2nd Supplement

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CATALOGUE OF WESTERN AUSTRALIAN METEORITE COLLECTIONS

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to cover additions to the collections between the preparation of the 1st Supplement, 1968, and June 1972.

Perth, Western Australia
1972

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1. TABLE OF STATISTICS

The collections now comprise 196 meteorites, 92 from Western Australia and 13 from other parts of Australia; together with 91 from overseas countries. In this total are included two meteorites from Western Australia that are not represented in the State collections, but are held in other museum collections.

Western Australian Meteorite Finds and Falls

Type	Finds	Falls	Total
Irons	31(1)	1(2)	32
Stony-Irons	7(3,4)	-	7
Stones	49	4(5)	53
	87	5	92(6)

(1) one iron and stony-iron paired (Dalgaranga), two irons should be paired (Mt Edith I and II): they are still considered separately in statistics

(2) of doubtful validity (Gundaring)

(3) one stony-iron better classified as an iron-rich enstatite achondrite (Mt Egerton)?

(4) two stony-irons should be paired (Bencubbin I and Bencubbin II)?

(5) Woolgorong, Baandee, Millbillillie, Wiluna

(6) other probable pairings are Mt Dooling and Gosnells; Mellenbye and Yalgoo; Mt Stirling, Quairading, Mooranoppin and Youndegin. They are, however, still considered separately in statistics. Mundrabilla, Premier Downs, Loongana Station and Loongana Station West are probably also the product of a single arrival on Earth; though they should be paired, they are considered separately in statistics.

Dowerin and Lake Moore, present in older lists, are discredited.

Western Australian Meteorites (tabulated by classes)

Irons

H	Nil
Og, Ogg	8
Om	17
Of, Off (two possibly ataxites)	5*
D	1*(+2?)
Unclassifiable, anomalous	1

Stony-Irons

P	1
M	3
Enstatite-olivine stony-iron	1
Iron-rich enstatite achondrite	1
Anomalous stony-iron	1

* Ballinoo, Mt Magnet

Stones

Chondrites[1]

Enstatite chondrites		2
Amphoterites		3
Hypersthene chondrites		22
Bronzite chondrites		22
Carbonaceous chondrites	Type III	1
	Type II	Nil
	Type I	Nil

Achondrites

Aubrites (enstatite achondrite)	Nil
Ureilites (olivine-pigeonite achondrite)	2

[1] In the text olivine compositions for chondrites are, except where otherwise stated, determined for classification purposes by B. Mason at the Smithsonian Institution by the method of H.S. Yoder & T.G. Sahama (1957) Am. Miner. 42: 475-491.

The classification of W. van Schmus & J.A. Wood used for chondrites is given in (1967) Geochim. cosmochim. Acta 31: 747-765.

Howardites (hypersthene-plagioclase achondrite)	Nil
Eucrites (pigeonite-plagioclase achondrite)	1
Diogenites (hypersthene achondrite)	Nil
Nakhlite (diopside-olivine achondrite)	Nil
Angrite (augite achondrite)	Nil
Chassignite (olivine achondrite)	Nil

In addition there are enclaves of eucrite, diogenite and olivine achondrite (chassignite?) in the Mt Padbury mesosiderite and enclaves of anomalous enstatite, hypersthene and amphoterite chondrites in Bencubbin I and II.

Western Australian Craters

Two craters are known

Dalgaranga
Wolf Creek

2. (a) WESTERN AUSTRALIAN METEORITES

Additional information, corrections, additional references concerning meteorites previously listed.

47 AVOCA

This collection, WAM no. 12793, main mass; exhibition slice covered with plastic, 2000g. Other slices, 477.2, 158.6 and 158.2g. Fragment 217.2g.

Other collections, W.A. School of Mines, Kalgoorlie, no. 10074, heat affected off-cut (welding torch), 55.7g; no. 10293, cut piece, 1054g.

Specific gravity, 7.89; Ni 8.65%; Co 0.52%.

Reference: McCall, G.J.H. (1968) Mineralog. Mag. 36: 859-861.

3,4 BENCUBBIN I and II

Additional reference, McCall, G.J.H. (1968) Mineralog. Mag. 36: 726-739 (including analyses by E. Jaresowich).

A further enclave in Bencubbin II has been examined and found to be a chondrite, showing poorly defined chondrules and no evidence of recrystallization (microscopic observation, G.J.H. McCall) and to be of LL type (amphoterite), olivine, Fa_{33} (microprobe examination, S.J.B. Reed).

5 BILLYGOAT DONGA

Additional finds made by W.H. Cleverly and party, 1970 and 1971, within Mulga North strewn field:

WAM no. 12277c originally 392.4g, now 358.2g, single incomplete stony mass (1970); WAM no. 12277d originally 98.4g, now 92.2g, single fragment (1971).

51 DINGO PUP DONGA

Additional references, McCall, G.J.H. & Cleverly, W.H. (1968) Mineralog. Mag. 36: 691-716; Vdovykin, G.P. (1970) Space Sci. Rev. 10: 483-510.

This latter reference reports the presence of diamond; this ureilite is classified in the Novo Urei subtype.

13 HAIG

Additional reference, Cleverly, W.H. (1968) J. Proc. R. Soc. West. Aust. 51: 76-88, reports the find of a further fragment, interlocking with the main mass, and more closely defines the site.

14 MT EGERTON

Additional reference, Cleverly, W.H. (1968) J. Proc. R. Soc. West Aust. 51: 76-88, details of a further large recovery of fragments from the site of find, which was relocated.

15 MT PADBURY

Additional reference, McCall, G.J.H. (1966) Mineralog. Mag. 35: 1029-1060 (with analyses by H.B. Wiik and A.A. Moss).

54 MULGA NORTH

The total known recovery is now 781 complete fusion crust covered stones and parts of stones showing incomplete fusion crust coating. Weights range from 2095 to 0.2g, and the total weight of 19.4kg is represented in two Museum Collections as under:-

Western Australian Museum

768 masses approx. 19.1 kg

Smithsonian Institution,
Washington D.C.

13 masses approx. 0.3 kg

55 MULGA SOUTH

The total known recovery is now 24 fragments of stone, total weight 894g.

Additional finds were made by W.H. Cleverly and party as under:-

WAM no. 13201

1970: 3 fragments totalling 205.4g (now 201g)
1971: 13 fragments totalling 390.8g (now 388g)

All but a 52.6g mass (1963 recovery) and a 28.4g mass (1964 recovery) (both held in the W.A. School of Mines Collection, nos 9584.2 and 9740) of the 24 fragments are held in the Western Australian Museum Collections.

56 MUNDRABILLA

Additional references, Ramdohr, P. & El Goresy, A. (1971) Meteoritics 6: 302-303 reporting unmixing products in the troilite nodules (unusually abundant) as follows: "daubréelite, alabandite, sphalerite, rutile and chromite. Similarities are seen in the unique Soroti meteorite. Graphite is present in the iron and shows unusual crystal forms. Niobian rutile (2.93% NbO_2), iron-rich sphalerite (38% Zn and 28% Fe), zincian daubréelite, and ferroan alabandite (4% Fe, 0.45% Zn) are described. The high niobium content of the rutile establishes the lithophile behaviour of this element in meteorites".

