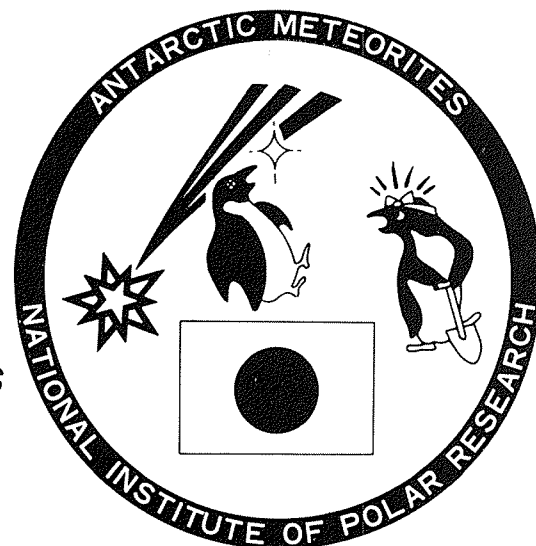


METEORITES NEWS

JAPANESE COLLECTION OF ANTARCTIC METEORITES



Volume 2, Number 1

December 1983

National Institute of Polar Research (NIPR)

Tokyo

INTRODUCTION

The Meteorites News have been planned to be published for the purpose of informing scientists of the basic characteristics of the meteorite specimens in the Japanese Collections of Antarctic Meteorites. This issue constitutes the second of such news, and contains data sheets for a number of meteorites collected from the bare ice area near the Yamato Mountains by the Japanese Antarctic Research Expedition in the 1974 field season.

The meteorites news has been prepared by the Department of Meteorites, National Institute of Polar Research (NIPR), Tokyo. We are indebted to Dr. Brian Mason for his discussions and review of our descriptions, and to Mr. H. Haramura, University of Tokyo, for his bulk chemical analyses.

Copies of sample request form and regulation are enclosed in this issue. Requests for Antarctic meteorite samples for scientific research are welcome from all qualified scientists.

SAMPLE REQUESTS

The Committee on Antarctic Meteorites (Chairman, Prof. Takesi Nagata), National Institute of Polar Research will meet after next March for the purpose of reviewing requests for Antarctic Meteorites. Requests to samples should be sent to:

Keizo Yanai,
Curator, Antarctic Meteorites
Department of Meteorites,
National Institute of Polar Research,
9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173
Japan
Telephone: Tokyo (03) 962-4711
Cable Address: POLARESEARCH TOKYO
Telex: 2723515 POLRSC J

DATA SHEET

Information in data sheets for meteorite specimens includes inventory data, field data, initial survey data and other pertinent sample information. The inventory data include a sample identification number, specimen weight and specimen dimensions. The field data give the location and the date of the find, and the original sample number assigned to a specimen in the field. Initial survey data consist of a classification by an optical and chemical examination of a specimen (petrographic description) and a description of macroscopic features (physical description), with information about degree of weathering and degree of fracturing.

The scale for apparent degree of weathering and fracturing is like that used in the NASA curatorial facilities.

Degree of Weathering

A - minor B - moderate C - severe

Degree of Fracturing

A - slight B - moderate C - severe

If you would like to obtain additional copies of the news, please contact Dr. K. Yanai, Secretary of the Antarctic Meteorite Research Committee, Department of Meteorites, National Institute of Polar Research.

We would like to thank Reiko Mitsuda, Chieko Masuo and Mieko Miyazaki for their assistance on the compilation of this issue.

REQUIREMENTS AND PROCEDURES FOR ANTARCTIC METEORITES

RESEARCH ON JAPANESE COLLECTIONS

Formal requests for Antarctic meteorite samples for scientific research and display should be submitted in writing along with the formal request form to Professor Takesi Nagata, Chairman, Antarctic Meteorite Research Committee, National Institute of Polar Research(NIPR), Tokyo.

Requests are welcome from all qualified scientists in the world and will be reviewed and considered two or three times each year by the Antarctic Meteorite Research Committee of the NIPR in Japan. Consortium-type sample requests may also be submitted. When your proposal is accepted by the committee, the requested samples will be sent to you from the curator, Department of Meteorites of the NIPR.

SAMPLE ALLOCATION

1. Sample allocation may be limited under few grams for each sample.
2. Sample allocation may be under 10 samples for each research proposed.
3. All samples are provided as a lone.
4. In a case of museum display, it may be provided on an exchange basis.
5. Sample requests should include detailed sample numbers, preferable weight and minimum weight requirements, sites(crust, outer part, inner part and central part, etc.), shaps(powder, grains, fragments, chips, cubes, plates, thin section and polished thin section) etc.

SAMPLE DISTRIBUTION

1. Sublease of meteorite samples is not permitted to anybody except coinvestigators of the proposed research. If sublease is required to other investigators, a new separate proposal form must be submitted to the Antarctic Meteorite Research Committee prior to the sample transfer.
2. Return of unused meteorite sample to the curator is requested upon completion of the proposed research.

REPORTING RESULT

1. Any result of your studies is encouraged to be reported promptly. It is desirable to report at the Symposium on Antarctic Meteorites sponsored by the National Institute of Polar Research. The presented papers at this symposium will be published as the Proceedings of the symposium after review by the editorial committee of the NIPR. Two referees will read the paper. Instruction to contribution can be obtained from the Library of the NIPR. The symposium will be held each year, customarily in late February.
2. It is also possible to submit paper to the Antarctic Record and to the Memoirs of the National Institute of Polar Research.
3. Twenty reprints of each article which was published in other journal than those of the National Institute of Polar Research should be sent to the curator by authors.

Please mail to;

Keizo Yanai
Curator, Antarctic Meteorites
Department of Meteorites,
National Institute of Polar Research,
9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173
Japan

Japanese Collections of Antarctic Meteorites

Yamato and Belgica meteorites

<u>Collection Names</u>	<u>Meteorite Names</u>	<u>Abbreviations</u>
Yamato-69 meteorites	Yamato-691 to -699.	Y-691 to Y-699
Yamato-73 meteorites	Yamato-7301 to -7312.	Y-7301 to Y-7312
Yamato-74 meteorites	Yamato-74001 to -74663	Y-74001 to Y-74663
Yamato-75 meteorites	Yamato-75001 to -75307.	Y-75001 to Y-75307
Yamato-79 meteorites	Yamato-790001 to -794093.	Y-790001 to Y-794093
Belgica-79 meteorites	Belgica-7901 to -7905.	B-7901 to B-7905
Yamato-80 meteorites	Yamato-8001 to -8014.	Y-8001 to Y-8014
Yamato-81 meteorites	Yamato-81001 to -81113.	Y-81001 to Y-81113
Yamato-82 meteorites	Yamato-82001 to -82211.	Y-82001 to Y-82211

Victoria Land meteorites

<u>Collection Name</u>	<u>Meteorite Name</u>	<u>Abbreviation</u>
Mount Baldr meteorites	Mount Baldr a and b.	MBR a and MBR b
Allan Hills-76 meteorites	Allan Hills-761 to -769.	ALH-761 to ALH-769
Allan Hills-77 meteorites	Allan Hills-77001 to -77307.	ALH-77001 to ALH-77307
Purgatory Peak-77 meteorite	Purgatory Peak-77006.	PGP-77006
Derrick Peak-78 meteorites	Derrick Peak-78001 to -78010.	DRP-78001 to DRP-78010
Meteorite Hills-78 meteorites	Meteorite Hills-78001 to -78028.	MET-78001 to MET-78028
Bates Nunatak-78 meteorites	Bates Nunatak-78001 to -78006.	BTN-78001 to BTN-78006
Allan Hills-78 meteorites	Allan Hills-78001 to -78262.	ALH-78001 to ALH-78262
Reckling Peak-78 meteorites	Reckling Peak-78001 to -78005.	RKP-78001 to RKP-78005

Table. Data on classified Yamato-74 meteorites

Name	Original Weight(g)	Class & Type	%Fa in olivine (range)	%Fs in low-Ca pyroxene (range)	* Comments
Yamato-74001	246.1	H5	18.3(17.2-19.5)	16.1(15.5-16.6)	C with H4 Clast
74002	69.7	LL4	27.9(26.7-28.4)	22.9(22.5-23.4)	A
74003	15.5	L6	25.2(24.6-25.9)	21.1(20.7-22.2)	maskelynite
74004	8.05	H5	19.0(17.1-20.1)	16.7(15.9-17.3)	
74005	3.69	Dio(A)	-	24	A
74006	35.83	H6	19.1(18.2-20.7)	16.5(15.0-17.1)	En62.9Fs10.6Wo26.6, En48.9Fs6.1Wo44.9
74007	162.3	L6	25.5	21	B
74008	14.31	H	18.5(17.3-21.9)	16.2(14.8-19.8)	shocked
74009	8.97	L5	24.5(23.4-25.4)	20.6(20.0-21.6)	apatite, merrillite
74010	298.5	Dio(A)	-	24	A
74011	206.0	Dio(A)	-	24	A
74012	75.4	H5	19.6	17.6	B
74013	2059.5	Dio(A)	-	24	A
74014	2347.9	H6	19.6	16	B granular chondrule
74015	88.0	L6	26.7	22.1	B
74016	11.54	H6	19.1(18.1-19.9)	16.8(15.8-17.6)	En48.9Fs6.1Wo45.0, merrillite
74017	3.23				
74018	5.25	LL6	29.8(28.8-30.5)	24.1(23.8-24.5)	merrillite, Pl(An9.6, 9.9)
74019	6.02	H			
74020	0.56				
74021	39.3	H5	19.9	18.1	C
74022	34.7	LL5	26.7(25.7-29.0)	22.1(21.7-22.6)	A
74023	6.30	LL6			
74024	50.0	L3	22.8(0.8-26.0)	10.5(2.4-18.7)	A
74025	14.0				
74026	5.24	LL6-L6			
74027	35.7	L6			granular part (clast)
74028	90.2	L6	24.5	22.1	B En45Fs7Wo46, Pl(An11)
74029	4.3	H			angular troilite
74030	7.82	L			
74031	6.1	Dio(A)	-	24	A
74032	14.1	H3-4			
74033	2.9	L			
74034	27.6	H			
74035	115.7	L6	24.5	21	B
74036	201.4	L6	25.2	21	B
74037	591.9	Dio(A)	-	24	A
74038	208.9	H5	18.9	17	B
74039	47.6	L6	25.8	22.5	A
74040	35.17	L			
74041	1.79	H			
74042	3.85	H			
74043	5.19	H3-4			
74044	51.8	Pa1	12.3	-	B
74045	39.82	H-L			
74046	2.22	H-L			
74047	2.22	L3-4			
74048	67.1	LL6	30.3	25.6	B
74049-064	491.9	H4	19.0(18.0-21.0)	(16-21)	B
74065-066	24.5	L6	24.4(23.2-24.6)	20.2(19.6-21.1)	A with L4 Clast
74067	4.0	H6			
74068	5.41	H5-6			
74069	18.57	H6			
74070-075	184.2	H5	18.5(17.9-19.6)	16.6(15.9-17.2)	B
74076	20.36	L6			
74077	5575.1	L6	21.8(20.9-23.2)	18.4(17.5-19.1)	A
74078	15.88	H4			
74079	620.8	H5	15	19	A/B
74080	536.9	L6	24.5(23.8-26.8)	20.6(20.3-21.0)	A En46Fs8Wo46
74081	102.5	H4	18.3(17.3-19.6)	15.9(15.4-16.4)	C En48.3Fs6.0Wo44.7
74082	179.8	H4	19.3	(15-18)	B
74083	3.31	H4			
74084	2.1	H			
74085	30.5	H4	18.2(16.9-19.3)	15.9(14.9-16.9)	B/C En72.4Fs13.4Wo14.2, En48.4Fs6.4Wo45.1
74086	0.97	H4-5			
74087	0.78	H			
74088	14.28	H			shocked
74089	43.36	H			

Table (continue)

Name	Original Weight(g)	Class & Type	%Fa in olivine (range)	%Fs in low-Ca pyroxene (range)	* Comments
74090	1.01	H			
74091	2.30	L			
74092	3.23	L			
74093	6.59	LL			
74094	867.2	H6	19.0(17.5-19.8)	16.6(15.9-17.2)	C with clast
74095	65.92	H			
74096	16.19	Dio(A)	-	24	A
74097	2193.9	Dio(A)	-	24	A
74098	9.10	H			
74099	27.36	H			
74100	15.45	L			
74101	9.10	H			
74102	2.99	H			
74103	21.59	H			
74104-108	447.1	H5	18.9	16.8	A/B
74109	43.67	Dio(A)	-	24	A
74110	90.1	L6	21.4	19.2	C
74111	58.0	L6	19.4	18.3	B/C
74112	45.52	L6			
74113	28.21	L6			
74114	42.28	L5			
74115	1045.1	H5	18.1	16.0	B
74116	68.9	L5	24.6(23.1-25.5)	20.5(19.9-21.1)	C P1(An9.9)
74117	80.2	L6	25.5	22.1	A
74118	845.1	L6	24.5(23.4-25.2)	20.8(19.7-21.6)	A An8.3, 7.5
74119	4.36	L5			
74120	90.5	L6	25.6	22.2	B
74121	8.53	H			
74122	54.89	H			
74123	69.9	Ure	21.6(13-23)	18.2	B
74124	62.3	H4	18.5(16.9-19.2)	15.8(14.9-16.7)	B En51.6Fs16.2Wo42.3, An12.1
74125	107.0	Dio(A)	-	24	A
74126	14.52	Dio(A)	-	24	A
74127	19.20	L			
74128	41.98	L			
74129	6.57	L			
74130	17.9	Ure	22	17.9	C
74131	18.06	H			
74132	2.37	H			
74133	3.36	H			
74134	3.08	L			
74135	7.75	LL			shocked
74136	725.0	Dio(A)	-	24	A
74137	26.32	H			shocked
74138-141	41.6	H3	17.1(0.3-36.9)	14.5(3.0-16.7)	A/B Tridymite, En48.7Fs5.7Wo45.4
74142	29.5	H3	16.9(10.9-27.9)	13.4(1.0-16.9)	A
74143	4.89	H			shocked
74144	141.4	L6	24.8	21.9	B
74145	0.6	H			
74146	8.55	L			
74147	5.93	L			
74148	1.02	H			
74149	0.70	H			
74150	33.56	Dio(A)	-	24	A
74151	49.42	Dio(A)	-	24	A
74152	3.92	H			
74153	6.17	L			
74154	2.83	LL			shocked
74155-156	3788.1	H4	17.2-19.5	18	A
74157-158	135.6	L6	22.5	22.0	B
74159	98.2	Euc(po1)	-	35-65	A
74160	31.4	LL6-7	29.4(28.2-30.6)	23.1(22.0-24.1)	A P1(An7-17)
74161	42.09	L			
74162	3.86	Dio(A)	-	24	A
74163	134.2	H5	17.7(16.7-18.6)	15.8(15.0-16.5)	C
74164	248.8	L6	25.1	21	A
74165	203.4	L4	25.2(24-27)	(19-25)	C
74166-170	6.9	H3	18.1(17.6-19.4)	15.5(13.8-16.4)	B

Table (continue)

Name	Original Weight(g)	Class & Type	%Fa in olivine (range)	%Fs in low-Ca pyroxene (range)	* Comments
74171	4.6				
74172	47.0				
74173-181	89.5	L6	24.0(23.1-24.9)	20.3(19.7-22.5)	B
74182-185	16.8	L6	24.5	20.5	A P1(An10)
74186	5.1				
74187-188	13.3	H5	18.0(16-22)	17.1(16-18)	C Pl., Cpx.
74189	1.4				
74190	3235.7	L6	24.6	21.1	A
74191	1091.6	L3	18.8(12-25)	(4-25)	A
74192	420.3	H5(or 6)	18.2	15.8	C
74193	1818.5	H5(or 4)	19.1	17.3	B
74194-342	719.3	H5	19.1	17.7	C
74343	52.2				
74344	1.4	Dio(A)	-	24	A
74345	8.3				
74346	82.3				
74347	7.8	Dio(A)	-	24	A
74348-353	43.2	H4	18.0	16.6	C
74354	2721.1	L6	24.2	20.8	A
74355	82.9	L4	24.9	21.4	B
74356	10.0	Euc(mono)	-	62	A
74357	13.8	Lod	7.9(7.0-8.5)	13.8(11.5-14.6)	Ab820r3An15, Chr. Diop.
74358	2.9				
74359	1.5				
74360	3.2				
74361	0.4				
74362	4175.0	L6	25.1	20.9	A
74363	1.0				
74364	717.8	H4	17.7	16.0	B
74365	0.7				
74366	0.2				
74367	165.6	L6	26.0	22.0	A
74368	7.8	Dio(A)	-	24	A
74369	4.1				
74370	42.1	E3-4	0.1	0.9(0-5.1)	B/C
74371	5067.9	H5	18.6	17	A
74372	84.6	L6	25.2	21.8	B
74373	0.2				
74374	205.2	H6	18.4	16	B
74375	92.7	H4	18.1(17.3-19.3)	15.6(14.7-18.3)	C clinobronzite
74376	120.0	L5	24.7	21.3	B
74377	10.4				
74378	18.3				
74379-416	64.2	H5	18.0	16.6	C
74417	44.5	H3	13.7(0.2-31.8)	10.9(3.1-27.0)	A
74418-436	719.0	H6	19	19	C
74437	3.1				
74438	42.6				
74439	32.6				
74440	1.7				
74441	27.4	L3	15.1(1.5-31.3)	11.6(2.0-29.4)	B
74442	173.3	LL4	29.0(27-31)	(21-25)	A
74443	6.0				
74444	11.9				
74445	2293.2	L6	24.8(23.7-25.8)	20.8(20.2-22.0)	C maskelynite
74446	7.3				
74447	14.3	H6	18.0(17.1-18.7)	15.6(14.8-16.2)	B P1(An12.5), merrillite
74448	17.7	Dio(A)	-	24	A
74449	4.0				
74450	235.6	Euc(pol)	-	30-65	A
74451	0.8				
74452	33.9	L6	24.0(23.1-24.7)	20.8(19.5-20.7)	A
74453	14.4				
74454	578.8	L6	23.6	20.8	A
74455	114.1	L6	24.7(24.0-25.4)	20.8(20.0-24.1)	A P1(An9.8-10.8)
74456	56.9				
74457	120.8	L5	25.3	22	B

