—Nickeliferous and Meteoric Iron.—*Brough Smyth's Gold Fields and Mineral Districts of Victoria*, 1869, p. 424.

GIBBONS (S.)—Note on the Cranbourne Meteorite.—*Trans. Roy. Soc. Vict.*, 1874, x., p. 130.

GREGORY (J. R.)—A Large Meteorite from West Australia.—*Nature*, 1892, xlvii., 1204, p. 90.

HAIDINGER (W. VON)—Die Dandenong Meteoreisenmasse in Melbourne.—*Sitz. K. Akad. Wiss. Wien*, 1861, xliv., pp. 378, 465; *Ibid.*, 1862, xlv., p. 63.

HAUSKOFER (K.)—Meteorit von Cranbourne, Australien.—*Journ. Prakt. Chem.*, 1869, cvii., p. 330.

„ Meteorite found near Cranbourne, Melbourne, Australia.—*Chem. News*, 1870, xxi., p. 12.

LE GOULD (L.)—Discovery of an Aerolite, and Visit to a Petrified Forest in Northern Queensland.—*Geol. Mag.*, 1864, i., p. 142.

LIVERSIDGE (A.)—The Deniliquin or Baratta Meteorite.—*Trans. Roy. Soc. N.S. Wales* for 1872 (1873), p. 97; *Journ. Roy. Soc. N.S. Wales* for 1882, xvi., p. 31.

„ On the Bingara Meteorite.—*Journ. Roy. Soc. N.S. Wales* for 1882, xvi., p. 35.

„ Metallic Meteorite, Queensland.—*Journ. Roy. Soc. N.S. Wales* for 1886 (1887), xx., p. 73.

„ [The Thunda Meteorite].—*Journ. Roy. Soc. N.S. Wales* for 1888 (1889), xxii., 2, p. 341.

„ Australian Meteorites.—*Proc. Austr. Assoc. Adv. Sci.* for 1890 (1891), ii., p. 387.

„ The Minerals of New South Wales, etc.—(8vo. London, 1888), pp. 207, 218, 221.

MINGAYE (J. C. H.)—Notes and Analyses of a Metallic Meteorite from Moonbi, near Tamworth, N.S. Wales.—*Journ. Roy. Soc. N. S. Wales* for 1893, xxvii., p. 82.

RUSSELL (H. C.)—[Meteorite near Hay (Eli Elwah Meteorite)].—*Journ. Roy. Soc. N.S. Wales* for 1888 (1889), xxii., 2, p. 341.

„ [The Baratta and Gilgoin Meteorites].—*Journ. Roy. Soc. N.S. Wales* for 1889, xxiii., 1, p. 46.

„ [The Narraburra Meteor].—*Journ. Roy. Soc. N.S. Wales* for 1890, xxiv., p. 81.

„ On Meteorite No. 2, from Gilgoin Station.—*Journ. Roy. Soc. N.S. Wales* for 1893, xxvii., p. 361.

„ On a Meteorite from Gilgoin Station.—*Nature*, 1894, xlix., 1266, p. 325.

SELWYN (A. R. C.) AND ULRICH (G. H. F.)—Notes on the Physical Geography, Geology, and Mineralogy of Victoria.—(8vo. Melbourne, 1866). [Cranbourne Meteorite, p. 517].

SMITH (J. LAWRENCE).—On the Composition of the new Meteoric Mineral Daubréelite, and its frequent, if not universal occurrence in Meteoric Iron.—*Silliman's Amer. Journ. Sci.*, 1878, (3) xvi., p. 270; *Min. Mag.*, 1879, ii., 9, p. 152.

ULRICH (G. H. F.)—*Vide* Selwyn (A. R. C.) and Ulrich (G. H. F.)

WARD (H. A.)—Supplementary Catalogue of Meteorites for Sale, April 1, 1897.

WILKINSON (C. S.)—[The Cowra Meteorite].—*Journ. Roy. Soc. N.S. Wales* for 1888 (1889), xxii., 2, p. 341.

I am indebted to Prof. A. Liversidge, F.R.S., Messrs. H. C. Russell, F.R.S., R. T. Baker, G. M. Card, B. H. Woodward, and the Curator of this Museum, for assistance in compiling this Catalogue and Bibliography.

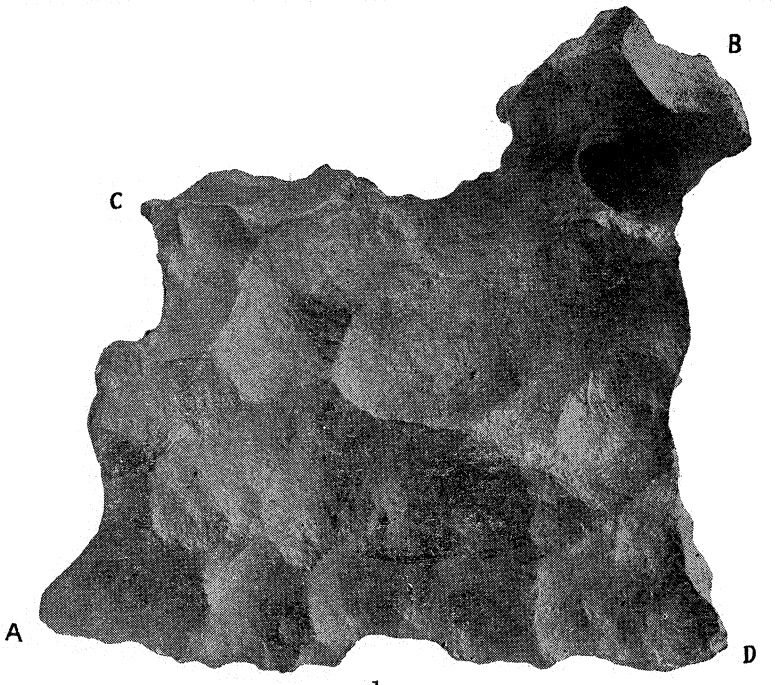
EXPLANATION OF PLATE XII.