G.J.H. McCall (1972), pp. 203-213 in Yearbook of Astronomy 1973, London: Sidgwick and Jackson; a general account of the history of the search and find, and the field occurrence and characteristics of the masses.

31 NORTH HAIG

Additional references, McCall, G.J.H. & Cleverly, W.H. (1968) Mineralog. Mag. 36: 691-716; Vdovykin, G.P. (1970) Space Sci. Rev. 10: 483-510. The latter reference reports the discovery of diamond and hexagonal diamond polymorph lonsdaleite: this ureilite is classified in the Goalpara subtype. It is now clear that North Haig and Dingo Pup Donga, despite the extraordinary coincidence of their recovery within 35km of each other within four years, are unlikely to represent fragments from a single arrival on Earth.

34 QUAIRADING

A recent inventory of the collections of the W.A. School of Mines at Kalgoorlie by W.H. Cleverly included an entry "SMK 9002, 35g of iron shale collected prior to removal of the Quairading mass to the Western Australian Museum". This is interesting as it provides evidence confirming the opinion of McCall & de Laeter (1965, Spec. Publs West. Aust. Mus. no. 3: 49) that the report of a fall near the site of the Quairading recovery did not in all probability have any connection with this mass. Iron shale would take decades, if not centuries to form from an iron meteorite mass in this arid climate and under these sandy soil conditions.

44 YARRI

Additional reference, Cleverly, W.H. & Thomas, R.P. (1969) J. Proc. R. Soc. West. Aust. 52: 89-94.

2. (b) WESTERN AUSTRALIAN METEORITES

New Falls and Finds

62 BAANDEE — Olivine bronzite chondrite (Cbr)

A small, very fresh, stone was picked up by Mr R. Spillman, of Baandee, adjacent to Hunters Dam on Land Unit 13929, 4.25 miles E.S.E. of Baandee Railway Station. The site of the find is 32°37'S, 118°02'E. Mr Spillman was ploughing and saw what appeared to be a very large piece of sheep dung on the surface. The date of find was sometime before the end of 1967. The find is coupled with a report by Mrs Barbetti, a neighbour, of a fall accompanied by an explosion nearby in 1961 or 1962 on the next land unit to the W.N.W., 11404.

The meteorite is a flattened, oriented cone.

Single mass weighing 256.6g. WAM no. 13225, now two pieces 188.5g and 42.3g. Cast of original mass WAM no. 12896.

The specific gravity is 3.33.

63 COCKARROW CREEK — Olivine hypersthene chondrite (Chy)

Find 1970, by H.J.W. Barnes, on a small hillock, a quarter of a mile across, situated approximately 8 miles south-west of Wiluna, south of the road and close to Milly Milly Creek, 26°40'S, 120°10'E. The mass consists of two pieces interlocking, coated with a brown fusion crust; the interior surfaces are light grey with coarse metal flecks, surrounded by haloes of ferruginization. There is no suggestion of orientation.

Weight 429.2g, WAM no. 13128, main mass, 221 and 208g. Also thin section.

Specific gravity, 3.38, 3.41; olivine, Fa_{23}; Class 5 of van Schmus & Wood (1967).

64 COORARA — Olivine bronzite chondrite (Cbr)

Find, 1966, by A.J. Carlisle, 4 miles north of the site of the Dingo Pup Donga ureilite find (see McCall, 1st Supplement to this catalogue, 1968 and McCall & Cleverly (1968) Mineralog. Mag. 36: 691-716) 30°27'S, 126°06'E.

A single, small, broken, partly fusion crust coated stone, and some small chips.

Weight, total 122.7g; main mass 92.4g, WAM no. 13013, main mass now 53.2g; no. 12941, slice, 2.1g; no. 12023, chips, 7g. Also thin sections. W.A. School of Mines, Kalgoorlie, no. 10150, chips, 11.5g.

Specific gravity, 3.27; olivine, Fa_{25}; Class 5 of van Schmus & Wood (1967).

This meteorite contains: in veins formed either in the parent body, or by shock in orbital collision of meteoroids or by shock on atmospheric entry, the high pressure polymorph of olivine ringwoodite and the garnet-structured high pressure polymorph of pyroxene, majorite.

References: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80; Smith, J.S. & Mason, B. (1970) Science N.Y. 168: 832-833.

65 CREDO — Olivine hypersthene chondrite (Chy) recrystallized

Find, 1967, by P.J. Howell, 8.9 miles on a bearing of 325° from Credo Station Homestead: 30°22'S, 120°44'E.

A single cushion shaped, faceted stone, covered almost entirely with a pale purplish fusion crust.

Weight 10.82 kg; WAM no. 12936, cast of main mass and a slice, 181.7g, also a thin section; W.A. School of Mines, Kalgoorlie, no. 10280, main mass, now 10.3 kg.

Specific gravity, 3.41; olivine, Fa_{24}; Class 5 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1969) Mineralog. Mag. 37: 281-285.

66 DONNYBROOK — Stony-iron, mesosiderite(?)

Find by person unknown in 1918 (and put in the University of Western Australia collections as magnetite) at Thompson Brook, near Donnybrook, approx. 33°37'S, 115°55'E.

Consists of large crystals of clino-hypersthene and fragments of pyroxene-plagioclase-olivine-troilite rock surrounded by large ovoid kamacite crystals with taenite cores.

Two pieces (i) 337.7g and (ii) 76.6g; WAM not represented; University of Western Australia no. 4011, both main masses.

Specific gravity (i) 5.50, (ii) 7.51.

67 DOOLGUNNA — Olivine hypersthene chondrite (Chy)

Find, 1967, by W.N. Macleod of the Geological Survey of Western Australia, in a claypan near the southern boundary of Doolgunna Station, 75 miles north-east of Meekatharra, 25°56'S, 119°18'E. A single fragment of chondritic stone.

Weight 20g; WAM not represented; main mass in collection of Geological Survey of W.A.

Specific gravity, 3.37.

Reference: Macleod, W.N. (1967) Ann. Rep. geol. Surv. West. Aust. 68-69.

68 EDJUDINA — Olivine bronzite chondrite (Cbr) spherical

Find, 1969, by I.R. Williams of the Geological Survey of Western Australia, 33 chains south of One Tree Well, about 150 feet west of the north-south fence line, Edjudina Station, 29°35'11"S, 122° 10'54"E.

A single fusion crust coated mass, not oriented.

Weight 4.48 kg; WAM no. 13196, a small chip 9.96g; Geological Survey of Western Australia, no. 20942, main mass.

Specific gravity, 3.85; contains 21% of metal by weight; olivine, Fa_{19} (by method of Yoder & Sahama, 1957). B. Mason, pers. comm., reports some variability in the diffractometric results for olivine, suggesting a degree of unequilibration; Class 4 of van Schmus & Wood (1967).

Reference: Lewis, J.D., Ann Rep. geol. Surv. West. Aust. 1971 (in the press).