Table (continue)

Name	Original Weight(g)	Class & Type	%Fa in olivine (range)	%Fa in low-Ca pyroxene (range)	* Comments
74458	37.2				
74546	7.3	Dio(A)		24	A
74459-602	5138.8	H6	18.8	17.4	C
74603	188.7	L4	21.8(20.2-25.0)	20.4(18.8-22.7)	C
74604	58.5				
74605	580.8	L6	23.8(22.8-24.9)	20.2(19.4-21.1)	B maskelynite, merrillite
74606	2.9	Dio(A)	-		A
74607	0.6				
74608	2.0				
74609	257.2	H5	18.4(17.2-19.2)	16.0(14.4-17.4)	C
74610	46.8	H4	17.9(17.1-19.1)	15.8(15.1-16.9)	B clinobronzite
74611	7.3				
74612	2.4				
74613-638	144.4	H6	18		C
74639	89.5	L5	24.1(23.3-25.2)	20.4(18.9-22.5)	A
74640	1065.9	H6	19.0	17	C
74641-642	15.1	C2			A
74643	38.0				
74644	20.4				
74645	35.6	H4-L4	21.1(20.0-22.1)	17.9(17.2-18.4)	C
74646	554.7	LL6	29.1(27.6-29.8)	24.8	A En45.5Fs8.6Wo45.9
74647	2323.8	H5	18.3(17.3-19.3)	15.9(15.4-16.7)	A
74648	185.5	Dio(A)	-	24	A
74649	2.8				
74650	163.2	L6	10.5(0.4-49.5)	8.9(0.4-34.5)	A/B
74651	1.0				
74652	7.9	L6	24.4(23.9-25.1)	20.6(19.7-21.4)	A
74653	1.0				
74654	45.0				
74655	10.5				
74656	12.4				
74657	8.9				
74658	11.0				
74659	18.9	Ure	8	8	B
74660	27.2	LL3	10.5(0.4-49.5)	8.9(0.4-34.5)	B
74661	5.1				
74662	150.9	C2	10.9(0.2-52.8)	5.0(0.5-45.3)	A
74663	213.9	LL6	28.1(26.8-28.8)	23.0(21.8-23.8)	B

Pal: Pallasite, Dio: Diogenite, Ure: Ureilite, Euc: Eucrite
 *: Degree of Weathering

Yamato74001

H5 Chondrite (with H4 clast)

Weight: 246.1 gms
 Dimension: 6.7 x 5.1 cm
 Degree of Weathering: C
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°50'10"S 36°16'20"E
 Original Number: 74112401
 Found: Nov. 24, 1974, K. Yanai et al.

Physical Description:

A fragment with about one-third of the surface covered with brownish-black fusion crust; the interior shows brown weathering throughout. The material appears to be finely granular, and no chondrules are visible.

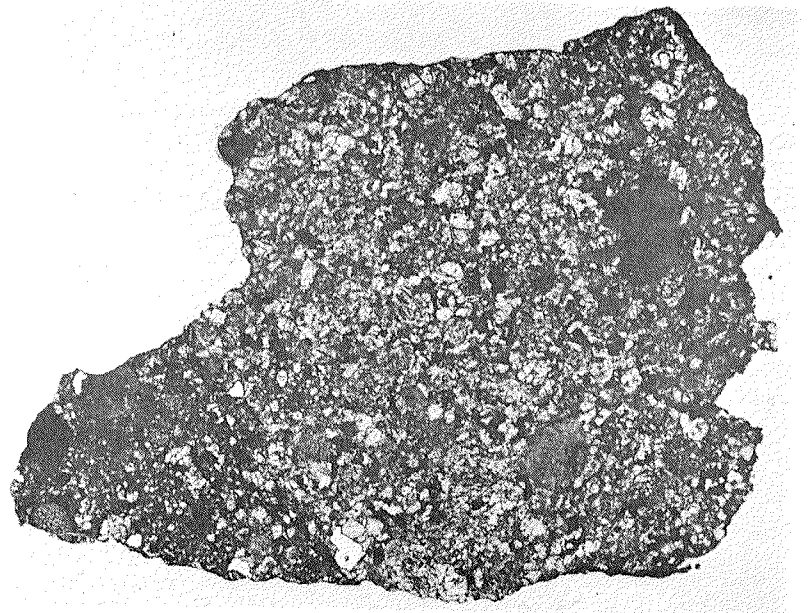
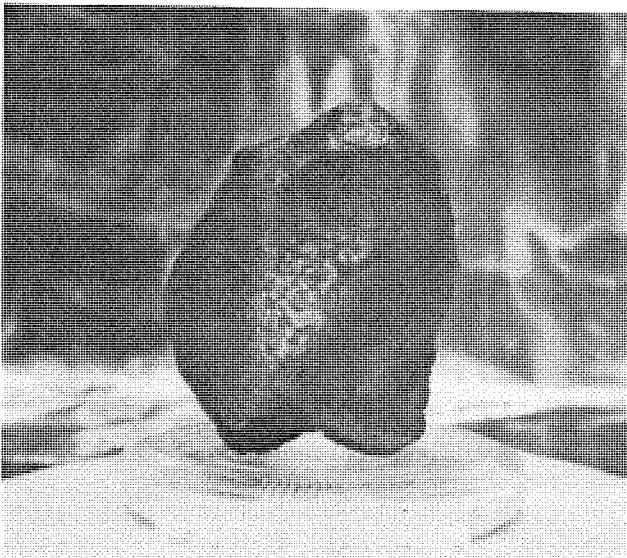
Petrographic Description:

Chondritic structure is well developed, but the chondrules tend to merge with the granular groundmass, which consists largely of olivine and pyroxene, with about 15% nickel-iron and 5% troilite with minor amount of plagioclase. The meteorite is moderately weathered, with some brown limonitic staining throughout the section. The section shows a few thin black veinlets. Mean Fa molecular percent of olivine in the meteorite is present by Yanai et al. and Kimura et al. as following: Fa_{22.7} and Fa₁₆ respectively.

Microprobe analysis give the following results:

	Average	%M.D.	Range
Olivine	Fa _{18.3}	2.1	17.2-19.5
Low-Ca pyroxene	Fs _{16.1}	1.7	15.5-16.6

The meteorite is classified as an H5 chondrite.



Yamato-74002,95

LL4 Chondrite

Weight: 69.7 gms
 Dimension: 4.4 x 3.7 cm
 Degree of Weathering: A
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'32"S 36°15'20"E
 Original Number: 74112402
 Found: Nov. 24, 1974, K. Yanai et al.

Physical Description:

A partly crusted fragment; interior surfaces are pale gray and essentially unweathered. Chondritic structure is prominent and well developed. Nickel-iron content is very low, a large (3 mm) sulfide grain was noted.

Petrographic Description:

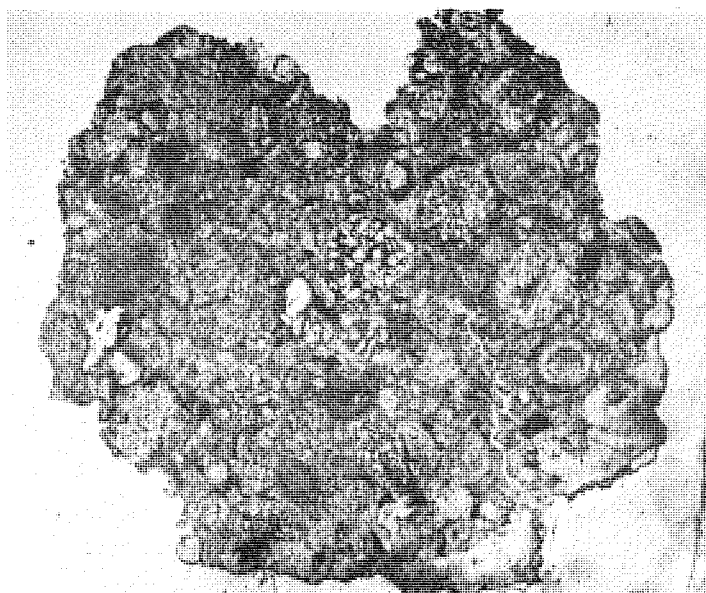
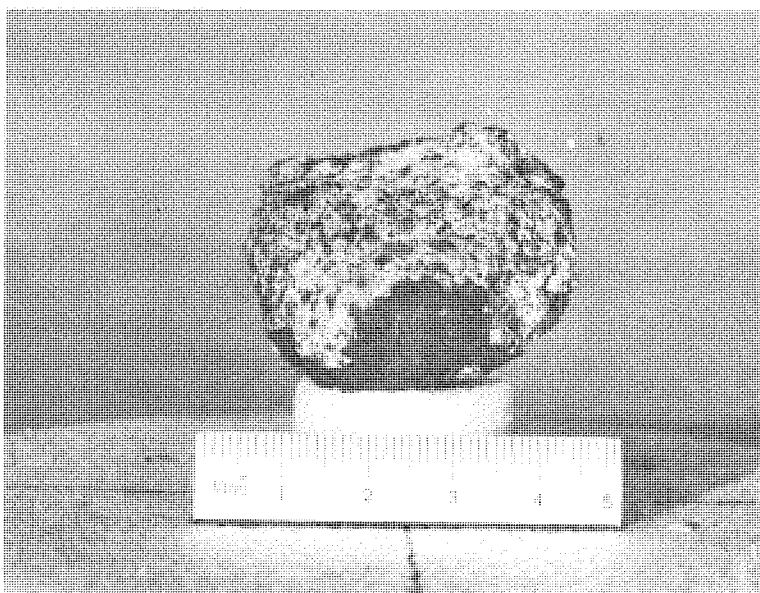
The meteorite consists largely of well-developed chondrules, with relatively little matrix. A variety of chondrule types is present, the commonest being granular or porphyritic olivine with interstitial glass (usually turbid, sometimes transparent and pale brown in color). The matrix consists of finely granular olivine and pyroxene, with a little nickel-iron and troilite. The meteorite shows no signs of weathering. Microprobe analysis gave the following results:

	Average	%M.D.	Range
Olivine	Fa _{27.9}	0.9	Fa _{26.7-28.4}
Low-Ca pyroxene	Fs _{22.9}	1.0	Fs _{22.5-23.4}

Composition of olivine and pyroxene are also presented by Matsueda et al. (1981) as following:

Olivine	Fa _{29.8}	%M.D. 1.84
Low-Ca pyroxene	Fs _{25.4}	%M.D. 1.68

The meteorite is classified as an LL4 chondrite.



Yamato-74011,93

Diogenite

Weight: 206.0 gms
 Dimension: 6.5 x 5.0 cm
 Degree of Weathering: A
 Degree of Fracturing:

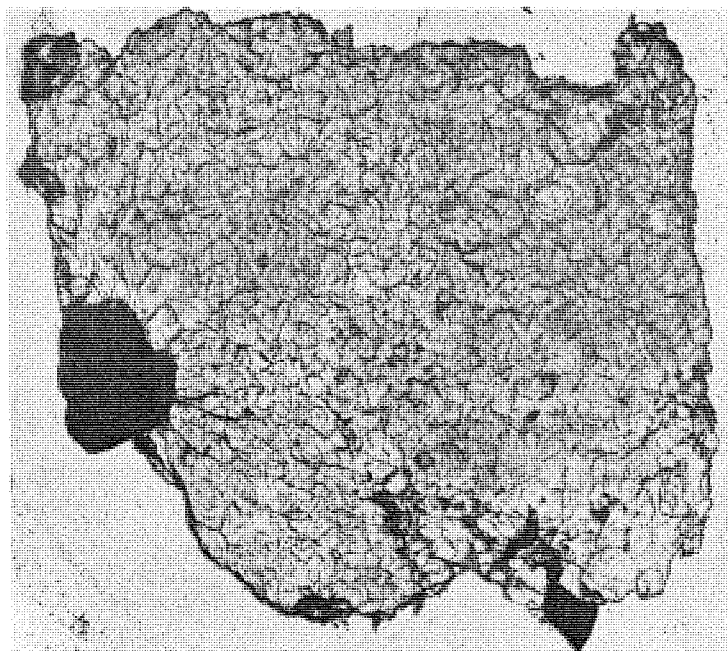
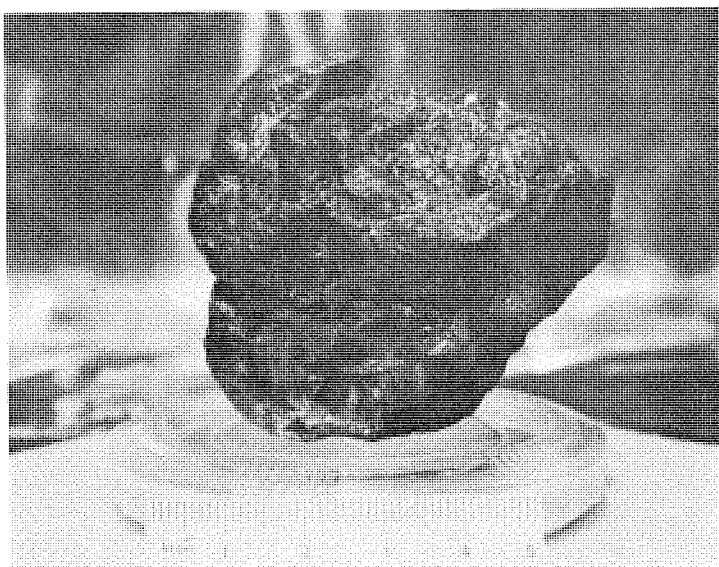
Location: Yamato Mountains, Antarctica
 71°49'58"S 36°17'30"E
 Original Number: 74112509
 Found: Nov. 25, 1974, K. Yanai et al.

Physical Description:

A granular fragment with a small area of lustrous black fusion crust. Interior surfaces show fine-grained olive-yellow pyroxene with scattered crystals of lustrous black chromite.

Petrographic Description:

The meteorite shows granolilastic texture, which consists almost entirely of recrystallized orthopyroxene with minor euhedral chromite crystals up to 4 mm in diameter and similar to Yamato-692 recrystallized diogenite. The meteorite is very fresh specimen and shows almost no signs of weathering. The chemical composition of the orthopyroxene in this specimen falls in the range between $\text{Ca}_{2.0} \text{Mg}_{74.6} \text{Fe}_{24.4}$ and $\text{Ca}_{3.0} \text{Mg}_{72.1} \text{Fe}_{24.9}$ (average $\text{Ca}_{2.5} \text{Mg}_{73.1} \text{Fe}_{24.4}$).



Yamato-74012

H5 Chondrite

Weight: 75.4 gms
 Dimension: 4.0 x 3.6 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°50'12"S 36°17'55"E
 Original Number: 74112510
 Found: Nov. 25, 1974, K. Yanai et al.

Physical Description:

An almost complete crusted stone of pyramidal shape; a small broken surface is weathered brown and shows poorly defined chondritic structure.

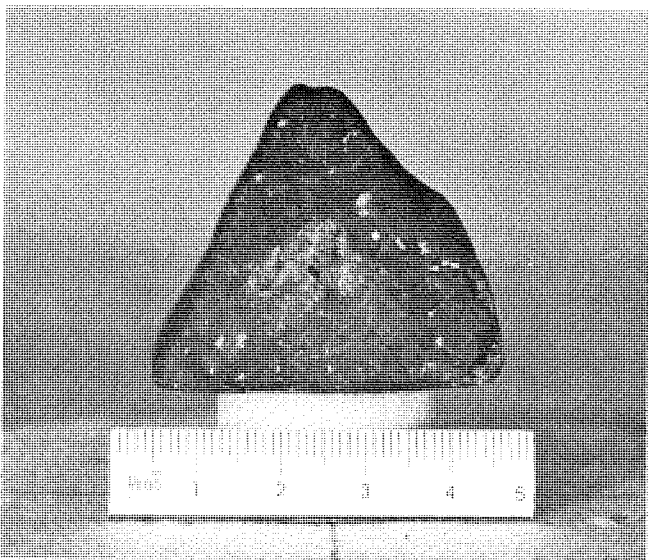
Physical Description:

Complete crusted stone of pyramidal shape, weathered, chondrules are developed.