Views of the Nocoleche Meteorite before cutting.

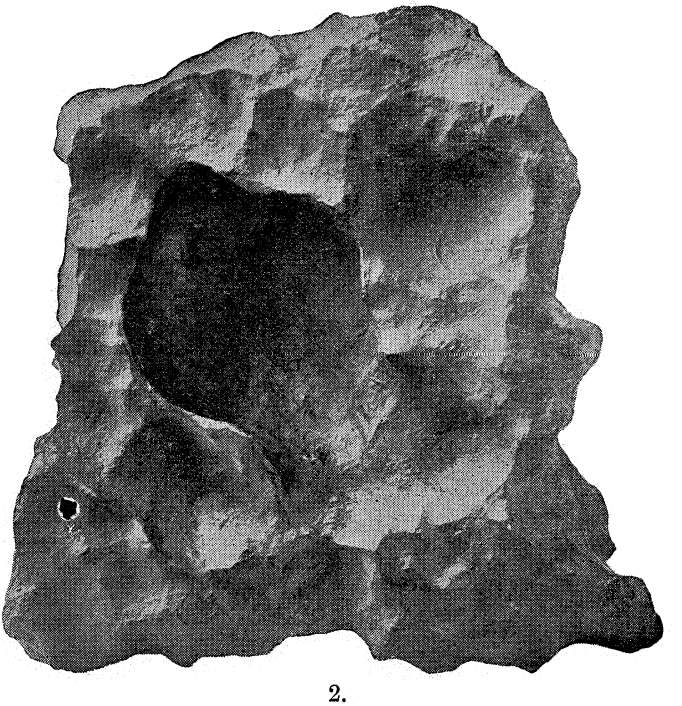
Fig. 1. Side view.

Fig. 2. Under surface.

Reproduced from photographs, about one-third natural size.



1.

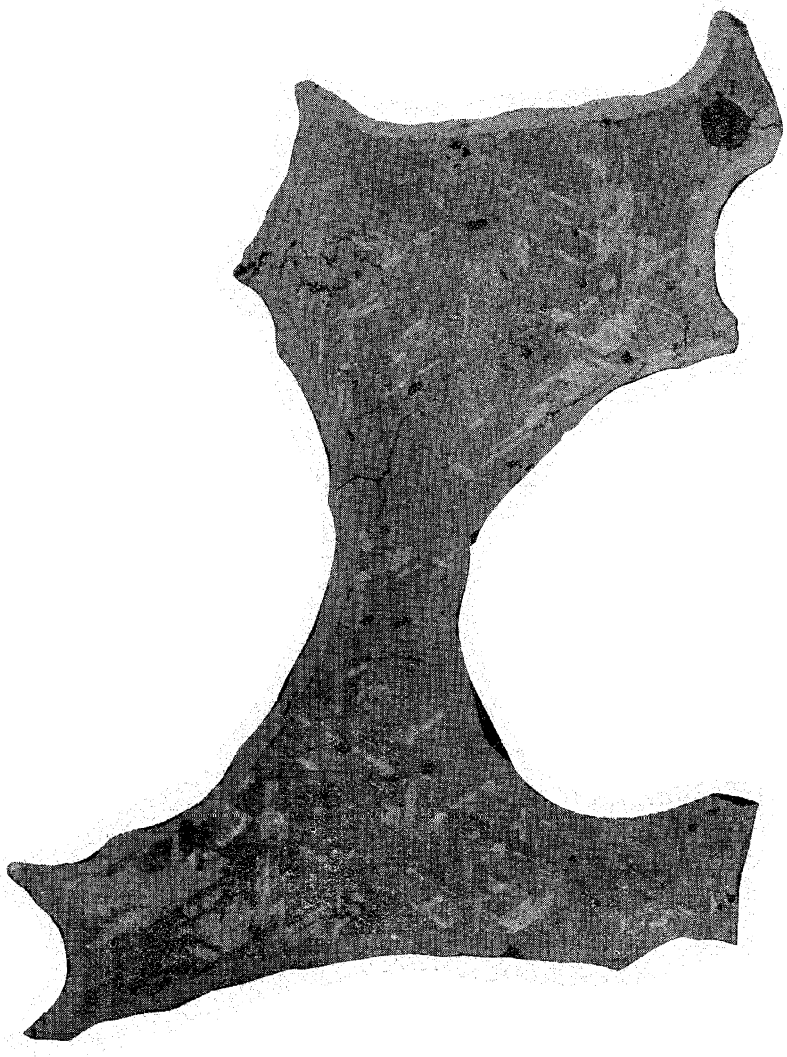


2.

EXPLANATION OF PLATE XIII.

Etched surface of the Nocoleche Meteorite, showing Widmanstätten figures.

Reproduced from photograph, about two-thirds natural size.



EXPLANATION OF PLATE XIV.

Same surface of the Nocoleche Meteorite as Plate XIII., but with different lighting.

Reproduced from photograph, about two-thirds natural size.

ADDENDUM.

SINCE going to press, the following additional information has been received in continuation of "Catalogue of Australian Meteorites," pages 55 – 60 :—

YARDEA.—

Type.—Siderite.

Weight.—7lbs. 3½ozs.

Locality.—Four miles S. of Yardea Station, Gawler Ranges, South Australia.

Finder and Date.—Found in 1875.

Coll.—Public Museum, South Australia.