69 FENBARK — Olivine bronzite chondrite (Cbr)

Find, 1968, by A.A. Skinner, F.C. Bray and K.J. Erbe, one quarter mile on a bearing of 8° from Mt Ellis trig. point, close to the Fenbark group of Gold Mines, 30°26'25"S, 121°15'25"E.

A single weathered stone, shaped like a tennis ball and covered by oxidized fusion crust, also some fragments, no orientation characteristics.

Weight 1861.7g; main mass 1368g; WAM no. 12974, two small slices, 25.6 and 13.0g; no. 13016, 15 fragments, totalling 143.3g; also W.A. School of Mines, Kalgoorlie, no. 10305, main mass reassembled, 1368g; slice 14.5g; the finders retained masses as follows: A.A. Skinner, 115.6g, F.C. Bray, 120.1g, K.J. Erbe, 60.6g.

Specific gravity, 3.54; olivine, Fa_{18}; Class 5 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1969) Mineralog. Mag. 37: 281-285.

70 GOSNELLS — Iron, coarse octahedrite (Og), brecciated and granular textured

Find, 1965, by R. Dodd, close to the Blue Metal quarry in the Darling Scarp, about 3 miles east of Gosnells township. 32° 05'S, 116°01'E.

A single mass in the form of an irregular flange, detached apparently from a larger mass; the primary surface displays shallow, ill-defined regmaglypts; the broken off surface displays a reticulate ribbing, due to the crystallographic structure of the metal alloy; the polished and etched cut surface reveals troilite aggregated in cracks, and flexural deformation of Neumann bands; there are patches of secondary microgranulation.

Weight 1.500 kg; WAM no. 13193, three small pieces, 8.6, 4.9 and 4.6g; main mass held in the private collection of F. Soklich of Orange Grove, near Gosnells.

Specific gravity, 7.6; Ni, 6.0% ($\pm$ 0.04); Co, 0.45% ($\pm$ 0.01); Ga, 49 ($\pm$ 10) ppm; Ge, 252 ($\pm$ 10) ppm.

This meteorite shows marked similarities of structure and geochemistry to Mt Dooling (McCall & de Laeter, 1965, Spec. Publs West. Aust. Mus. no. 3: 40) and a cast of the mass has been found to interlock with the Mt Dooling mass held in the Western Australian Museum. Mt Dooling is 400 km away to the north-east, and it seems doubtful if paired falls could be so much separated by distance; also what is doubtful is that two fragments separated during atmospheric entry, high in the atmosphere, could interlock; it must be concluded that one or the other fragment has undergone human transport; the smaller Gosnells mass is the more likely candidate; transport by Aborigines seems most likely to be the answer to this anomaly.

71 GUNNADORAH — Olivine bronzite chondrite (Cbr)

Find, 1968, by M.K. Quartermaine, 168 metres on a bearing of 8° from the 837 mile post on the Trans-Australian Railway, Nullarbor Plain; 31°00'S, 125°56'E.

A single small weathered fragment.

Weight 19.7g; WAM no. 13019, chip 4.5g, and thin section; also W.A. School of Mines, Kalgoorlie no. 10307, remnant of the main mass, 7.6g.

Specific gravity, not determined due to weathered state; olivine, Fa_{18}; Class 4 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

72 JEEDAMYA — Olivine bronzite chondrite (Cbr), recrystallized

Find, 1971, by R. Blizzard, Jeedamya Station, Menzies district, in a shallow depression in the soil 1cm deep, 29°35' S, 121°10'E.

A single oriented mass, with a conical shape, suggestive of a command module space capsule; fusion crust black and broken interior surfaces white, flecked with metal.

Weight, 914g; WAM no. 13191, main mass.

Specific gravity, 3.53; olivine, Fa_{19}; Class 6 of van Schmus & Wood (1967).

73 LAUNDRY EAST — Olivine bronzite chondrite (Cbr), spherical

Find, 1967, by A.J. Carlisle, 7 miles east of Laundry Rockhole, which is 25 miles north of Madura, on the Eyre Highway to Loongana Station road, 31°31' S, 127°08'E.

A single complete meteorite covered with oxidized fusion crust.

Weight, 43.1g; WAM no. 12937, chip, 2.7g and thin section; also W.A. School of Mines, Kalgoorlie, no. 10242, main mass, now 33.3g.

Specific gravity, 3.30; olivine, Fa_{19}; Class 4 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

74 LAUNDRY ROCKHOLE — Olivine bronzite chondrite (Cbr), recrystallized

Find, 1967, by M.K. Quartermaine, at the corner of the enclosure fence surrounding the rockhole (see entry no. 73) 31°32'S, 127°01'E.

Thirty two fragments; main mass of half-brick form, weathered and covered with oxidized brown fusion crust; no orientation characteristics evident.

Total weight, 1.44 kg; WAM no. 12939, two small chips, 8.2 and 3.5g, and thin section; no. 13015, 25 fragments totalling 259.6g; also W.A. School of Mines, Kalgoorlie, no. 10243, main mass assembled, 1149g.

Specific gravity, 3.44; olivine, Fa_{19}; Class 5 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

75 LAUNDRY WEST — Olivine hypersthene chondrite (Chy), recrystallized

Find, 1967, by M. and A.J. Carlisle, 6 miles N.W. of Laundry Rockhole (see entry no. 73), 31°28'S, 126°56'E.

Five angular fragments with weathered, brown fusion crust.

Weight, 201.9g; WAM no. 12938, slice 20.3g and thin section, no. 13011, fragment, 120.4g; also W.A. School of Mines, Kalgoorlie, no. 10241, fragment 53.6g.

Specific gravity, 3.40; olivine, Fa_{25}; Class 5 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

76 LOONGANA STATION WEST — Iron, medium octahedrite (Om), granular

Find, 1967, by W.H. Butler, site description not given, but coordinates given, 30°57'S, 126°56'E, place it about 4 miles west of Loongana, just north of the Trans-Australian Railway, on the Nullarbor Plain.

A single mass, WAM no. 12897, 66.5g, probably a small shed iron belonging to the Mundrabilla (see no. 56) group, which also includes Premier Downs (no. 33) and Loongana Station (no. 19). The site of recovery is 40 km from the site of find of the two large Mundrabilla masses, and provides the maximum dispersion known of these small shed irons from the focus of the fall; it is suggested that there was a trail of small irons extending out towards the west from the focus, and that this is in accord with the position of the largest mass (11 tons) at rest on the surface of the Nullarbor Limestone, which position suggested oblique descent from the west.

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

77 MILLBILLILLIE — Achondrite, eucrite (Eu)

Fall, October 1960, exact date not known, at about 1 p.m. local time (0500 GMT). Recovered 1970, 26°27'S, 120°22'E; the fall and fireball effects were observed by station workers F. Vincenti and F. Quadrio while opening a gate in the boundary fence on the Millbillillie-Jundee track. An object with sparks coming off was seen to fall on the spinifex plain to their north; no search was initiated, but two stones were later found there by D. Vincenti and M. Finch in 1970 and 1971; Aborigines have since made additional recoveries.