Petrographic Description:

Chondrules are abundant and well developed, and are set in a granular groundmass consisting largely of olivine and pyroxene, with minor nickel-iron and troilite. The groundmass is pervaded with brown limonitic staining. Traces of fusion crust are present at the edges of the section. Microprobe analysis give the following results: the mean composition of olivine $Fa_{19.6}$ and %M.D. of 1.47, low-Ca pyroxene $Fs_{17.6}$ and %M.D. of 2.24

The meteorite is classified as an H5 chondrite.



Yamato-74013; 74097 Diogenite

Weight: 2059.5 gms; 2193.9 gms
 Dimension: 15.0 x 10.0 cm
 16.0 x 11.0 cm

Degree of Weathering: A
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°50'12"S 36°18'15"E
 71°49'30"S 36°19'30"E

Original Number: 74112511; 74120205
 Found: Nov. 25, 1974; Dec. 2, 1974
 K. Yanai et al.

Physical Description:

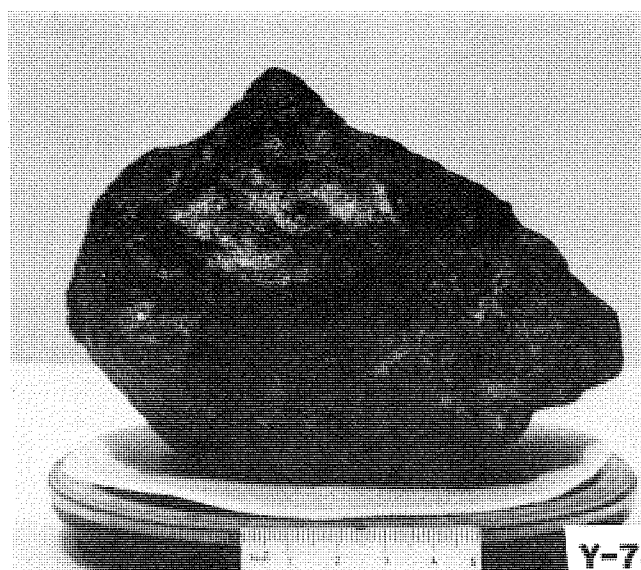
Yamato-74013 and 74097 are the largest masses of diogenite so far collected in the Yamato region; they are paired with many smaller specimens, and can be matched with Yamato-74037 (591.9 g, and 74136, 725.0 g) as pieces of a single stone (see photograph in Yanai, 1981, p.14). Yamato-74013 is an irregularly rounded stone, coated with remnants of thin lustrous black fusion crust except on fracture surfaces. The interior is olive-yellow, and consists almost entirely of finely granular orthopyroxene; accessory chromite is present as lustrous black crystals up to 4 mm in diameter. Yamato-74097 is a rectangular mass, similar in all respects to Yamato-74013; it shows parallel linear features (see photograph in Yanai, 1981, p.19, 20)

Petrographic Description:

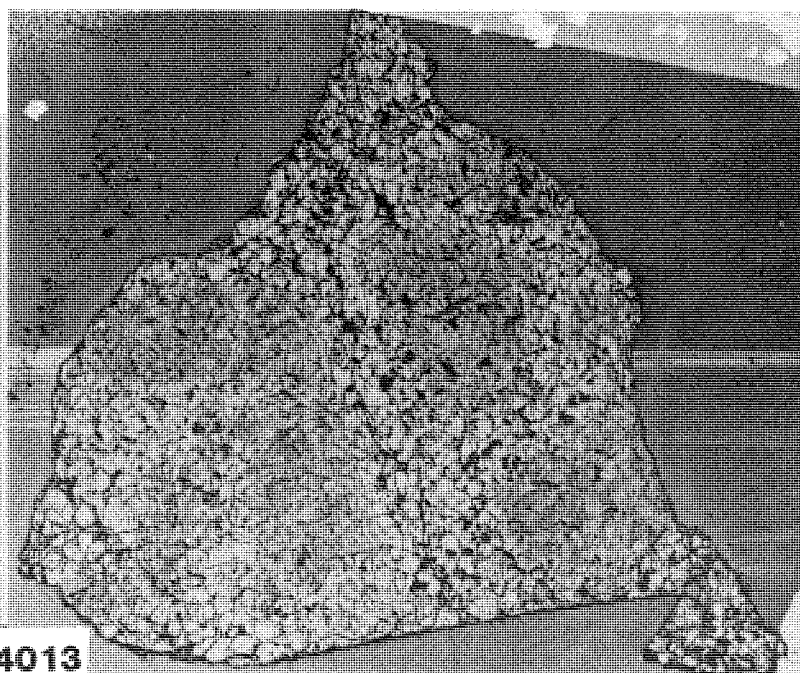
The meteorite consists almost entirely of orthopyroxene. The sizes of the pyroxenes are less than 1 mm. The texture is not brecciated and the pyroxene seems to have re-crystallized to a granoblastic texture with small change in mineral composition. A light-colored band consisting of coarse grained, transparent pyroxene crystals and forming a complex network can be observed between islands of fine-grained dark yellowishgreen colored crystals of pyroxene (0.05 to 0.1 mm in diameter) with numerous minute inclusions. Orthopyroxene ranges in composition from $\text{Ca}_{2.0} \text{Mg}_{74.8} \text{Fe}_{23.2}$ to $\text{Ca}_{2.2} \text{Mg}_{72.3}$

$\text{Fe}_{24.8}$ (average $\text{Ca}_{2.6} \text{Mg}_{73.6} \text{Fe}_{23.8}$).

The calcium and iron contents in the large clear orthopyroxenes appear to be slightly higher than those of inclusion-rich small ones. The opaque mineral inclusions in the pyroxenes are troilite, Co-rich Ni-rich metallic iron and chromite crystals. A silica mineral and plagioclase were found together with coarse-grained troilite.

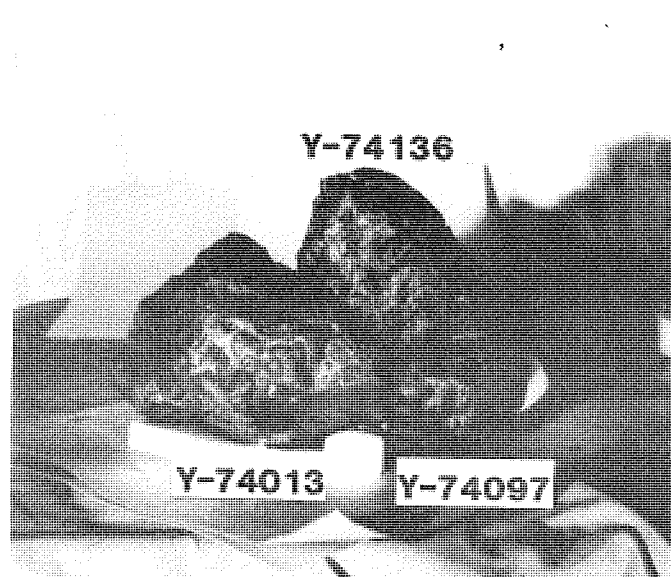


Y-74013



Bulk chemical compositions of these meteorite are shown as follow:

	Y-74013	Y-74097,41
SiO ₂	51.35	52.07
TiO ₂	0.13	0.08
Al ₂ O ₃	0.89	1.43
Fe ₂ O ₃	-	3.49
FeO	16.35	12.30
MnO	0.48	0.48
MgO	26.04	26.29
CaO	1.10	1.12
Na ₂ O	0.04	0.06
K ₂ O	0.02	0.03
H ₂ O(-)	0.00	0.13
H ₂ O(+)	0.4	0.33
P ₂ O ₅	0.09	0.05
Cr ₂ O ₃	2.49	1.08
NiO	0.0064	-
FeS	0.82	1.55
Ni	-	0.0040
Co	0.003	0.003
<hr/>		
Total	100.20	100.49



Yamato-74014

H6 Chondrite

Weight: 2367.9 gms	Location: Yamato Mountains, Antarctica
Dimension: 15.0 x 12.0 cm	71°50'08"S 36°18'10"E
Degree of Weathering: B	Original Number: 74112512
Degree of Fracturing:	Found: Nov. 25, 1974, K. Yanai et al.

Physical Description:

A complete crusted stone of pyramidal form; a chipped surface shows pale gray granular material with traces of chondritic structure. Brown weathering is present immediately below the crust and around metal grains.

Petrographic Description:

Chondrules are present but they are poorly defined, their margins merging with the granular groundmass which consists largely of olivine and pyroxene, with minor amounts of nickel-iron and troilite. The iron concentrations of olivine fall within the range of the known equilibrated (H) chondrites with the mean composition $Fa_{19.1}$ and % mean deviation of 0.87. The meteorite

contains sodium-rich plagioclases large enough to be analyzed by the electron microprobe technique. Weathering is moderate, with brown limonitic staining concentrated around metal grains. The meteorite is classified an H6 chondrite. Yabuki et al. (1978) have described this meteorite as follows:

This meteorite is an olivine-bronzite chondrite. Various types of chondrules, 0.2-2.0 mm in size, are still readily distinguishable, although they have a more or less rugged outline. Most part of the well-recrystallized granular matrix is thinly covered with a brownish weathered product.

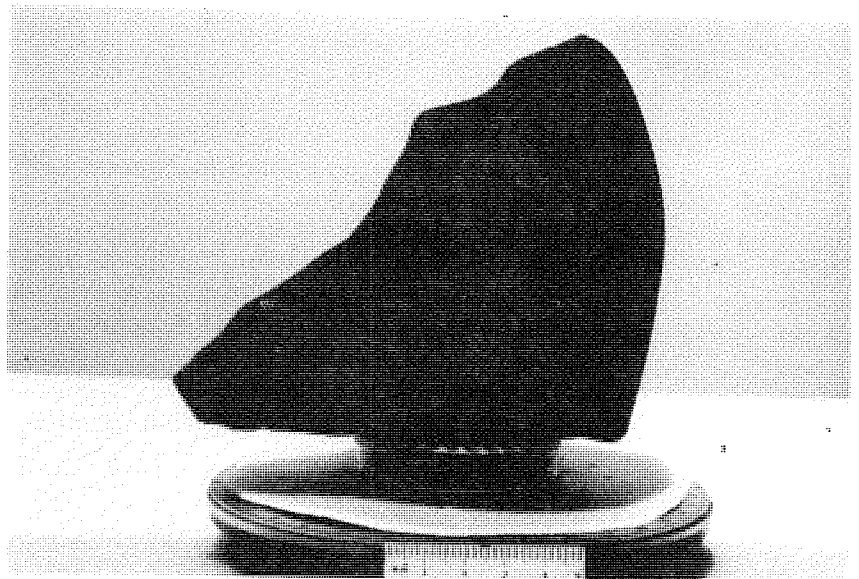
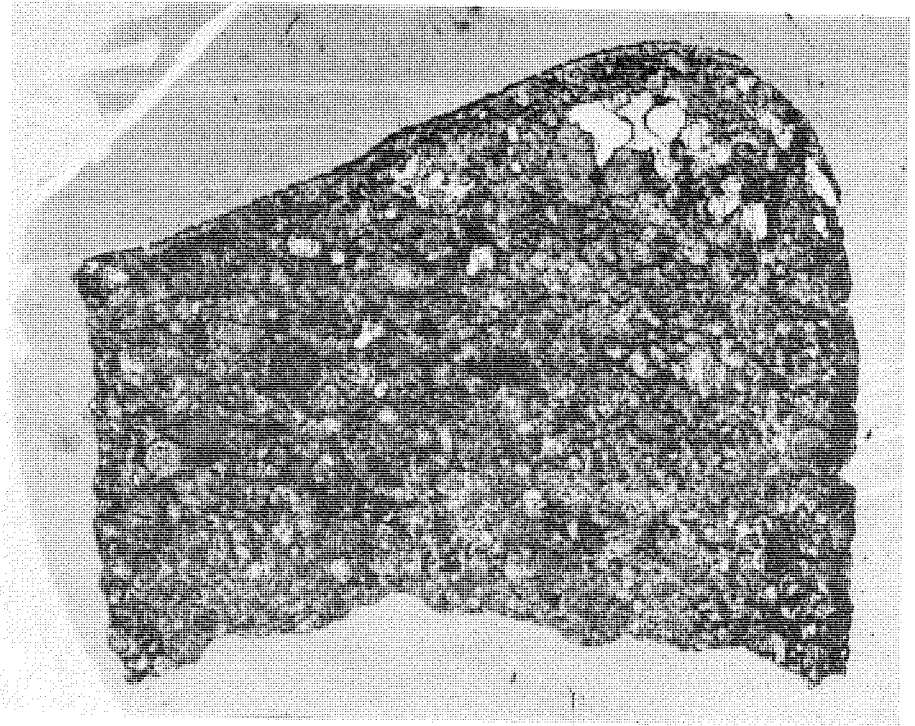
Olivine, which is the most predominant mineral, occurs usually as xenomorphic grains, but is idiomorphic within some chondrules. From optical properties, its composition is determined as $Fo_{82} Fa_{18}$ (mole percent).

Orthopyroxene occurs as xenomorphic crystals, colorless in thin section. The optical properties indicate a composition of $En_{80} Fs_{20}$ in mole percent.

The grains are sometimes partly surrounded by clinopyroxene with much higher birefringence, probably augite. The extinction angle (Z c) of the rim clinopyroxene is about 45°.

A small amount of plagioclase is present interstitial to other silicates and opaque minerals in both matrix and chondrules. Some grains show albite- or carlsbad twinning between crossed nicols. Optical properties suggest the molar composition of $An_{15} Ab_{85}$ - $An_{20} Ab_{80}$, belonging to a high-temperature oligoclase.

Among the opaque phases, kamacite is most predominant and usually occurs as irregular-shaped veins among silicates in the matrix. Taenite occurs in an intimate intergrowth with kamacite. Myrmekitic or plessitic intergrowth of both phases is not rare. Troilite is also very common and occurs in a xenomorphic form. Chromite is less than other opaque minerals in amount. Aggregates of fine-grained chromite are occasionally found within some chondrules as the interspatial material between silicate minerals.



Yamato-74015

L6 Chondrite

Weight: 88.0 gms
 Dimension: 5.0 x 3.6 cm
 Degree of Weathering: B
 Degree of Fracturing:

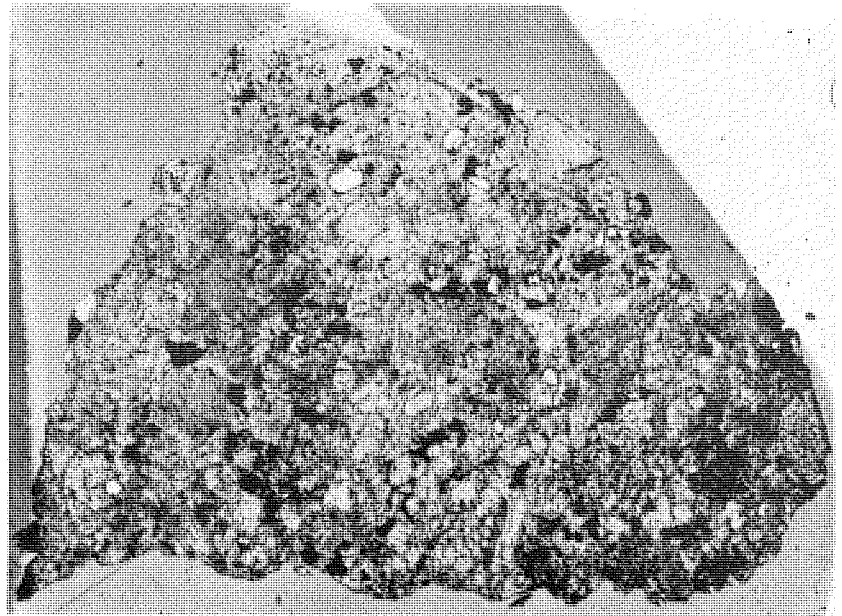
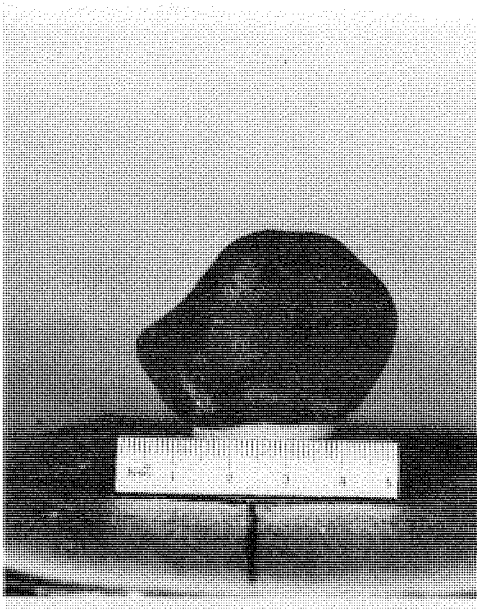
Location: Yamato Mountains, Antarctica
 71°48'14"S 36°14'05"E
 Original Number: 74112513
 Found: Nov. 25, 1974, K. Yanai et al.

Physical Description:

An almost complete angular stone with brownish black fusion: broken surfaces show a light grey (unoxidized) and brown (oxidized).

Petrographic Description:

Chondritic structure is poorly perceptible, some chondrules show radial chondrules of pyroxene, but most of the chondrules being integrated with groundmass as a granular aggregate of olivine and pyroxene, with minor amount of nickel-iron and troilite. In the thin section the meteorite was recognized barely weathering around the metal grains. Microprobe analysis give the following results: the mean composition of olivine $Fa_{26.7}$, low-Ca pyroxene $Fs_{22.1}$. Bulk chemical analysis give the meteorite belong to an L chondrite. The meteorite classified as an L6 chondrite.



Bulk chemical composition of Y-74015,71 meteorite is shown as follow:

SiO ₂	39.71
TiO ₂	0.07
Al ₂ O ₃	2.43
Fe ₂ O ₃	0
FeO	15.57
MnO	0.31
MgO	25.07
CaO	1.80
Na ₂ O	0.89
K ₂ O	0.09
H ₂ O(-)	0.09
H ₂ O(+)	0.2
P ₂ O ₅	0.26
Cr ₂ O ₃	0.56
FeS	5.76
Fe	6.23
Ni	1.15
Co	0.038
<hr/>	
Total	100.22

Yamato-74021,92

H5 Chondrite

Weight: 39.3 gms
 Dimension: 3.6 x 2.6 cm
 Degree of Weathering: C
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°47'38"S 36°10'55"E
 Original Number: 74112519
 Found: Nov. 25, 1974, K. Yanai et al.

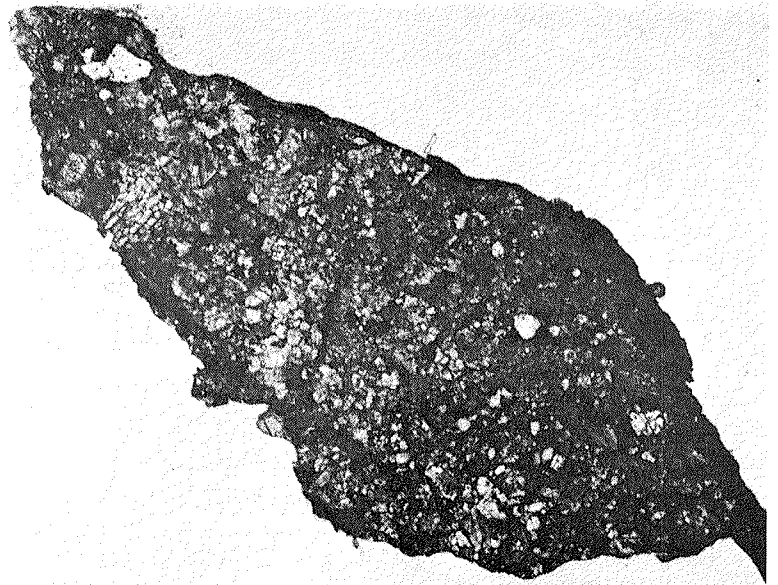
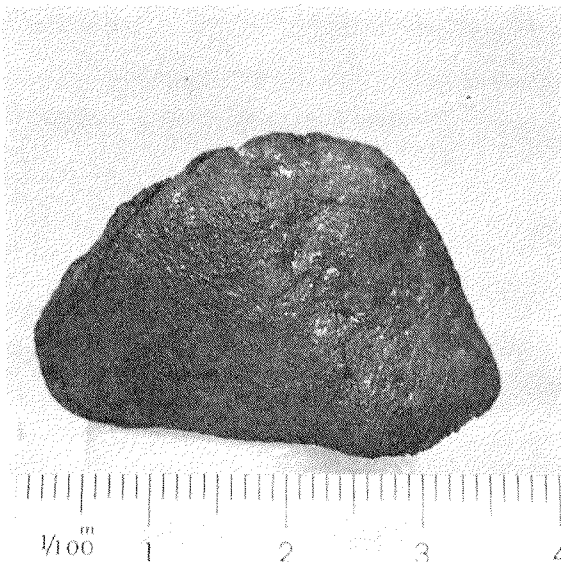
Physical Description:

About one-half of the stone has brownish-black fusion crust, and the remaining surface is weathered dark brown, obscuring the internal structure.

Petrographic Description:

Chondrules are fairly abundant, but their margins are indistinct, tending to merge with the groundmass of granular olivine and pyroxene with minor nickel-iron and troilite. The meteorite is extensively weathered, with brown limonitic staining throughout the section. Some areas of the section are blackened, probably a shock effect. Microprobe analyses give the following result; the mean composition $Fa_{19.9}$ and $\%M.D.$ of 4.13, $Fs_{18.1}$ and $\%M.D.$ of 5.12

(Matsueda et al. 1980). The meteorite is classified as an H5 chondrite.



Yamato-74022,92

LL5 Chondrite

Weight: 34.7 gms
 Dimension: 3.4 x 2.9 cm
 Degree of Weathering: A
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°50'55"S 36°19'05"E
 Original Number: 74112601
 Found: Nov. 26, 1974, K. Yanai et al.

Physical Description:

A pyramidal, almost completely crusted stone; a chipped surface is pale gray except for some brown halos around metal grains, and chondritic structure is not prominent.

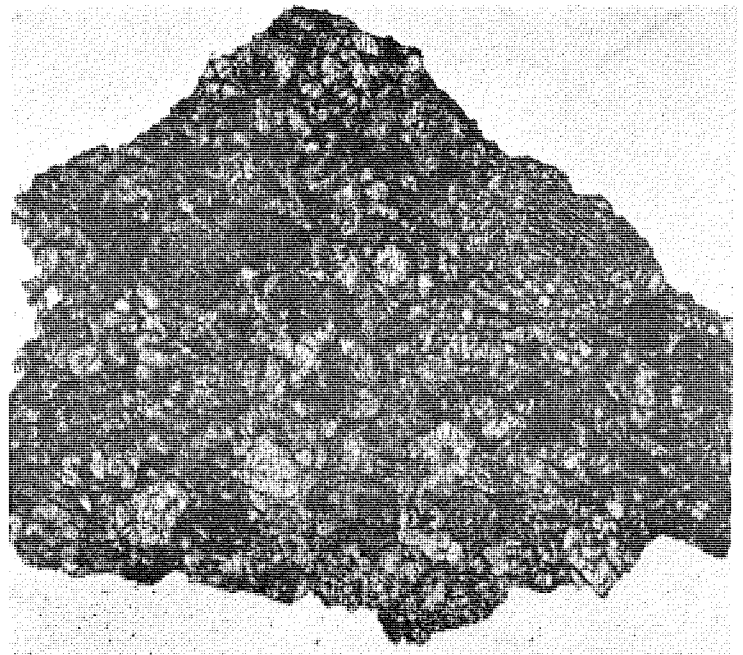
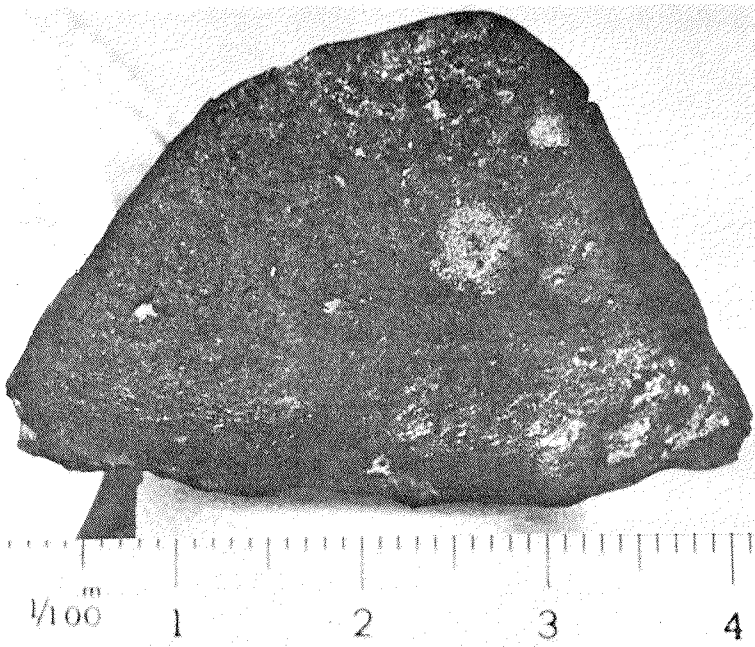
Petrographic Description:

Chondrules are moderately abundant but poorly defined, tending to merge with the granular groundmass, which consists largely of olivine and pyroxene with minor nickel-iron and troilite. Slight weathering is indicated by brown limonitic staining around metal grains. Fusion crust is present on one edge. Microprobe analysis show the chemical compositions:

	Average	%M.D.	Range
Olivine	Fa _{26.7}	1.45	Fa _{25.7-29.0}
Low-Ca pyroxene	Fs _{22.1}	1.0	Fs _{21.7-22.6}

Matsueda et al. (1980) give also the following results; mean composition Fa_{27.6} and %M.D. of 0.85, Fs_{23.8} and % M.D. of 2.24 (Matsueda et al. 1980).

The meteorite is classified as an LL5 chondrite.



Bulk chemical composition of the Y-74022,71 meteorite is shown as follow:

SiO ₂	40.63
TiO ₂	0.08
Al ₂ O ₃	2.61
Fe ₂ O ₃	0
FeO	17.24
MnO	0.32
MgO	24.86
CaO	1.77
Na ₂ O	0.95
K ₂ O	0.10
H ₂ O(-)	0.00
H ₂ O(+)	0.1
P ₂ O ₅	0.28
Cr ₂ O ₃	0.58
FeS	5.87
Fe	3.30
Ni	1.12
Co	0.033
<hr/>	
Total	99.84

Yamato-74024,81

L3 Chondrite

Weight: 50.0 gms
 Dimension: 5.0 x 2.8 x 2.4 cm
 Degree of Weathering: A
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'28"S 36°15'20"E
 Original Number: 74112603
 Found: Nov. 26, 1974, K. Yanai et al.

Physical Description:

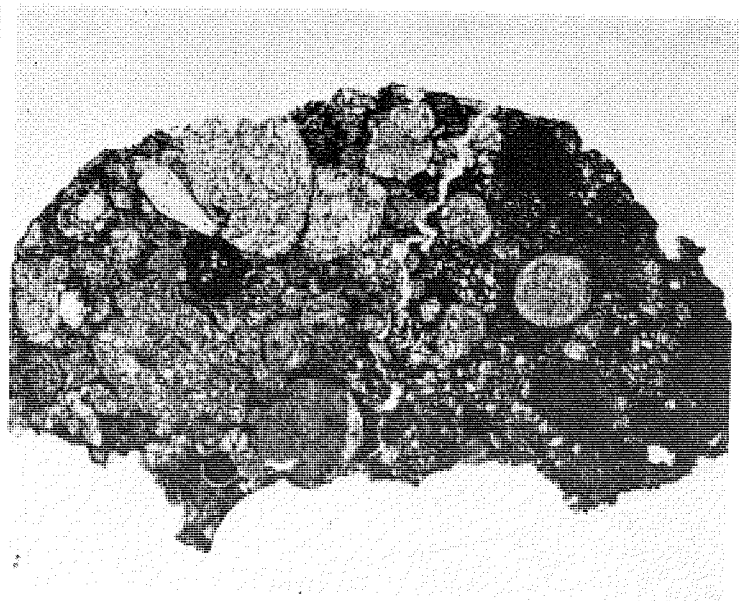
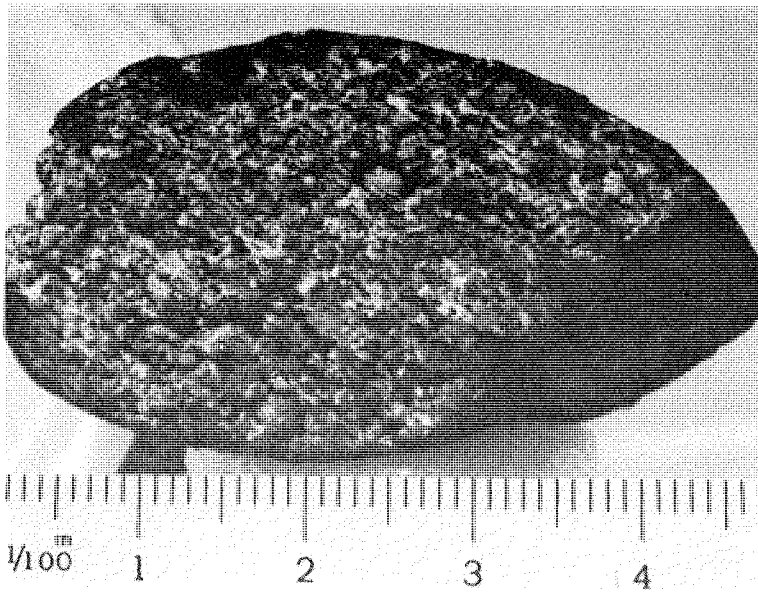
About one-half of the surface has brownish-black fusion crust; the interior is highly chondritic, medium gray in color, with rust halos around metal grains.

Petrographic Description:

Chondritic structure is well developed. The section shows a close-packed aggregate of chondrules and chondrule fragments, with a little interstitial fine-grained matrix, and some large grains of nickel-iron and troilite. A variety of chondrule types is present, including granular and porphyritic olivine and olivine-pyroxene, barred olivine and fine grained radiating pyroxene, with interstitial glass (some glass is brown in color, some is turbid and partially devitrified). Most of the pyroxene is polysynthetically twinned. Brown limonitic staining is associated with the nickel-iron grains. Microprobe analysis give the following results:

	Average	M.D.	Range
Olivine	Fa _{22.8}	14.2	Fa _{0.8-26.0}
Low-Ca pyroxene	Fs _{10.5}	55.5	Fs _{2.4-18.7}

The meteorite is classified as an L3 chondrite.



Bulk chemical composition of the Y-74024,72 meteorite is shown as follow:

SiO ₂	39.46
TiO ₂	0.09
Al ₂ O ₃	1.61
Fe ₂ O ₃	0
FeO	15.09
MnO	0.30
MgO	25.69
CaO	2.79
Na ₂ O	0.92
K ₂ O	0.10
H ₂ O(-)	0.04
H ₂ O(+)	0.2
P ₂ O ₅	0.23
Cr ₂ O ₃	0.49
FeS	7.84
Fe	4.44
Ni	0.97
Co	0.029
<hr/>	
Total	100.28

Yamato-74035

L6 Chondrite

Weight: 115.7 gms
Dimension: 5.8 x 3.7 cm
Degree of Weathering: B
Degree of Fracturing:

Location: Yamato Mountains, Antarctica
71°48'06"S 36°08'35"E
Original Number: 74112701
Found: Nov. 27, 1974, K. Yanai et al.

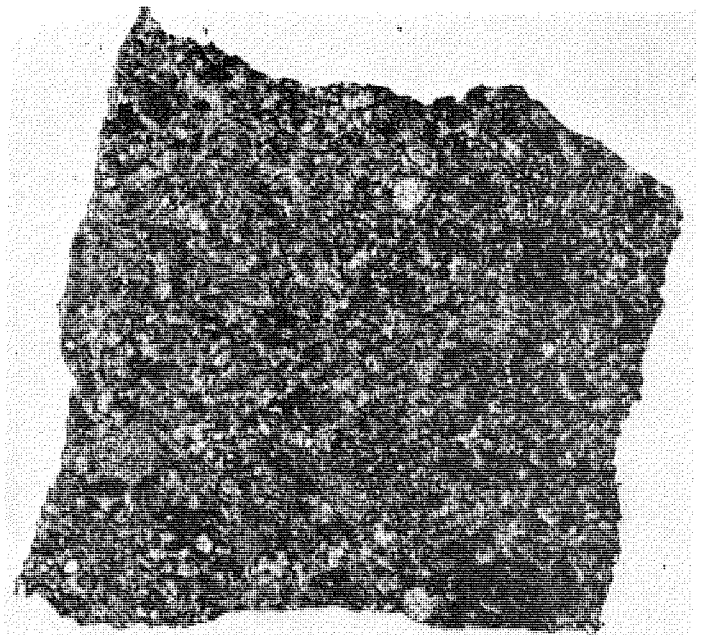
Physical Description:

A partly crusted fragment; structure surfaces are weathered brown, and the interior appears to be finely granular with little trace of chondritic structure.

Petrographic Description:

Chondrules are sparse and poorly defined, merging with the granular ground-mass, which consists of olivine and pyroxene with minor amounts of plagioclase, nickel-iron, and troilite. Some weathering is indicated by brown limonitic staining around nickel-iron grains. The iron concentration of olivine falls within the range of equilibrated L6 chondrites with the mean composition $Fa_{24.5}$ and % M.D. of 0.94; the meteorite contains sodium-rich

plagioclase large enough for analysis by the electron microprobe technique (Yanai et al., 1978). The meteorite is classified as an L6 chondrite.



Yamato-74036

L6 Chondrite

Weight: 201.4 gms
 Dimension: 7.2 x 5.1 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°48'54"S 36°11'35"E
 Original Number: 74112702
 Found: Nov. 27, 1974, K. Yanai et al.