Total weight, 26 kg known, more probably recovered, largest mass, 20 kg; WAM no. 13198; main mass 20 kg, a faceted rounded stone displaying small regmaglypts in a black, shiny fusion crust; broken interior surfaces show grey; thin section shows patchy granulation of the ophitic texture, a form of recrystallization also evident in eucrite enclaves of the Mt Padbury meteorite (no. 53); the cut face also displays a lamination, faintly evident, due to coarse and fine crystallization in planes (pers. comm., R.A. Binns).

WAM no. 13199, smaller fusion crust coated mass, 565g; also a 4.8 kg mass is held in a private collection at Wiluna.

Specific gravity, 2.86 (low value due to spongy, porous texture).

Reference: Binns, R.A., report in preparation.

78 MULGA WEST — Chondrite, carbonaceous Type III ("C4")

Find, by M.K. Quartermaine, T.G. Bateman and W.H. Cleverly, 12th December 1971, 4 km north of Billygoat Donga (see McCall, G.J.H. & de Laeter, J.R., 1965, Spec. Publs West. Aust. Mus. no. 3: 26, entry no. 5) approx. 30°11'S, 126°22'E. This stone, found at the west end of the Mulga North ellipse from which 781 fresh stones have been recovered, is more weathered and grey in colour than Mulga North (no. 54), it is much finer textured than Billygoat Donga (no. 5) and quite unlike Mulga South (no. 55) in colour and weathering. It appears to be the fourth discovery in a quadruple chondrite find overlap. A single faceted mass, wedge shaped with rectangular corners, fusion

crust coated entirely, no regmaglypts or orientation characteristics. Outer skin 0.5cm thick, fawn, interior quite fresh, medium grey, flecked with very fine specks of magnetite and pyrrhotite and dotted with small pink chondrules.

Weight, 169.2g; WAM no. 13205, thin section only; W.A. School of Mines, Kalgoorlie, main mass.

Specific gravity, 3.18; olivine, Fa_{32}; Ca-poor clinopyroxene, Fs_{27}; plagioclase ~ An_{50}; Class C4 of van Schmus & Wood (1967).

79 NALLAH — Olivine bronzite chondrite (Cbr)(?)

Find, 1968, by A.J. Carlisle, half a mile S.E. of Nallah Nallah Rockhole (see McCall, G.J.H. & Cleverly, W.H. (1968) Mineralog. Mag. 36: 708 for location), 31°58'S, 126° 15'E.

A single, fusion-crust coated stone, resembling in shape a flanged australite button.

Weight, 4.617g; not represented in the Western Australian Museum collection; W.A. School of Mines, Kalgoorlie, no. 10391, main mass, now 4.6g.

Specific gravity, 2.89; olivine δ (max) = 1.706; orthopyroxene, α = 1.670 (Mason, B., pers. comm., 1968).

References: McCall, G.J.H. & Cleverly, W.H. (1969) Mineralog. Mag. 37: 286-287; (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

80 NORTH EAST REID — Olivine hypersthene chondrite (Chy) (or olivine bronzite chondrite (Cbr))*

Find, 1969, by D.A. Carlisle, 3 miles N.E. of the site of the initial Reid find (for location see entry no. 87), on the Nullarbor Plain, 30°09'S, 128°43'E.

Two small ferruginized stones.

Total weight, 38.6g; WAM no. 13110, thin section only; W.A. School of Mines, Kalgoorlie, no. 10554, two masses, 31.1 and 7.5g; the former is now 24.7g.

Specific gravity, not measured due to weathered state; olivine Fa_{24}*; Class 4 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

81 NORTH FORREST — Olivine hypersthene chondrite (Chy), spherical (or olivine bronzite chondrite (Cbr))**

Find, 1969, by A.J. Carlisle, 25 miles north of Forrest Station, on the Trans-Australian Railway line, 30°30'S, 128° 06'E.

A single, highly weathered mass, consisting of three interlocking pieces.

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* Mason, pers. comm., reports microprobe determinations of $Fa_{18.6}$.

** Mason, pers. comm., reports microprobe determinations of $Fa_{19.2}$.

Total weight, 608.9g; WAM no. 13107, fragment, 368.5g and thin section; W.A. School of Mines, Kalgoorlie, no. 10538, fragment, 197g.

Specific gravity, 3.29; olivine, Fa_{24}**; Class 4 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

82 NORTH REID — Olivine hypersthene chondrite (Chy), variety amphoterite, recrystallized

Find, 1969, by D.A. Carlisle, three separate masses:-

(i) 5 miles N.W. of the site of the initial Reid find

(ii) 7 miles S.S.W. of the site of the initial Reid find

(iii) 6 miles S.W. of the site of the initial Reid find

(see entry no. 87)

Three fusion crust coated stones with distinctly oriented form.

Total weight, 308.7g (108.3, 43.9, 156.5g); WAM no. 13109, thin section only; W.A. School of Mines, Kalgoorlie, nos 10547, 10553, 10555, the three main masses, now 100.3, 34.9 and 146.4g.

** Mason, pers. comm., reports microprobe determinations of $Fa_{19.2}$.

Specific gravity, mass I, 3.49; olivine, Fa_{28}; Class 5 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

83 NORTH WEST FORREST (1971) Enstatite chondrite (Cen), recrystallized

Find, 1971, by Mr Diaz, 25 miles north west of Forrest Station on the Trans-Australian Railway line, 30°36'S, 127° 49'E (approx.). Some hundreds of weathered fragments of meteoritic stone forming a blunt ellipse 10 metres long, with larger fragments concentrated at the south-west end, this ellipse is a product of slow terrestrial decomposition, break-up and drift.

Total weight, 4.4 kg; WAM no. 13194 consisting of 300 - 400 fragments. Also thin section.

84 NORTH WEST FORREST (1969) Spherical olivine bronzite chondrite

Find, by Mr P. Ryan, not later than 1969, approx. 14 km N.W. of Forrest, approx. 30°46'S, 128°01'E.

A single mass, broken in two; wedge shaped, faceted, with sharp rectangular corners; no regmaglypts or orientation characteristics. Shows intense ferruginization of fusion crust and interior. Contains clear or turbid glass, and areas of transparent microcrystalline or opaque matrix.

Weight, 238.4g; WAM no. 13206, thin section only; W.A. School of Mines, Kalgoorlie, nos 10565 and 10631, main mass, two interlocking pieces.

Specific gravity not measured, due to excessive weathering; olivine Fa18.8; Class 3-4* of van Schmus & Wood (1967).

85 OAK — Olivine hypersthene chondrite (Chy), recrystallized

Find, 1968, by D.A. Carlisle, 20 miles N.W. of Mundrabilla Station Homestead on the Nullarbor Plain, 31°35'S, 127° 42'E.

A single, faceted, slightly weathered mass, coated with a brown, oxidized fusion crust; marked orientation characteristics are evident.

Weight, 75.3g; WAM no. 13111, thin section only; W.A. School of Mines, Kalgoorlie, no. 10390, main mass, now 70.9g.

Specific gravity, 3.31; olivine, Fa_{25}; Class 5 of van Schmus & Wood (1967).

This stone shows in microscope section a coarse/fine patchiness of texture calling to mind the light/dark patchiness commonly attributed to shock (Fredriksson, K. & Keil, K. (1963) Geochim. cosmochim. Acta 27: 717-739); it contains abundant plagioclase.

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

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* Variation on olivine composition conforms exactly to the boundary between Class 3 and 4. S.J.B. Reed.

86 REDFIELDS Anomalous phosphide-rich iron, brecciated

Find, exact date unknown, recognized as a meteorite by G.J.H. McCall and J.R. de Laeter, 1969, when sent into Western Australian Museum by Mrs M.N. Bennett of Wongan Hills. It was found at Redfields Farm, which is situated 7 miles east of Gabalong; at the site of find there is a shallow depression in the ground, 30° 43'S, 116°30'E.

A single, faceted and wedge-shaped iron mass, displaying shallow regmaglypts.

Weight, 8.74 kg; WAM no. 13141, main mass; display section, 500g; also etched sections, 350g and 147g; W.A. Institute of Technology, Bentley, cut section 83g; Department of Geochemistry at the Australian National University, Canberra, cut section, 120g (since further subdivided).

Specific gravity, 7.8; Ni, 6.46% (± 0.06); Co, 0.48% (± 0.01); Ga, 41 ppm (± 1) (MSID); Ge, 98 ppm (± 7); Zn, 0.94 ppm (± 0.04) (MSID) (de Laeter, J.R. & Reed, S.J.B.); Ga/Ge group II of J.T. Wasson (anomalous variety). On etching the polished face, a fine kamacite granule reticulation is evident, this reticulation becoming irregular close to specks of graphite (not cliftonite) scattered evenly through the metal; cracks infilled with schreibersite and minor troilite traverse the mass, indicating brecciation.

Reference: de Laeter, J.R., McCall, G.J.H. & Reed, S.J.B. Mineralog. Mag., The Redfields meteorite --- a unique iron from Western Australia (in the press).

87 REID

Olivine hypersthene chondrite (Chy), spherical, unequilibrated

Find, 1969, two masses:-

(i) by D.A. Carlisle, 48 miles N.N.E. of Reid Station on the Trans-Australian Railway

(ii) by D.A. and A.J. Carlisle, 10 miles S.W. of the site of the initial find.

30°11'S, 128°41'E (initial find, Reid I).

Four weathered and fractured stones with chondrules visible on a ferruginized surface. This appears to be a primary surface, and the metal deficient nature of the meteorite may account for the lack of a distinct fusion crust.

Total weight, 144.1g; WAM no. 13108, thin section only. W.A. School of Mines, Kalgoorlie, main masses, no. 10544, Reid I, 82.5g; no. 10552, Reid II, 25.5, 28.0 and 0.5g.

Specific gravity, 3.14; olivine, variable; Class 4 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

88 ULARRING — Olivine hypersthene chondrite (Chy), recrystallized

Find, 1970, by W.R. Moriarty, 300 m north of the Golden Wonder Gold Mine, which is 6 miles south of the former township of Ularring, 29°58'S, 120° 36'E.

A single delta shaped plano-convex stone, of "flattened" form, showing spectacular orientation characteristics; conspicuous regmaglypts are developed near to the sharp corner separating the smooth, concave anterior surface in ablation flight from the flat, rough rearward facing surface.

Weight, 271.8g; WAM no. 13220, thin section only; W.A. School of Mines, Kalgoorlie, no. 10575, main mass, in two interlocking parts.

Specific gravity, 3.32; olivine, Fa_{23}; Class 6 of van Schmus & Wood (1967).

89 WEBB — Olivine hypersthene chondrite (Chy), recrystallized

Find, 1968, by E.J. Hockley, twelve miles N.N.W. of Mundrabilla Homestead, on the Nullarbor Plain, 31°45'S, 127° 47'E.

A single fusion-crust coated, oxidized mass.

Weight, 410.5g; WAM no. 12983, two small slices, 12.0 and 3.3g; W.A. School of Mines, Kalgoorlie, no. 10317, main mass now 376g.

Specific gravity, 3.38; olivine, Fa_{23}; Class 6 of van Schmus & Wood (1967).

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

90 WEST FORREST — Olivine bronzite chondrite (Cbr), recrystallized

Find, 1971, by J. Clohessy, about 10 miles N.W. of Forrest Station on the Trans-Australian Railway, approx. 30° 40'S, 127°50'E.

A single, fusion coated, faceted, oxidized stone.

Weight; 170.6g; WAM no. 13195, thin section and cast only; W.A. School of Mines, Kalgoorlie, casts and main mass (which has not, as yet, been secured for the collections, and may have to be returned to the finder).

Specific gravity, 3.47; olivine, Fa_{19}; Class 5(?) of van Schmus & Wood (1967).

91 WEST REID — Olivine bronzite chondrite (Cbr), extremely recrystallized

Find, 1969, by N.R. Carlisle, 2 miles west of the site of the original Reid find (see Reid I, entry no. 87), 30° 11'S, 128°40'E. A single fusion-crust coated stone, slightly oxidized, oriented.

Weight, 627.7g; WAM no. 12983, two small slices, 6.5 and 2.15g, and thin section; W.A. School of Mines, Kalgoorlie, main mass, now 588g.

Specific gravity, 3.38; olivine, Fa_{21} (orthopyroxene, Fs_{19}); Class 6 of van Schmus & Wood (1967), chondrules barely discernible; the olivine composition is unusual, being transitional between Cbr and Chy classes.

Reference: McCall, G.J.H. & Cleverly, W.H. (1970) J. Proc. R. Soc. West. Aust. 53: 69-80.

92 WILDARA — Olivine bronzite chondrite (Cbr), recrystallized

Find, 1968, by J.R. Money and R.J. and I. Hill, in a sandy creek bed near Wildara Station Homestead, 28°14'S, 120° 51'E. The material formed small heaps of fragments taken from three shallow excavations in the river bed, when first seen by W.H. Cleverly. The excavations were each one metre apart and aligned along the stream bed. Before excavation a large continuous hump and a smaller one nearby were noticed by the finders, both proving to consist of meteoritic material. The mass seems to have disintegrated by the agency of terrestrial denudation, and then been further broken up during human excavation. The humps were probably aggregates of fragments rather than single masses. A train of small fragments from which about 1 kg was collected extended for about 200 m downstream from the excavations. The mass appeared to have been only recently

excavated and exposed by the natural agency of a shift in the pattern of stream flow along the ephemerally flowing watercourse, and had apparently just commenced to shed fragments downstream. No search of additional material was made by the discoverers or W.H. Cleverly.