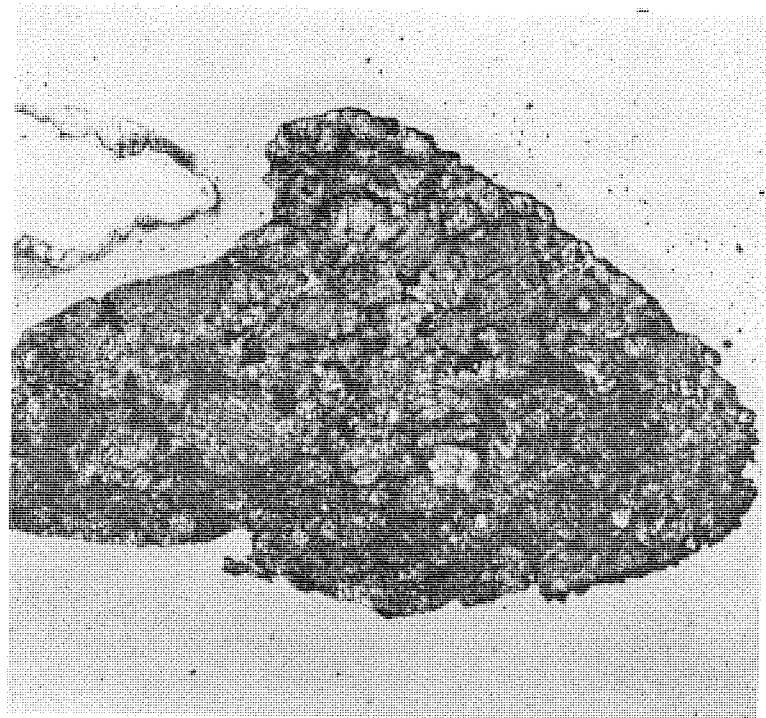
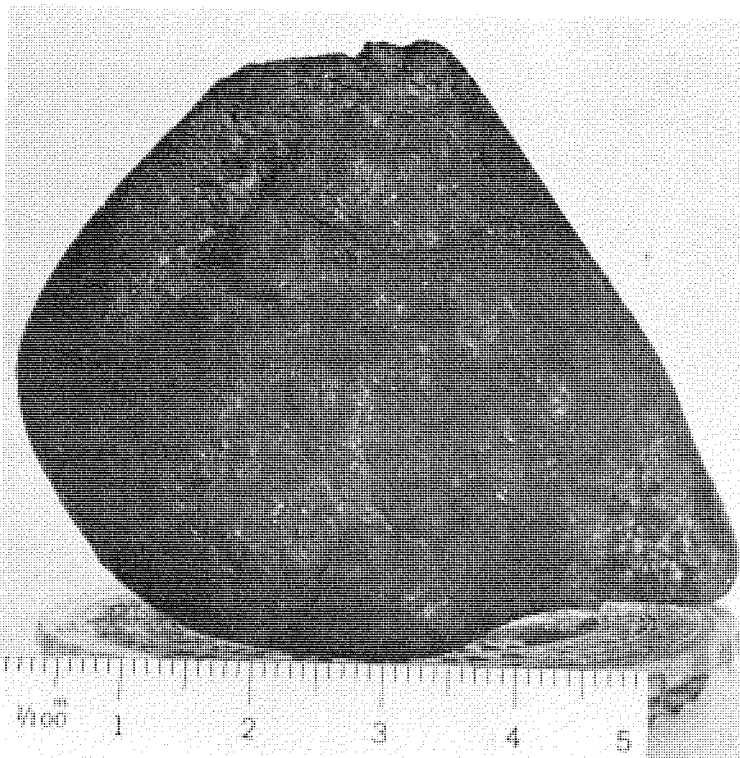
Physical Description:

An almost complete pyramidal stone with brownish black fusion crust; broken surfaces show a pale gray poorly chondritic interior, with brown weathering concentrated below the fusion crust.

Petrographic Description:

Chondrules are moderately abundant, but their margins are poorly defined because of integration with the granular groundmass, consisting largely of olivine and pyroxene, with minor amounts of plagioclase, nickel-iron and troilite. Moderate weathering is indicated by veinlets and small areas of red-brown limonite usually in association with nickel-iron grains. The iron concentrations of olivine fall within the range of the known equilibrated L6 chondrites with the mean composition $Fa_{25.2}$ and %M.D. of 1.4. The meteorite

is classified as an L6 chondrite.



Yamato-74038,94

H5 Chondrite

Weight: 208.9 gms
Dimension: 6.8 x 5.8 cm
Degree of Weathering: B
Degree of Fracturing:

Location: Yamato Mountains, Antarctica
71°49'30"S 36°14'25"E
Original Number: 74112704
Found: Nov. 27, 1974, K. Yanai et al.

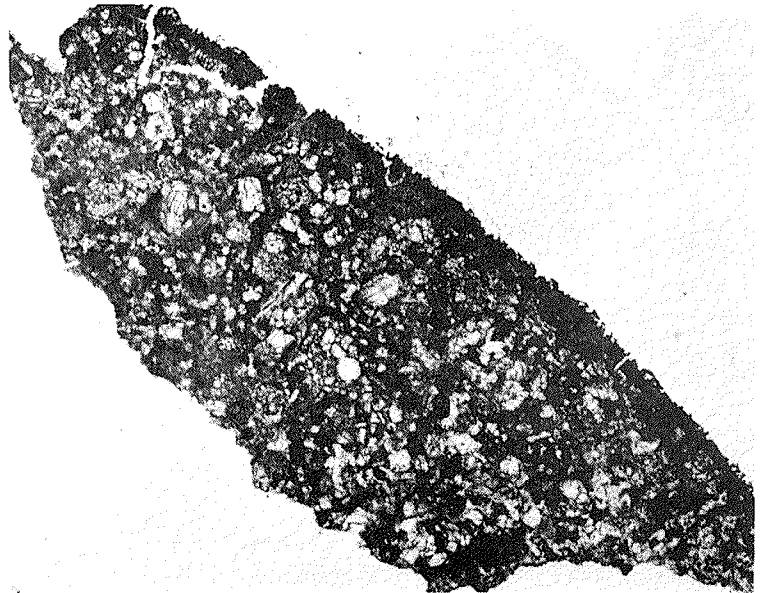
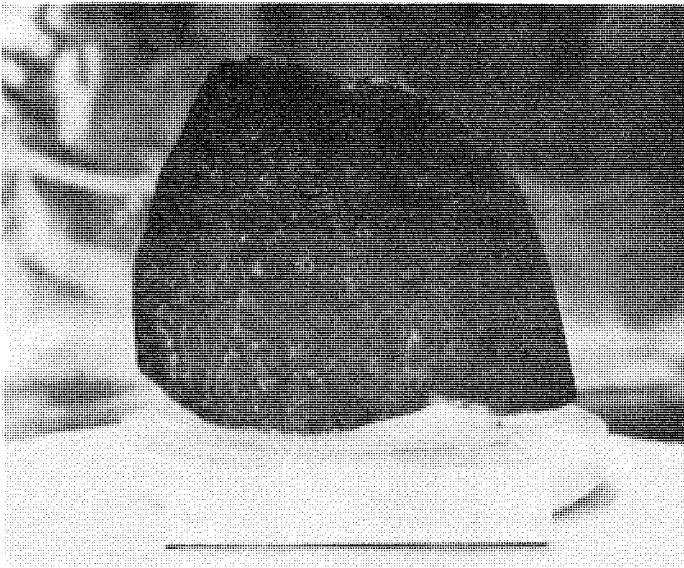
Physical Description:

A complete individual with brownish-black fusion crust, and a gray interior showing small chondrules under 0.5 mm in diameter.

Petrographic Description:

Chondritic structure is well defined, but the chondrules tend to merge with the granular groundmass, which consists largely of olivine and pyroxene with some nickel-iron and troilite. Well-preserved fusion crust rims part of the section. Brown limonitic staining is present, concentrated below the fusion crust. The iron concentrations of olivine fall within the range of equilibrated H chondrites with the mean composition $Fa_{18.9}$ and % M.D. of

1.3 (Yanai et al., 1978). The meteorite is classified as an H5 chondrite.



Yamato-74039

L6 Chondrite

Weight: 47.6 gms
 Dimension: 5.9 x 2.7 cm
 Degree of Weathering: A
 Degree of Fracturing:

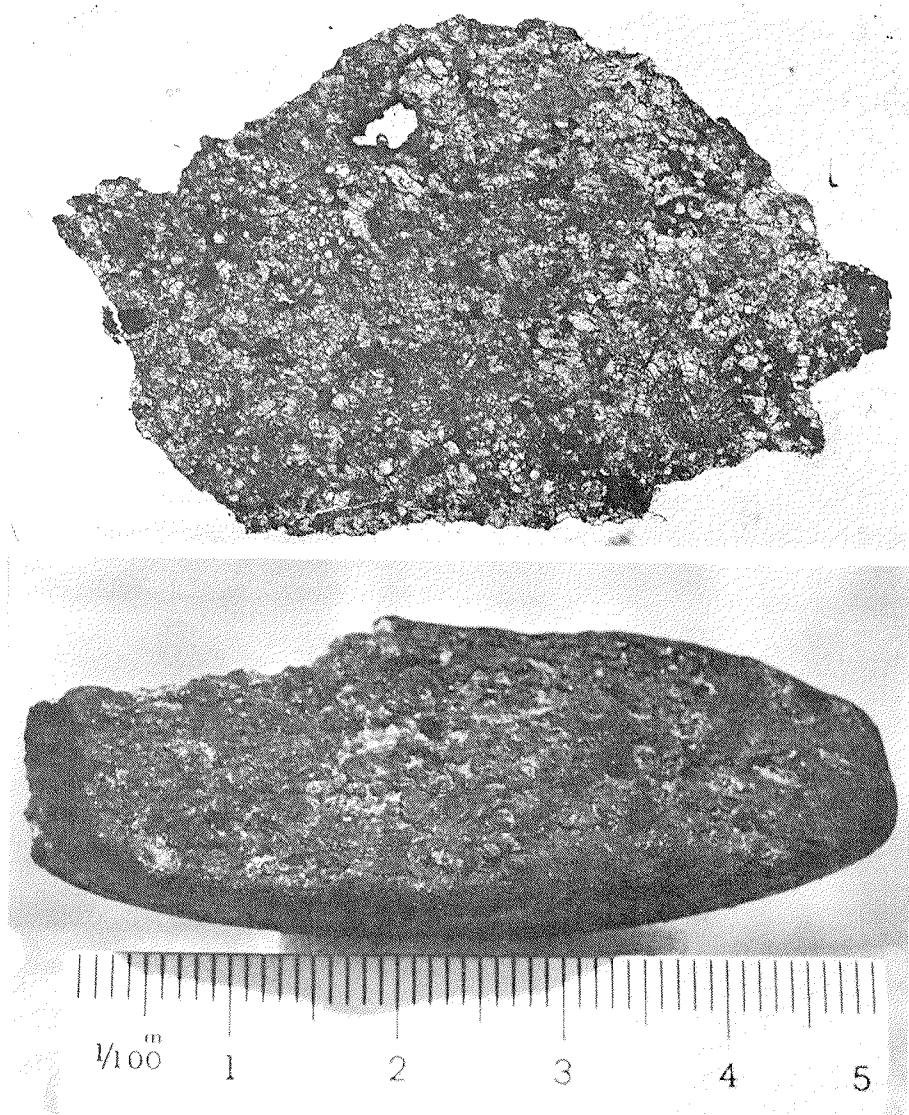
Location: Yamato Mountains, Antarctica
 71°49'39"S 36°14'40"E
 Original Number: 74112705
 Found: Nov. 27, 1974, K. Yanai et al.

Physical Description:

An almost complete boat-shaped stone with different degrees of fusion crust on different surfaces; the interior is pale gray, granular, with traces of chondritic structure. Slight brown weathering is present on the surface.

Petrographic Description:

Chondrules are present, but their margins are diffuse, being integrated the granular groundmass, which consists largely of olivine and pyroxene with minor amounts of plagioclase, nickel-iron, and troilite. Slight weathering is indicated by brown limonitic staining around some metal grains. The meteorite is classified as an L6 Chondrite. Microprobe analysis give the following result: olivine $Fa_{25.8}$ and $\%M.D.$ of 2.03, low-Ca pyroxene $Fs_{22.5}$ and $\%M.D.$ of 2.33 (Matsueda et al. 1980).



Yamato-74044

Pallasite

Weight: 51.8 gms
Dimension: 4.7 x 2.5 x 1.7 cm
Degree of Weathering: B
Degree of Fracturing:

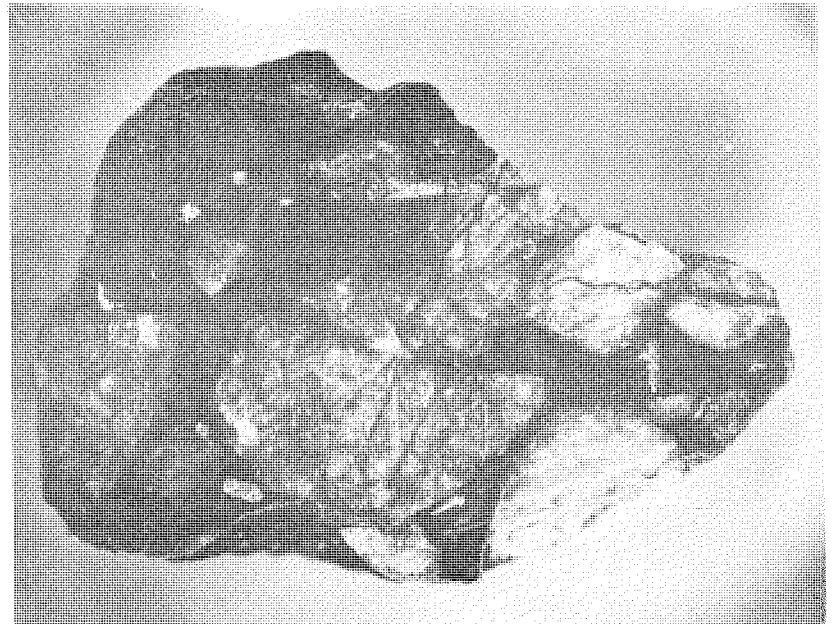
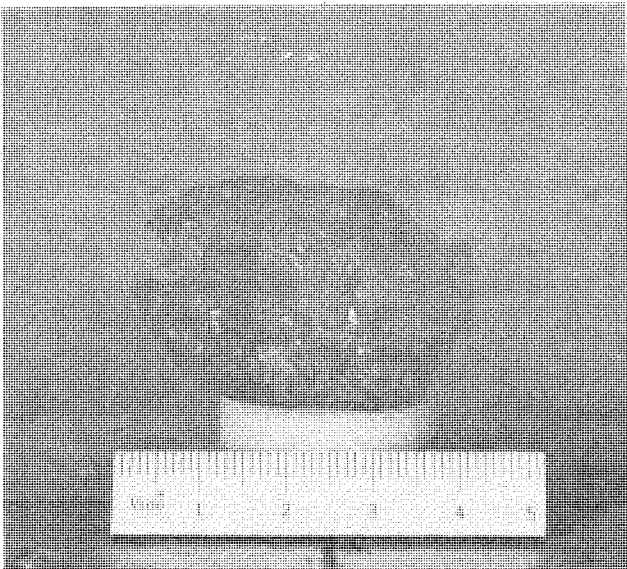
Location: Yamato Mountains, Antarctica
71°47'36"S 36°11'15"E
Original Number: 74112710
Found: Nov. 27, 1974, K. Yanai et al.

Physical Description:

A small rectangular fragment without recognizable fusion crust, consisting of brownish-black weathered nickel-iron enclosing euhedral to subhedral olivine crystals up to 1 cm across; the olivine has a rusty brown surface, but the interior is olive-yellow and unweathered. This is the only stony-iron meteorite found in the Yamato collection.

Petrographic Description:

Olivine crystals with uniform chemical composition, chromite and troilite are enclosed in the iron-nickel alloy. The nickel content of olivine appears to be low for the small sized crystal in kamacite, and high for a large crystal. The Fe-Ni metal exhibits Widmanstätten texture. The microprobe traverse of a taenite portion 0.2 mm thick exhibits the characteristic M-shaped pattern. The chemical compositions given in below are the value of the center of the M-shaped pattern with the lowest Ni content, that of kamacite around taenite, and that of taenite with the highest Ni content (46% Ni) (Takeda et al. 1978).