The material recovered appears highly ferruginized at the surface, but there are two large masses totalling 51 kg that interlock tightly to form the largest mass, and the interior of such masses is comparatively unoxidized. The surfaces of this largest mass display a brown, oxidized fusion crust, marked with a coarse, continuous regmaglypt pattern, more characteristic of the larger iron masses in that it has the character of a reticulation. Similar patterns are evident on the surfaces of some of the other fragments, and it seems justifiable to assume that the fall consisted of several large masses of this type. There seems to be too much material and the surfaces on the largest mass seem to be too tightly arcuate for there to have been only a single large mass. The fresh cut surfaces are dark grey and compact textured, being copiously flecked with shiny metal and troilite. Chondrules are small and indistinct.

The total weight of collected fragments was probably close to 500 kg; WAM no. 12984 consists of numerous masses and fragments totalling 320 kg, including the 51 kg main mass; W.A. School of Mines, Kalgoorlie, no. 10319, six pieces showing primary surfaces, 2.3 kg; no. 10319.1, faced piece for display; 319g, University of Western Australia, Geology Department.

Specific gravity, 3.64; olivine, Fa_{19}; Class 5 of van Schmus & Wood (1967). The meteorite is seen to be strongly recrystallized in thin section, but chondrules are distinctly recognizable within the recrystallized aggregate.

This is certainly the largest recovery of stony meteorite material from one find or fall in Australia. It is rare for such large amounts of stony material to fall to Earth.

93 WILUNA — Olivine bronzite chondrite (Cbr), veined, brecciated and recrystallized

Fall, 2nd September 1967, accompanied by fireball phenomena and loud reports. Ellipse of dispersion situated 5 miles west of Wiluna township, and measuring 4.2 miles. Elongation N.W.-S.E. and large fragments picked up at the north west end. Approach believed to be from the S.E. Fragments found lying on soil, caught in trees etc. Little burial on impact, 26°35'34"S, 120°19'42"E. 490 individual fusion-crust coated stones, plus a great number of broken fragments were recovered by a party from the Western Australian Museum and Aborigines from the nearby Mission.

The total weight is estimated at 250 kg, and the number of individual masses at 500-1000 completely crust-enveloped stones. WAM nos 13005 - 13010, 6 fragments. WAM no. 12034, 179 meteorite masses and 140 fragments, two tins of

very small masses collected at the south east end, near Millbillillie shearing shed by Amy Abott, also thin sections. Total, 145.7 kg; W.A. School of Mines, Kalgoorlie, no. 10291, 10 masses totalling 10.7 kg; many other masses in private collections.

Specific gravity, 3.69; olivine, Fa_{17}; Class 4 of van Schmus & Wood (1967); recrystallization incipient.

Reference: McCall, G.J.H. & Jeffery, P.M. (1970) Mineralog. Mag. 37: 880-887.

94 YILMIA — Enstatite chondrite (Cen), recrystallized

Find :-

1969 (i) by G. Coulson, not recognized as a meteorite until 1971

1971 (ii) by C. Slee and B. Aspinal, 2 miles north of Yilmia Hill trig. point, 31°11' 30"S, 121°32'E.

The first recovery was of numerous fragments lying on the soil. The second recovery was of a single large mass embedded in the soil, and surrounded by fragments. This mass shows a primary ablation surface.

Weights (i) (total) 1.65 kg

(ii) (total) 24 kg
main mass 11.4 kg

WAM no. 13192, recovery (i), no. 13197, recovery (ii) (less an unknown amount of material); W.A. School of Mines, Kalgoorlie, no. 10951.1, piece, 11g; no. 10951.2, fragment, 85.6g.

Specific gravity, 3.50; Class E6 of van Schmus & Wood (1967), the mass is completely recrystallized and chondrules are not evident.

Reference: unpublished report by A.C. Theron, Australian Selection Pty Ltd, filed at the Western Australian Museum.

3. METEORITES FROM AUSTRALIA EXCLUDING WESTERN AUSTRALIA

No additions were received from this source.

J.R. de Laeter has recently carried out XRFS analyses of Henbury, Box Hole and Hart Range (the latter two at the request of B. Mason) to determine whether they are from the same fall. The analyses are as follows:-

	Cobalt %	Nickel %	Gallium ppm	Germanium ppm
Henbury	0.47	7.41	17.6	35
Box Hole	0.48	7.56	18.5	38
Hart Range	0.48	7.57	20.4	38

Coupled with Widmanstatten pattern examination, it is concluded that Box Hole and Hart Range are identical but Henbury is probably different.

4. METEORITES FROM OUTSIDE AUSTRALIA

Additions

ALLENDE — Carbonaceous chondrite, (CcIII)

Fell, 1969, Allende, Northern Mexico; more than 2 tons of material recovered.

WAM no. 13190, piece, 268.5g (exch. California Institute of Technology, G.J. Wasserburg).

WAM no. 13182, piece, 7.7g (exch. University of Kentucky, W.D. Ehmann).

WAM no. 13102, piece, 17.2g (exch. N.A.S.A., D.D. Bogard).

W.A. School of Mines, Kalgoorlie, no. 10612, complete stone, 130.98g (exch. Smithsonian Institution, Washington D.C.).

BEAR CREEK — Iron, fine octahedrite, (Of)

Find, 1866, Jefferson County, Colorado, U.S.A.

WAM no. 12588, etched slice, 10.3g (exch. J.T. Wasson, U.C.L.A.).

BROWNFIELD — Olivine bronzite chondrite, (Cbr)

Find, 1937, Terry County, Texas, U.S.A.

WAM no. 13028, slice, 15g (exch. Max Planck Institute).

BONDOC — Mesosiderite, (M)

Find, 1957, Bondoc, Luzon, Philippine Islands.

WAM no. 13212, part slice, cut and polished, 40.7g (exch. Tiara Observatory).

BUDULAN — Mesosiderite, (M)

Find, 1962, Buryat National District, Chita, U.S.S.R.

WAM no. 13220. Five pieces 520.5g (exch. Committee on Meteorites, U.S.S.R. Academy of Sciences, Moscow, nos 2421, 2430, 2442, 2446).

CAMBRIA — Iron, fine octahedrite, (Of)

Find, 1818, Niagara County, New York, U.S.A.

WAM no. 12961, 181.4g (exch. British Museum (Natural History)).

CARLTON — Iron, fine octahedrite, (Of)

Find, 1887, Hamilton County, Texas, U.S.A.

WAM no. 12963, piece 177.4g (exch. British Museum (Natural History)).

CHEBANKOL — Iron, coarse octahedrite, (Og)

Find, 1938, Novosibirsk, Siberia.

WAM no. 13219, piece 418.6g (exch. Committee on Meteorites, U.S.S.R. Academy of Sciences, Moscow, no. 1215).

CLOVIS (No. 2) — Olivine bronzite chondrite, (Cbr)

Find, 1961, Curry County, New Mexico, U.S.A.

WAM no. 13027, slice, 15g (exch. Max Planck Institute).

FAWCETT — Olivine bronzite chondrite, (Cbr)

Find, Fawcett, Missouri, U.S.A., date not known.

WAM no. 13181, piece, 8.3g (exch. Leonard Collection, U.C.L.A.).

FREMONT BUTTE — Olivine hypersthene chondrite, (Chy)

Recognized as a meteorite 1963, from Fremont Butte, Colorado, U.S.A.