Yamato-74048,91

LL6 Chondrite

Weight: 67.1 gms
 Dimension: 5.0 x 4.0 cm
 Degree of Weathering: B
 Degree of Fracturing:

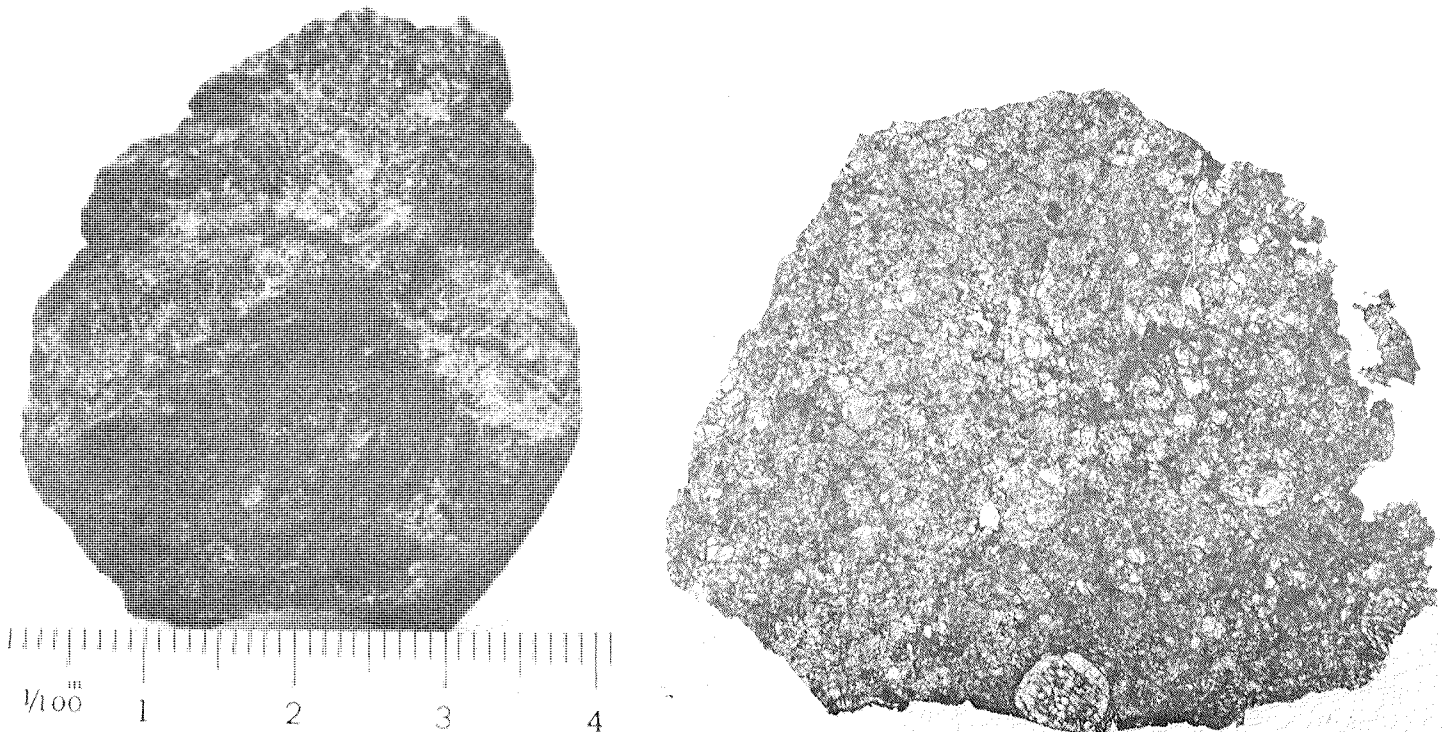
Location: Yamato Mountains, Antarctica
 71°48'15"S 36°17'30"E
 Original Number: 74112804-1
 Found: Nov. 28, 1974, K. Yanai et al.

Physical Description:

A fairly complete partly crusted stone, the crust showing two different fusion stages. The interior is medium gray in color, finely granular, and without visible chondrules. Metal grains are rare.

Petrographic Description:

Chondrules are few and poorly defined, the meteorite consisting largely of granular olivine and pyroxene with a cataclastic and brecciated texture. Nickel-iron and troilite are present in small amount (less than 5%). Minor limonitic staining is present. Remnants of fusion crust rim one edge. Microprobe analysis give the following result: the mean composition of olivine $Fa_{30.3}$ and %M.D. of 1.4, low-Ca pyroxene $Fs_{25.6}$ and %M.D. of 1.55. The meteorite is classified as an LL6 chondrite.



Yamato-74054

H4 Chondrite

Weight: 134.9 gms
 Dimension: 7.0 x 5.3 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°48'15"S 36°17'30"E
 Original Number: 74112804
 Found: Nov. 28, 1974, K. Yanai et al.

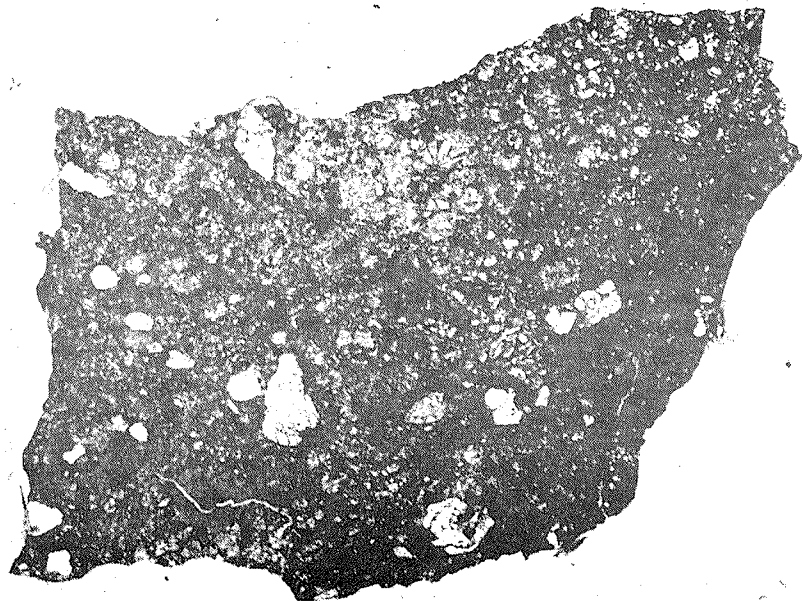
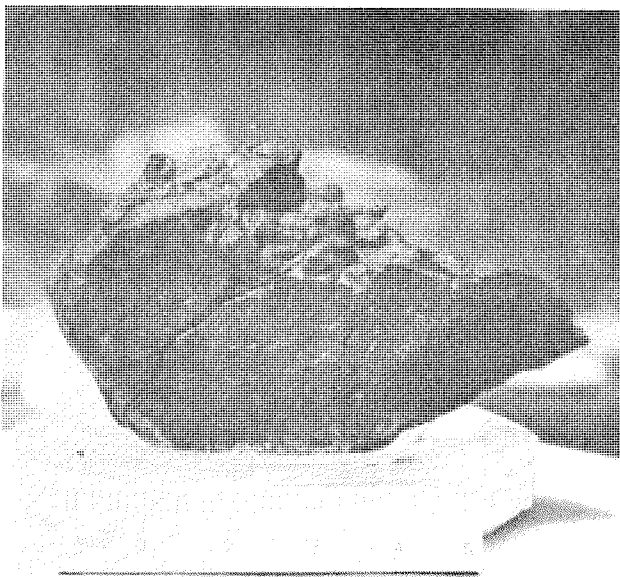
Physical Description:

A weathered partly crusted fragment; brown weathering obscures the internal structure, but some chondrules can be seen. Most pieces from Yamato-74048 to 74064 seem to fit for their physical features.

Petrographic Description:

Chondritic structure is well developed, with numerous chondrules and chondrule fragments. The groundmass consist largely of fine-grained olivine and pyroxene, with minor amounts of coarser-grained nickel-iron and troilite. Some of the pyroxene is polysynthetically twinned clinobronzite. Moderate weathering is indicated by brown limonitic staining concentrated around metal grains. Both olivine and pyroxene are variable in composition with the peak at iron concentrations appropriate of the equilibrated H group chondrites. Microprobe analysis show olivine ranging in composition from Fa_{18} to Fa_{21} and with the mean composition of $Fa_{19.0}$ and $\%M.D.$ of 2.6.

The meteorite is classified as an H4 Chondrite.



Yamato-74065,74, 66 L6 with L4 areas

Weight: 12.1 gms
 Dimension: 2.0 x 1.8 cm
 Degree of Weathering: A
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°47'59"S 36°17'25"E
 Original Number: 74112805
 Found: Nov. 28, 1974, K. Yanai et al.

Physical Description:

Yamato-74065 and 74066 are pieces of a single meteorite. They are crusted fragments with pale gray interior showing some chondritic structure. Slight weathering is indicated by brown halos around some metal grains.

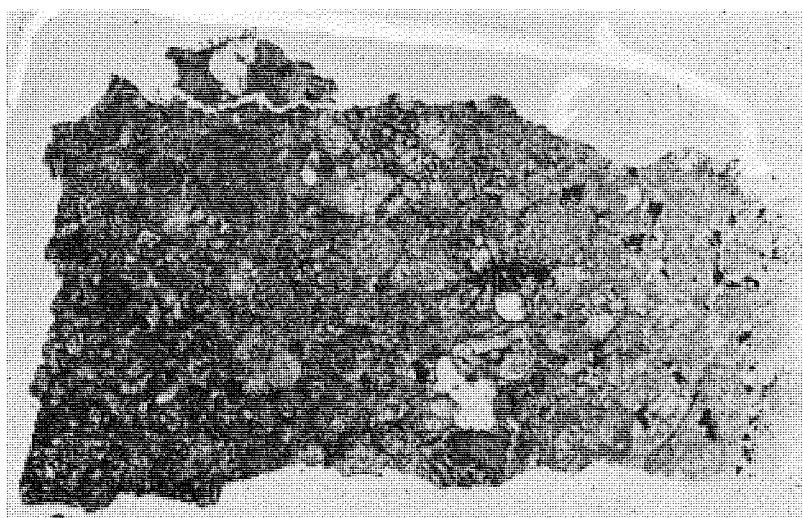
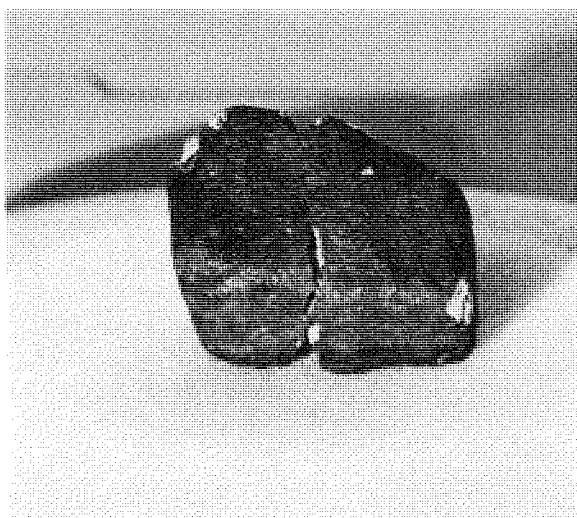
Petrographic Description:

Parts of the section show well-developed chondritic structure, whereas in other parts chondrules are few and poorly defined, merging with the granular groundmass of olivine and pyroxene, with minor nickel-iron and troilite. The meteorite appears to be unweathered. Yanai et al (1978) report (as 74067, in error) olivine of composition $Fa_{25.1}$ with % M.D. of 1.6, and

sodium-rich plagioclase large enough to be analyzed by the microprobe technique, these results indicate an L6 classification. The highly chondritic areas contain twinned clinobronzite, and these areas can be classified L4. Microprobe analysis give also the following result:

	Average	%M.D.	Range
Olivine	$Fa_{24.4}$	1.5	$Fa_{23.2-24.8}$
Low-Ca pyroxene	$Fs_{20.2}$	1.4	$Fs_{19.6-21.1}$

The meteorite appears to be a breccia of L6 and L4 material.



Yamato-74070,91

H5 Chondrite

Weight: 58.7 gms
 Dimension: 6.7 x 2.7 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°48'42"S 36°24'45"E
 Original Number: 74112904
 Found: Nov. 29, 1974, K. Yanai et al.

Physical Description:

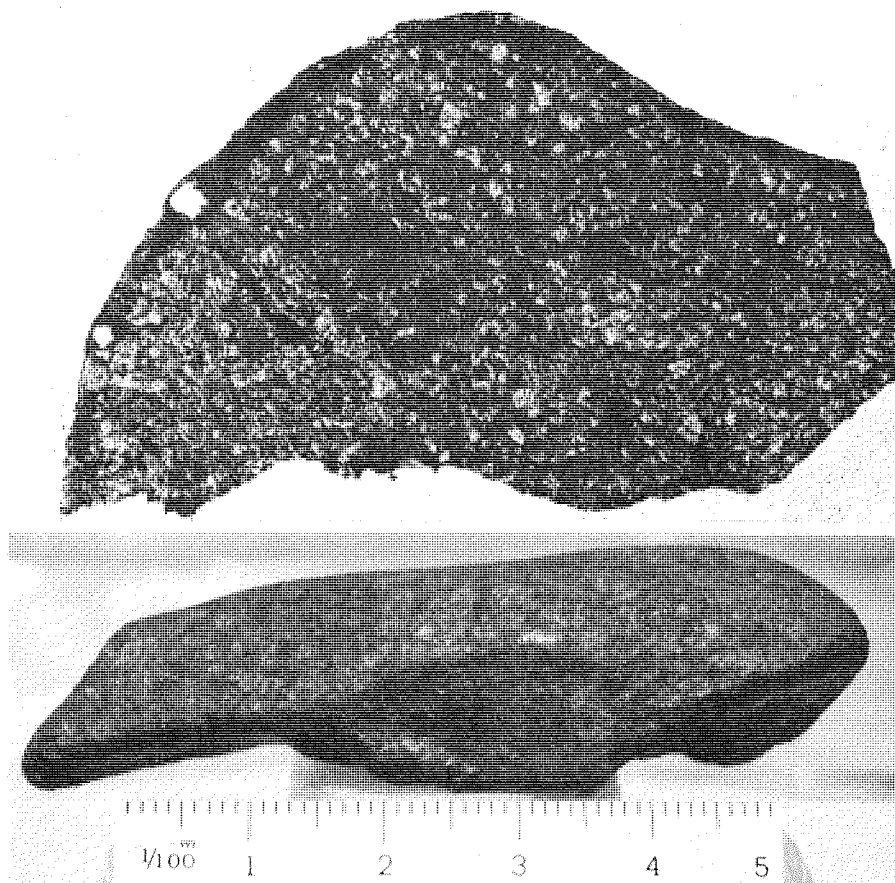
A complete stone, elongated in form and covered with brownish-black fusion crust. A chipped surface shows a dark gray interior with chondritic structure. Rusty brown weathering is concentrated below the fusion crust.

Petrographic Description:

Chondritic structure is present, but many of the chondrules appear to be fragmented, and their margins are ill-defined, merging with the granular groundmass. The groundmass consists largely of olivine and pyroxene, with minor nickel-iron and lesser amounts of troilite. Some of the nickel-iron and troilite occur as veinlets in the silicates. Well-preserved fusion crust rims part of the section. Brown limonitic staining is present throughout. The fragmentation of the chondrules and the veinlets of nickel-iron indicate that the meteorite has been shocked. Microprobe analysis give the following result:

	Average	%M.D.	Range
Olivine	Fa _{18.7}	1.8	Fe _{17.9-19.6}
Low-Ca pyroxene	Fs _{16.6}	1.7	Fs _{15.9-17.2}

Matsueda et al. (1980) present also the compositions of Olivine Fa_{20.6} and %M.D. of 5.37, Low-Ca pyroxene Fs_{18.7} and %M.D. of 5.38. The meteorite is classified as an H5 chondrite.



Yamato-74073,93

H5 Chondrite

Weight: 29.9 gms
 Dimension: 5.1 x 2.7 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°48'57"S 36°25'30"E
 Original Number: 74112907
 Found: Nov. 29, 1974, K. Yanai et al.

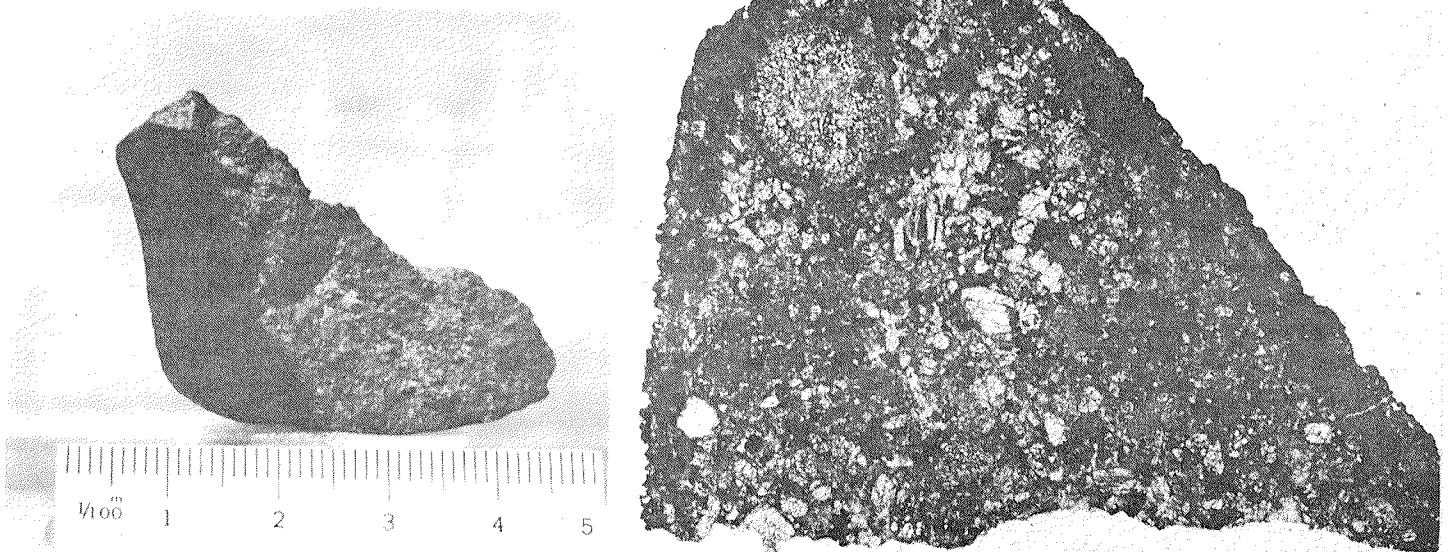
Physical Description:

A partly crusted fragment; a chipped surface shows a pale gray interior with traces of chondritic structure. The surface is weathered brown, and rusty halos surround metal grains.

Petrographic Description:

Chondrules are moderately abundant, but their margins are ill-defined, tending to merge with the granular groundmass, which consists largely of olivine and pyroxene with minor amounts of nickel-iron and troilite. Some weathering is indicated by brown limonitic staining in parts of the section. Well-preserved fusion crust is present. Microprobe analysis give the mean composition of olivine $Fa_{19.5}$ and %M.D. of 3.08, low-Ca pyroxene $Fs_{17.6}$ and

%M.D. of 3.19 (Matsueda et al.). The meteorite is classified as an H5 chondrite.



Yamato-74074,93

H5 Chondrite

Weight: 54.2 gms
Dimension: 5.0 x 3.0 cm
Degree of Weathering: B
Degree of Fracturing:

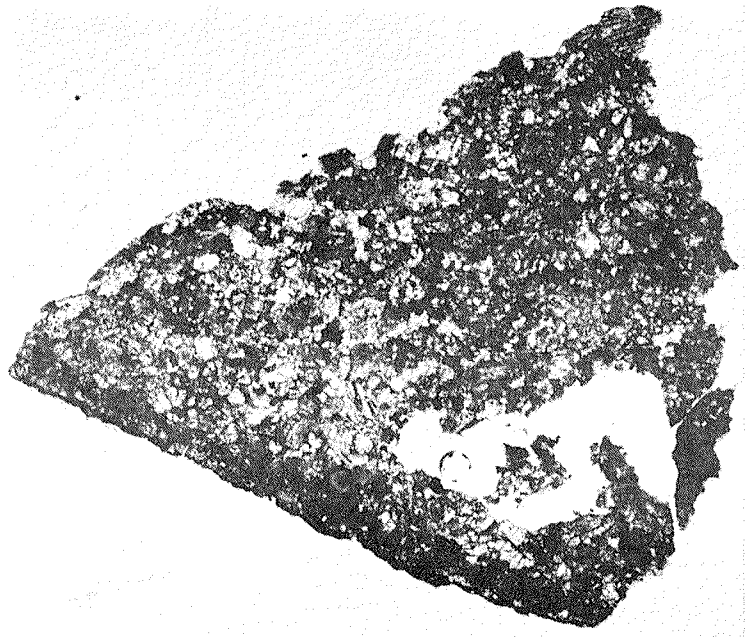
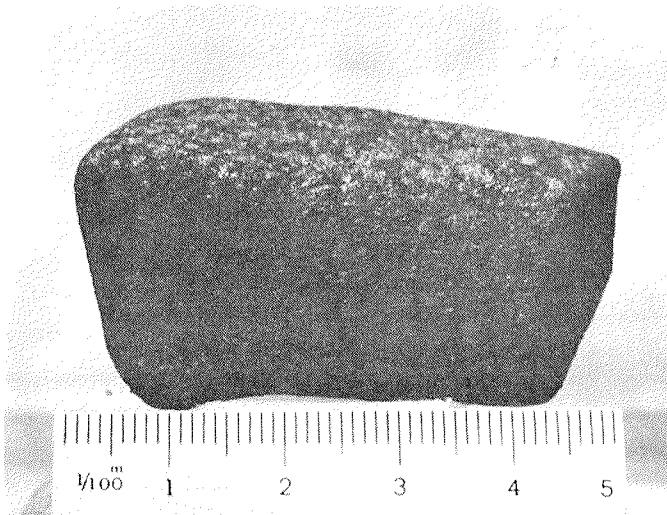
Location: Yamato Mountains, Antarctica
71°49'01"S 36°25'20"E
Original Number: 74112908
Found: Nov. 29, 1974, K. Yanai et al.

Physical Description:

A complete crusted stone, rhomboid in form. The interior is pale gray with traces of chondritic structure. Rusty halos surround metal grains.

Petrographic Description:

Chondritic structure is well-developed, but the chondrules tend to merge with the granular groundmass, which consists largely of olivine and pyroxene, with minor amounts of nickel-iron and troilite. Brown limonitic staining is present around nickel-iron grains. Well-preserved fusion crust rims part of the section. The meteorite is classified as an H5 chondrite.



Yamato-74077

L6 Chondrite

Weight: 5575.1 gms
 Dimension: 20.0 x 18.5 x 10.0 cm
 Degree of Weathering: A
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°50'08"S 36°21'30"E
 Original Number: 74112911
 Found: Nov. 29, 1974, K. Yanai et al.

Physical Description:

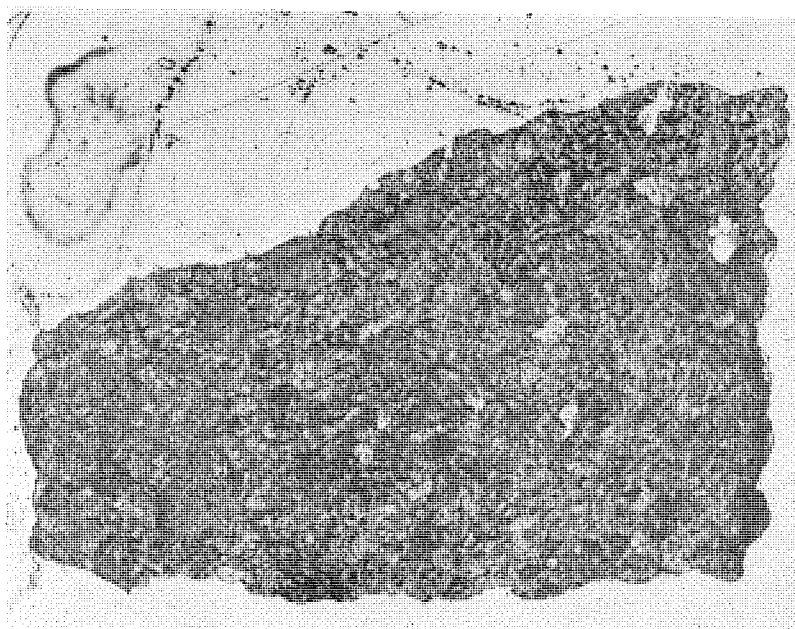
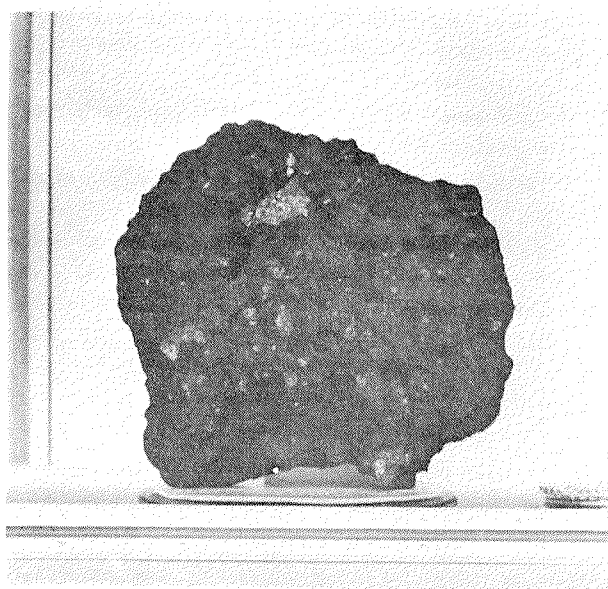
A complete stone with a brownish-black fusion crust, the largest specimen of the Yamato-1974 collection. It is a flat cone with well developed regmaglypts. Exposed surfaces are weathered brown, but the interior is pale gray and almost unweathered.

Petrographic Description:

Chondrules are few and are poorly defined, being barely distinguishable from the granular groundmass, which consists of olivine and pyroxene with minor amounts of plagioclase, nickel-iron and troilite. A little limonitic staining is present around the metal grains. Some blackened areas are present, probably produced by localized shock. Microprobe analysis give the following result:

	Average	M.D.	Range
Olivine	Fa _{21.8}	1.7	Fa _{20.9-23.2}
Low-Ca pyroxene	Fs _{18.4}	1.5	Fs _{17.4-19.1}

The meteorite is classified as an L6 chondrite.



Yamato-74080

L6 Chondrite

Weight: 536.9 gms
 Dimension: 9.5 x 8.0 cm
 Degree of Weathering: A
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'10"S 36°11'55"E
 Original Number: 74112914
 Found: Nov. 29, 1974, K. Yanai et al.

Physical Description:

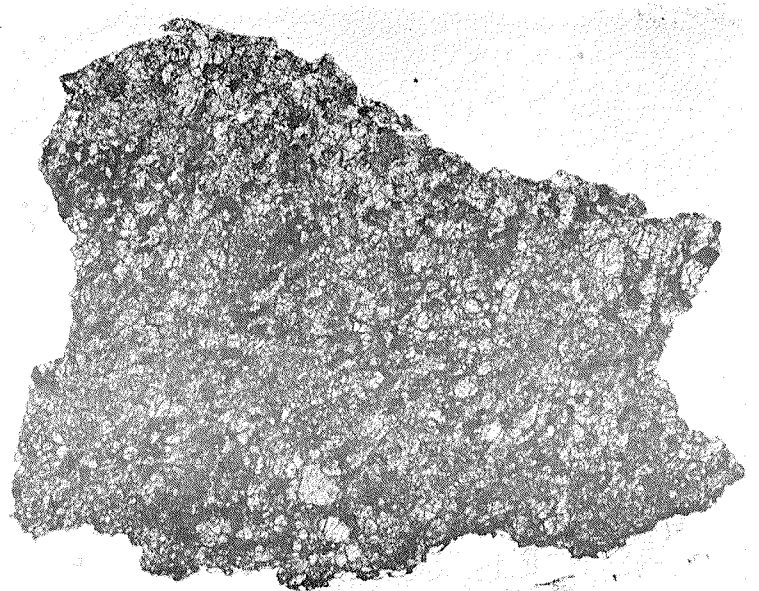
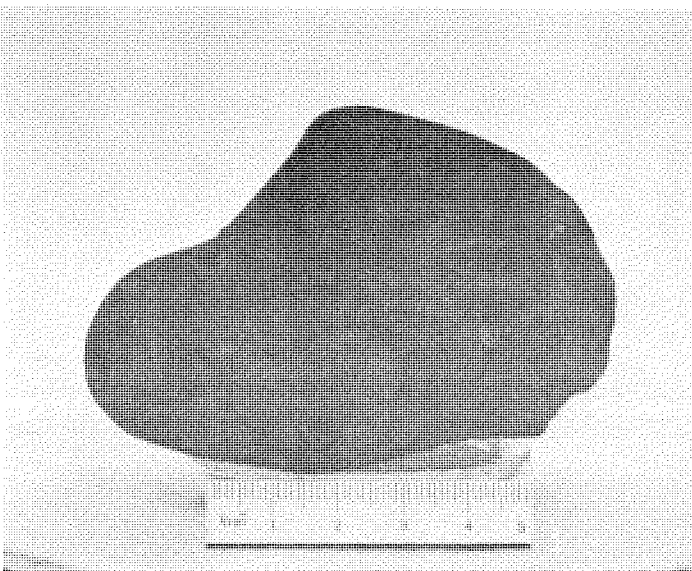
A complete individual, well rounded, with brownish-black fusion crust and light gray interior. Slight weathering is indicated by rusty halos around some metal grains.

Petrographic Description:

Chondrules are few and poorly defined, merging with the granular groundmass of olivine and pyroxene, with minor amounts of plagioclase, nickel-iron, and troilite. The meteorite is essentially unweathered, with only traces of limonitic staining in association with metal grains. Yabuki et al (1978) have described this specimen as follows: This meteorite belongs to an olivine-hypersthene chondrite and consists for the most part of olivine, orthopyroxene, kamacite-taenite and troilite with accessory clinopyroxene, apatite, plagioclase and chromite. Individual minerals are essentially xenomorphic and show an intensively fractured feather. Most silicate grains show extensively distinct undulatory extinction, and kink bands are also observed in some olivine and orthopyroxene grains. Some grains of plagioclase show a thin lamellar structure. This feature may be explained by fairly strong shock deformation due to pre-terrestrial collision. Few chondrules are identifiable in the thin section without the aid of crossed polarized light. Molar composition of olivine is $Fo_{77} Fa_{23}$ by optical properties and d_{130} spacing in X-ray powder pattern. Orthopyroxene, $En_{75} Fs_{25}$, is sometimes locally concentrated in some parts of the entire mass. Clinopyroxene occurs as exsolved thin lamellae in orthopyroxene or as a thin reaction rim around orthopyroxene grains. A small amount of apatite occurs in xenomorphic forms interstitial to silicates. It is characterized by very low birefringence and lower relief than mafic minerals. It occasionally shows weak cleavages and fractured appearance. Plagioclase (An_{17-18}) of accessory amount also occurs interstitial to other silicates. It often contains many minute grains of pyroxene and olivine in rounded shapes. In some chondrules plagioclase occurs as interspatial material separating bar-shaped olivine crystals. Kamacite is the most predominant opaque mineral, frequently attaining to 1.0 mm. Taenite occurs mostly in an intimate intergrowth with kamacite, but it is occasionally seen as an isolated grain. Troilite is also dominant and often shows a somewhat fractured feature. Chromite occurs not only as massive crystals but also as aggregates of numerous minute grains in idiomorphic forms. Native copper is present only in a trace amount associated with troilite fragments within metallic nickel-iron grains. Copper shows a characteristic pink color and high reflectivity. The meteorite is classified as an L6 chondrite.

Bulk chemical composition of the Y-74080,79 meteorite is shown as follow:

SiO ₂	39.99
TiO ₂	0.06
Al ₂ O ₃	2.60
FeO	17.61
MnO	0.34
MgO	27.03
CaO	1.53
Na ₂ O	0.94
K ₂ O	0.07
H ₂ O(-)	0.05
H ₂ O(+)	0.0
P ₂ O ₅	0.31
Cr ₂ O ₃	0.52
NiO	0.46
FeS	4.35
Fe	3.29
Ni	0.52
Co	0.028
<hr/>	
Total	99.69



Yamato-74081,93

H4 Chondrite

Weight: 102.5 gms
 Dimension: 4.2 x 3.5 x 3.2 cm
 Degree of Weathering: C
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°48'19"S 36°10'30"E
 Original Number: 74112915
 Found: Nov. 29, 1974, K. Yanai et al.

Physical Description:

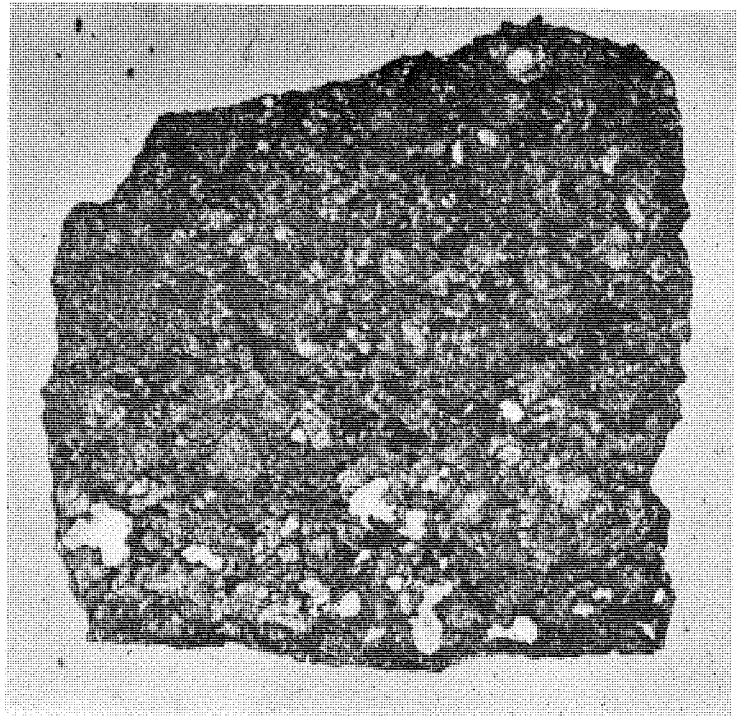
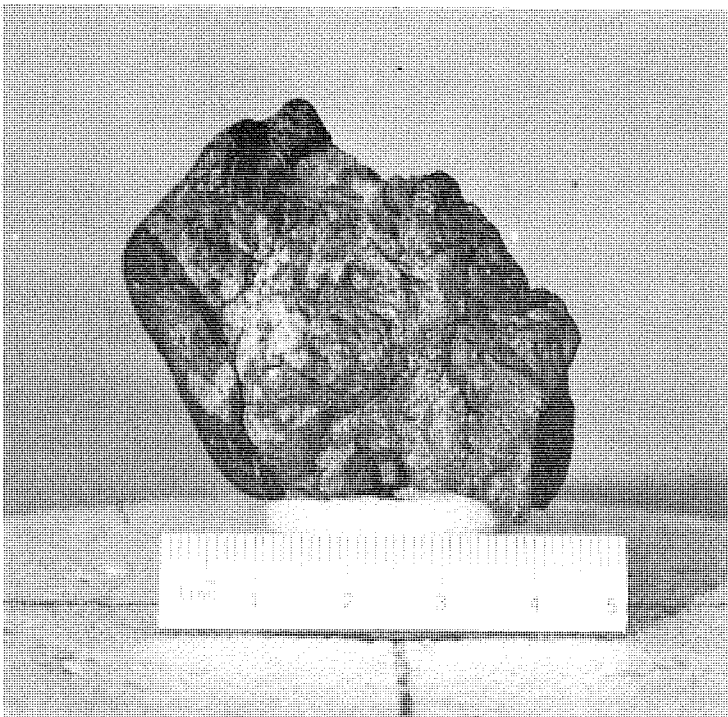
A cone-shaped fragment partly covered with fusion crust; the interior is largely obscured by brown limonitic weathering, but some areas are medium gray and show traces of chondritic structure.