WAM no. 13029, slice, 38g (exch. Max Planck Institute).

GOALPARA — Ureilite, (U)

Find, 1868, Goalpara, Assam, India.

WAM no. 12986, slice, 13g (exch. British Museum (Natural History)).

GROSNAJA — Carbonaceous chondrite, (CcIII)

Fell 1861, Grosnaja, Mekensk, Terek, Caucasus.

WAM no. 12870, piece, 0.4486g (exch. G.P. Vdovykin, Vernadskii Institute, Moscow).

IMILAC — Pallasite, (P)

(see McCall & de Laeter, 1965, Spec. Publs West. Aust. Mus. no. 3: 71).

W.A. School of Mines, Kalgoorlie, no. 10373, slice, 26.6g (exch. Hunterian Museum, Glasgow).

KAINSAZ — Carbonaceous chondrite, (CcIII)

Fell, 1937, Muslyumov, Tatar Republic, U.S.S.R.

WAM no. 13224, piece, 97.6g (exch. Committee on Meteorites, U.S.S.R. Academy of Sciences, Moscow, no. 1090).

KHOR TEMIKI — Aubrite (enstatite achondrite), (Au)

Fell, 1932, Khor Temiki, Gash Delta, Kassala, Sudan.

WAM no. 12967, fragments, 8.9g (exch. British Museum (Natural History)).

LANCÉ — Carbonaceous chondrite, (CcIII) spherical

Fell, 1872, Lancé, Vendôme, Loire-et-Cher, France.

WAM no. 12964, slice, 81.9g (exch. British Museum (Natural History)).

LANDES — Iron with silicate inclusions

Find, recognized 1968, Landes, W. Virginia, U.S.A.

WAM no. 13213, part slice, 28.1g, cut and polished but not etched (exch. Tiara Observatory).

MANTOS BLANCOS — Iron, fine octahedrite, (Of)

Find, 1876, Mantos Blancos, Atacama, Chile.

WAM no. 12962, slice, 226g (exch. British Museum (Natural History)).

NAKHLA — Nakhlite, (N)

Fell, 1911, Abu Hommos, Alexandria, Egypt.

WAM no. 12965, 2 slices, 60.8 and 6.3g (exch. British Museum (Natural History)).

NEEDLES — Iron, fine octahedrite, (Of)

Find, 1964, San Bernardino County, California, U.S.A.

WAM no. 13103, piece, 244g (exch. J.T. Wasson, U.C.L.A.).

OBERNKIRCHEN — Iron, fine octahedrite, (Of)

Known before 1863, from Obernkirchen, Bückeburg, Rinteln, Hesse-Nassau, Germany.

WAM no. 12966, piece, 150g (exch. British Museum (Natural History)).

PERVOMAISKY — Olivine hypersthene chondrite, (Chy)

Fell, 1933, Ivanovo - Vosnesenk district, Vladimir, Russia.

WAM no. 13221. Three pieces, 293.3g (exch. Committee on Meteorites, U.S.S.R. Academy of Sciences, Moscow, nos 237, 246, 658).

PESYANOE — Aubrite (enstatite achondrite), (Au)

Fell, 1933, Kurgan, Siberia.

WAM no. 13223, piece, 13.6g (exch. Committee on Meteorites, U.S.S.R. Academy of Sciences, Moscow, no. 756).

PLAINVIEW (1917) — Olivine bronzite chondrite, (Cbr), veined

Find, 1917, Plainview, Texas.

WAM no. 13210, complete individual with fusion crust and surface pitting, 535.5g (exch. Tiara Observatory).

SARATOV — Grey (or intermediate) spherical olivine hypersthene chondrite, (Chy)

Fell, 1918, Donguz and Belaya Gora, Russia.

WAM no. 13222. Two pieces, 1011.8g (exch. Committee on Meteorites, U.S.S.R. Academy of Sciences, Moscow, nos 311, 317).

SHAW — Olivine hypersthene chondrite, (Chy), amphoterite

Find, 1937, Shaw, Colorado.

WAM no. 13211, cut and polished part slice, 28.1g (exch. Tiara Observatory).

SIKHOTE-ALIN — Iron, granular hexahedrite, or coarsest octahedrite, (Ogg)

Fell, 1947, Eastern Siberia.

WAM no. 13216, polished slice, 2748g (exch. Committee on Meteorites, U.S.S.R. Academy of Sciences, Moscow, no. 1646/5).

SPRINGWATER — Pallasite, (P)

(see McCall & de Laeter, 1965, Spec. Publs West. Aust. Mus. no. 3: 75).

W.A. School of Mines, Kalgoorlie, no. 10311, slice, 119g (exch. Smithsonian Institution, Washington D.C.).

SSYROMOLOTOVO — Iron, medium octahedrite, (Om)

Find, 1873, Keshma, Yeniseisk, Siberia.

WAM no. 13218, slice, 161.8g (exch. Committee on Meteorites, U.S.S.R. Academy of Sciences, Moscow, no. 65).

SUSUMAN — Iron, medium octahedrite, (Om)

Find, 1957, Magadan region, U.S.S.R.

WAM no. 13217, slice, 333.5g (exch. Committee on Meteorites, U.S.S.R. Academy of Sciences, Moscow, no. 2293).

TRENTON — Iron, medium octahedrite, (Om)

Find, 1858, Trenton, Washington County, Wisconsin, U.S.A.

WAM no. 12878, slice, 85.2g.

W.A. School of Mines, Kalgoorlie, no. 10318, slice, 7.7g (exch. J.T. Wasson, U.C.L.A.).

VIEW HILL — Iron, medium octahedrite, (Om)

Find, about 1952, View Hill, Oxford, North Canterbury, New Zealand.

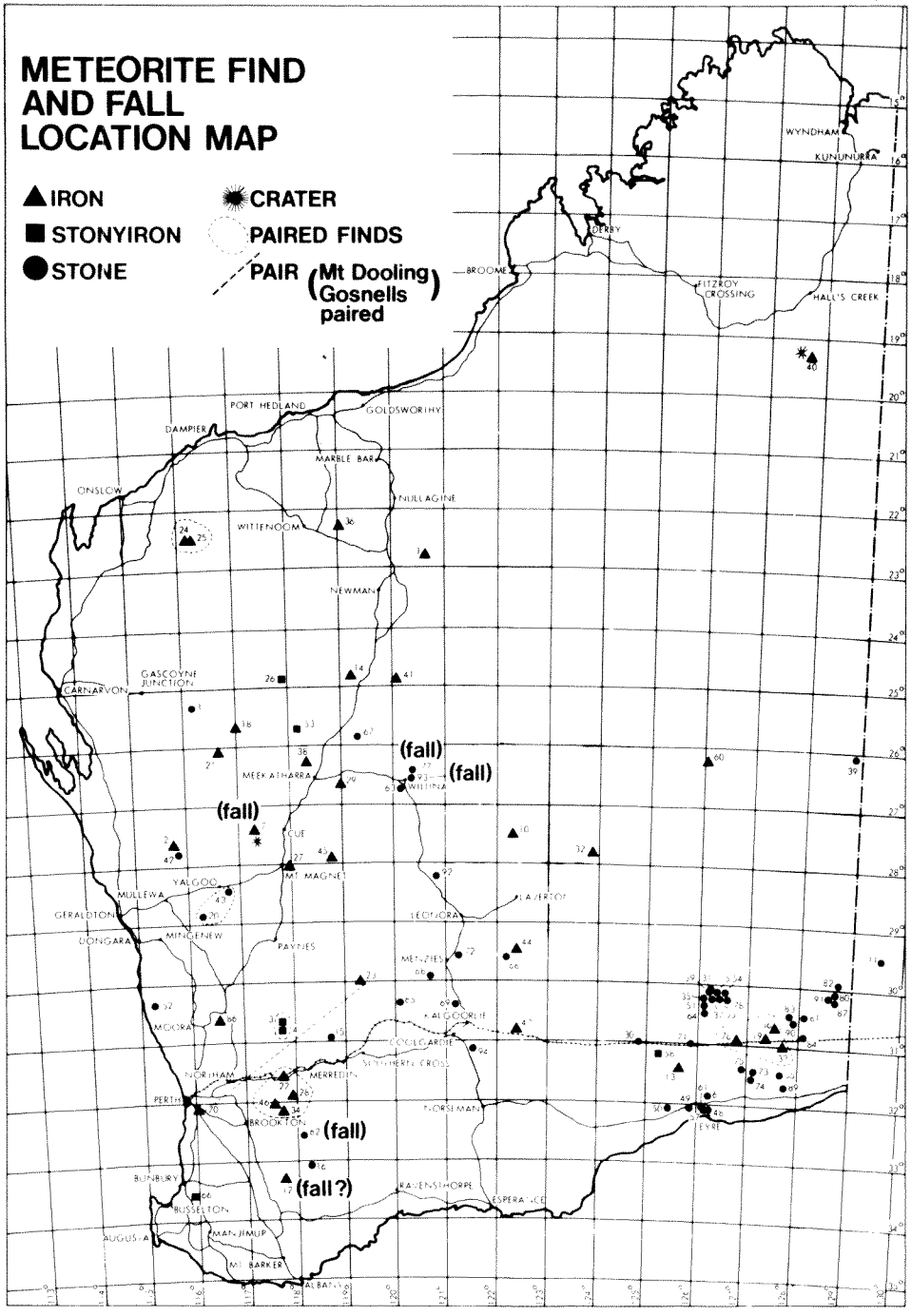
WAM no. 12969, slice, 73.1g (exch. Canterbury Museum).

WALLTOWN — Olivine hypersthene chondrite, (Chy)

Find, 1963, Walltown, Casey County, Kentucky, U.S.A.

WAM no. 12790, slice, 59.4g (exch. University of Kentucky, W.D. Ehmann).

1. BALFOUR DOWNS ▲
2. BALLINOO ▲
3. BENCUBBIN I ■
4. BENCUBBIN II ■
5. BILLYGOAT DONGA, I, II, III ●
6. COCKLEBIDDY ●
7. DALGARANGA ▲
8. DALGETY DOWNS, I, II ●
10. DUKETON ▲
11. FORREST LAKES ●
12. GUNDARING ▲
13. HAIG ▲
14. KUMERINA ▲
15. LAKE BROWN ●
16. LAKE GRACE ●
18. LANDOR STATION ▲
19. LOONGANA STATION ▲
20. MELLENBYE ●
21. MILLY MILLY ▲
22. MOORANOPPIN ▲
23. MOUNT DOOLING ▲
24. MOUNT EDITH I ▲
25. MOUNT EDITH II ▲
26. MOUNT EGERTON ■
27. MOUNT MAGNET ▲
28. MOUNT STIRLING ▲
29. MURCHISON DOWNS ▲
30. NARETHA ●
31. NORTH HAIG ●
32. NURELI ▲
33. PREMIER DOWNS ▲
34. QUAIRADING ▲
35. RAWLINNA (Stone) ●
36. ROEBOURNE ▲
37. SLEEPER CAMP ●
38. TIERACO CREEK ▲
39. WINGELLINA ●
40. WOLF CREEK ▲
41. WONYULGUNNA ▲
42. WOOLGORONG ●
43. YALGOO ●
44. YARRI ▲
45. YOUANMI ▲
46. YOUNDEGEN I, II ▲
47. AVOCA ▲
48. BURNABBIE ●
49. BURRIKA ●
50. CARDANUMBI ●
51. DINGO PUP - DONGA ●
52. FRENCHMAN BAY ●
53. MOUNT PADBURY ■
54. MULGA NORTH ●
55. MULGA SOUTH ●
56. MUNDRABILLA ▲
57. PANNIKIN ●
58. RAWLINNA (Pallasite) ■
59. RIVER ●
60. WARBURTON RANGE ▲
61. YAYJINNA ●
62. BAANDEE ●
63. COCKARROW CREEK ●
64. COORARA ●
65. CREDO ●
66. DONNYBROOK ■
67. DOOLGUNNA ●
68. EDJUDINA ●
69. FENBARK ●
70. GOSNELLS ▲
71. GUNNADORAH ●
72. JEEDAMUA ●
73. LAUNDRY EAST ●
74. LAUNDRY ROCKHOLE ●
75. LAUNDRY WEST ●
76. LOONGANA STATION WEST ▲
77. MILLBILLILLIE ●
78. MULGA WEST ●
79. NALLAH ●
80. NORTH EAST REID ●
81. NORTH FORREST ●
82. NORTH REID ●
83. NORTH WEST FORREST (1971) ●
84. NORTH WEST FORREST (1969) ●
85. OAK ●
86. REDFIELDS ▲
87. REID ●
88. ULARRING ●
89. WEBB ●
90. WEST FORREST ●
91. WEST REID ●
92. WILDARA ●
93. WILUNA ●
94. YILMIA ●


METEORITE FIND AND FALL LOCATION MAP
IRON
STONYIRON
STONE
CRATER
PAIRED FINDS
PAIR (Mt Dooling Gosnells paired)
WYNDHAM
KUNUNURRA
DERBY
BROOME
FITZROY CROSSING
HALL'S CREEK
PORT HEDLAND
DAMPIER
GOLDSWORTHY
MARBLE BAR
NULLAGINE
ONSLOW
WITTENOOM
NEWMAN
GASCOYNE JUNCTION
CARNARVON
MEEKATHARRA
WILUNA
(fall)
(fall)
(fall)
CUE
MT MAGNET
YALGOO
MULLEWA
GERALDTON
DONGARA
MINGENEW
PAYNES
LEONORA
LAVERTON
MOORA
NORTHAM
MERREDIN
PERTH
BROOKTON
(fall)
(fall?)
BUNBURY
BUSSELTON
MANJIMUP
AUGUSTA
MT BARKER
ALBANY
KALGOORLIE
COOLGARDIE
SOUTHERN CROSS
NORSEMAN
EYRE
RAVENSTHORPE
ESPERANCE