Petrographic Description:

Chondrules are moderately abundant but are poorly defined, merging with the granular groundmass, which consists largely of olivine and pyroxene, with minor amounts of nickel-iron and troilite. Considerable weathering is indicated by brown limonitic staining and small areas of limonite throughout the section. Well-preserved fusion crust is present. Microprobe analysis give the following results:

	Average	M.D.	Range
Olivine	Fa18.3	1.8	17.3-19.6
Low-Ca pyroxene	Fs15.9	1.9	15.4-16.4

The meteorite is classified as an H4 chondrite.



Yamato-74082

H4 Chondrite

Weight: 179.8 gms
Dimension: 7.8 x 3.9 cm
Degree of Weathering: B
Degree of Fracturing:

Location: Yamato Mountains, Antarctica
71°48'17"S 36°10'50"E
Original Number: 74112916
Found: Nov. 29, 1974, K. Yanai et al.

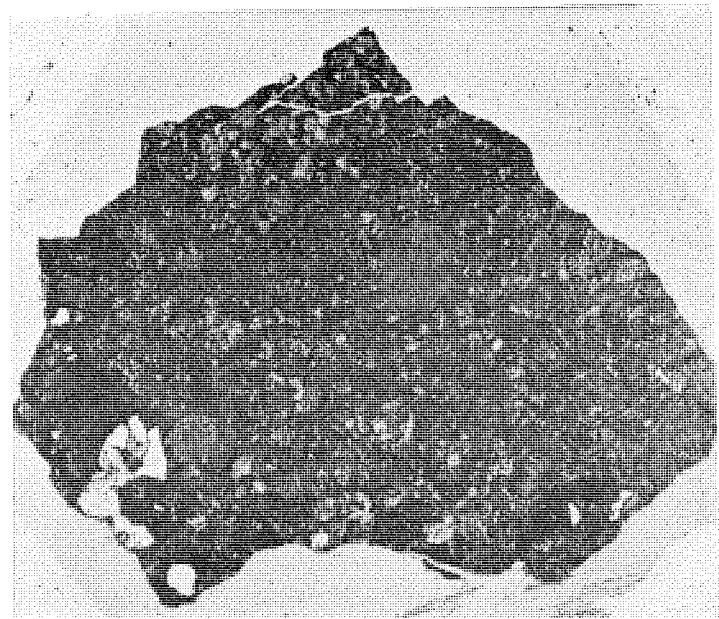
Physical Description:

Fragment about three-fourths of the original mass, with a brownish-black fusion crust, brown(oxidized) and gray(unoxidized) interior.

Petrographic Description:

Chondrules and chondrule fragments are abundant, and are set in a fine-grained groundmass of olivine and pyroxene, with minor amounts of nickel-iron and troilite. Some of the pyroxene is polysynthetically twinned clinobronzite. Brown limonitic staining pervades the section. Microprobe analysis shows that olivine composition is slightly variable with the mean composition of $Fa_{19.3}$ and $M.D.$ of 5.1(Yanai et al., 1978). The meteorite

is classified as an H4 chondrite.



Yamato-74094

H6 Chondrite

Weight: 867.2 gms
 Dimension: 11.0 x 9.7 cm
 Degree of Weathering: C
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°47'53"S 36°14'55"E
 Original Number: 74120202
 Found: Dec. 2, 1974, K. Yanai et al.

Physical Description:

A wedge-shaped specimen with remnants of black fusion crust on three surfaces, the other surfaces are fractures and are weathered reddish-brown. The interior appears to be finely granular with only traces of chondritic structure.

Petrographic Description:

Chondrules are few, and merge with the granular groundmass, which consists of olivine and pyroxene with minor amounts of nickel-iron, plagioclase, and troilite. Well-preserved fusion crust rims part of the section. The meteorite is extensively weathered, with veins and areas of limonite throughout the section. It is an H6 chondrite. Yabuki et al. (1978) have described as follows: This meteorite is composed of highly recrystallized clear matrix and some chondrules of various sizes. Chondrules and matrix intergrow so strongly that the boundaries are obliterated in most cases. Silicate minerals are sometimes partly covered with brownish weathered products.

Olivine occurs usually as irregular grains, except in porphyritic chondrules, in which hypidomorphic crystals are not rare. It often shows undulatory extinction between crossed nicols. The optical properties and d_{130} are

indicating a composition of $Fo_{81} Fa_{19}$ in mole percent.

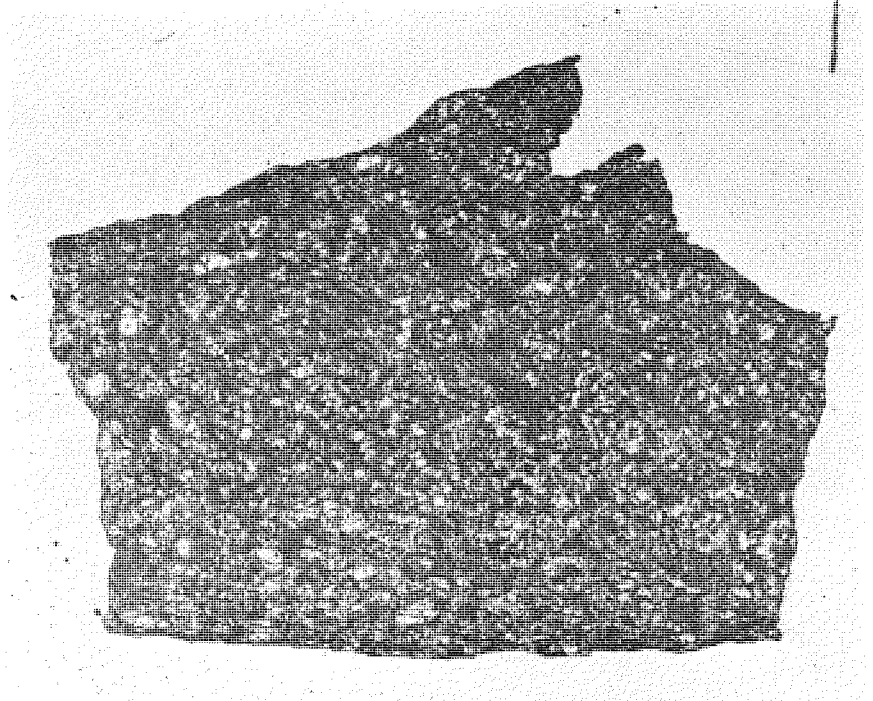
Orthopyroxene ($En_{81} Fs_{19}$) occurs also as xenomorphic grains, colorless in

thin section. Clinopyroxene is present in irregular shapes showing exsolved thin lamellae within some chondrules.

Plagioclase (An_{15-18}) occurs in a small amount as xenomorphic grains both in the

matrix and in the chondrules. Optical properties indicate that it is high temperature oligoclase.

Kamacite is the most predominant opaque mineral, which is occasionally intergrown with taenite or troilite. A fine plessitic intergrowth of kamacite and taenite is also common. Chromite occurs less in amount compared with metallic nickel-iron and troilite. The aggregates of fine chromite grains in irregular shape are frequently found among silicate minerals. Only a trace amount of native copper is present as inclusions within some kamacite grains associated with irregular troilite fragments. A few grains of mackinawite are found within troilite grains, associated with cubanite(?) as seen in Yamato-74459 meteorite.



Yamato-74106,93

H5 Chondrite

Weight: 146.6 gms
Dimension: 4.6 x 3.9 cm
Degree of Weathering: B
Degree of Fracturing:

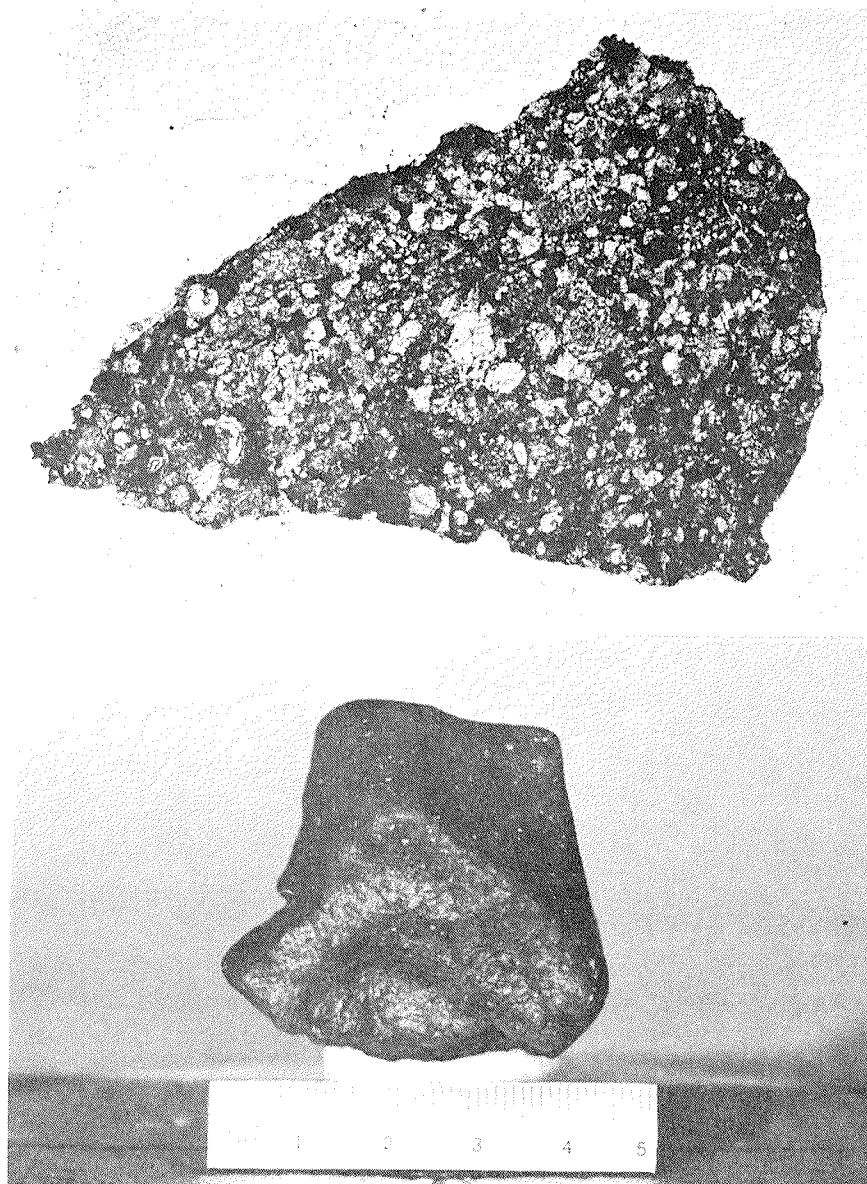
Location: Yamato Mountains, Antarctica
71°48'48"S 36°28'40"E
Original Number: 74120214
Found: Dec. 2, 1974, K. Yanai et al.

Physical Description:

An almost complete stone covered with brownish-black fusion crust; the interior is pale gray, granular, with traces of chondritic structure. Weathering is concentrated below the fusion crust and around the metal grains.

Petrographic Description:

Chondritic structure is poorly developed, the sparse chondrules merging with the granular groundmass, which consists of olivine and pyroxene, with minor amounts of nickel-iron and troilite. Brown limonitic staining is concentrated around metal grains. Traces of fusion crust are present. Microprobe analysis give the following results: the mean composition of olivine $Fa_{18.9}$, low-Ca pyroxene $Fs_{16.8}$. The meteorite is classified as an H5 chondrite.



Yamato-74107,93

H5 Chondrite

Weight: 114.0 gms
Dimension: 7.2 x 3.7 cm
Degree of Weathering: A
Degree of Fracturing:

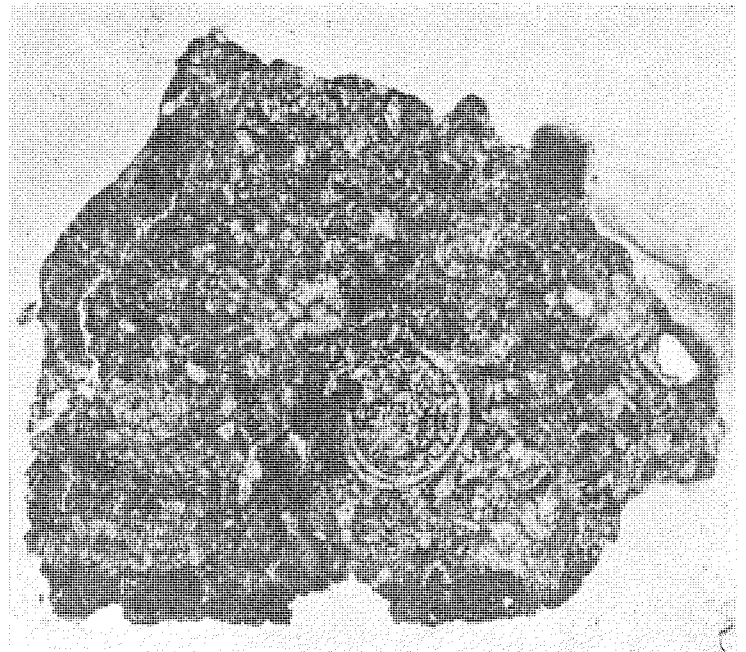
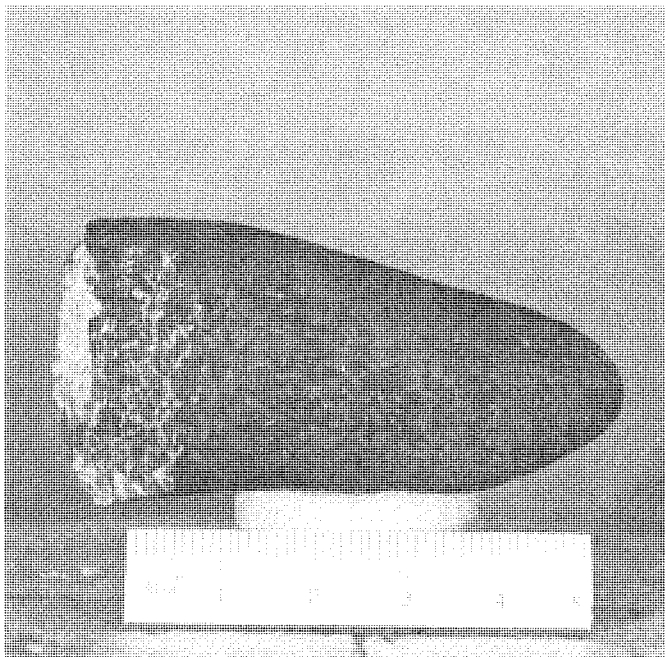
Location: Yamato Mountains, Antarctica
71°49'00"S 36°27'50"E
Original Number: 74120215
Found: Dec. 2, 1974, K. Yanai et al.

Physical Description:

A fairly complete stone with brownish-black fusion crust; the interior is medium gray, granular, with traces of chondritic structure. Weathering is minor, being limited to brown halos around some metal grains.

Petrographic Description:

Chondritic structure is moderately well developed; one prominent chondrule consists of worm-shaped olivine grains set in turbid devitrified glass with a solid rim of olivine in optical continuity. The groundmass consists largely of granular olivine and pyroxene with minor nickel-iron and troilite. Brown limonitic staining is present around metal grains. The meteorite is classified as an H5 chondrite.



Yamato-74108,93

H5 Chondrite

Weight: 139.3 gms
Dimension: 6.0 x 4.3 cm
Degree of Weathering: A
Degree of Fracturing:

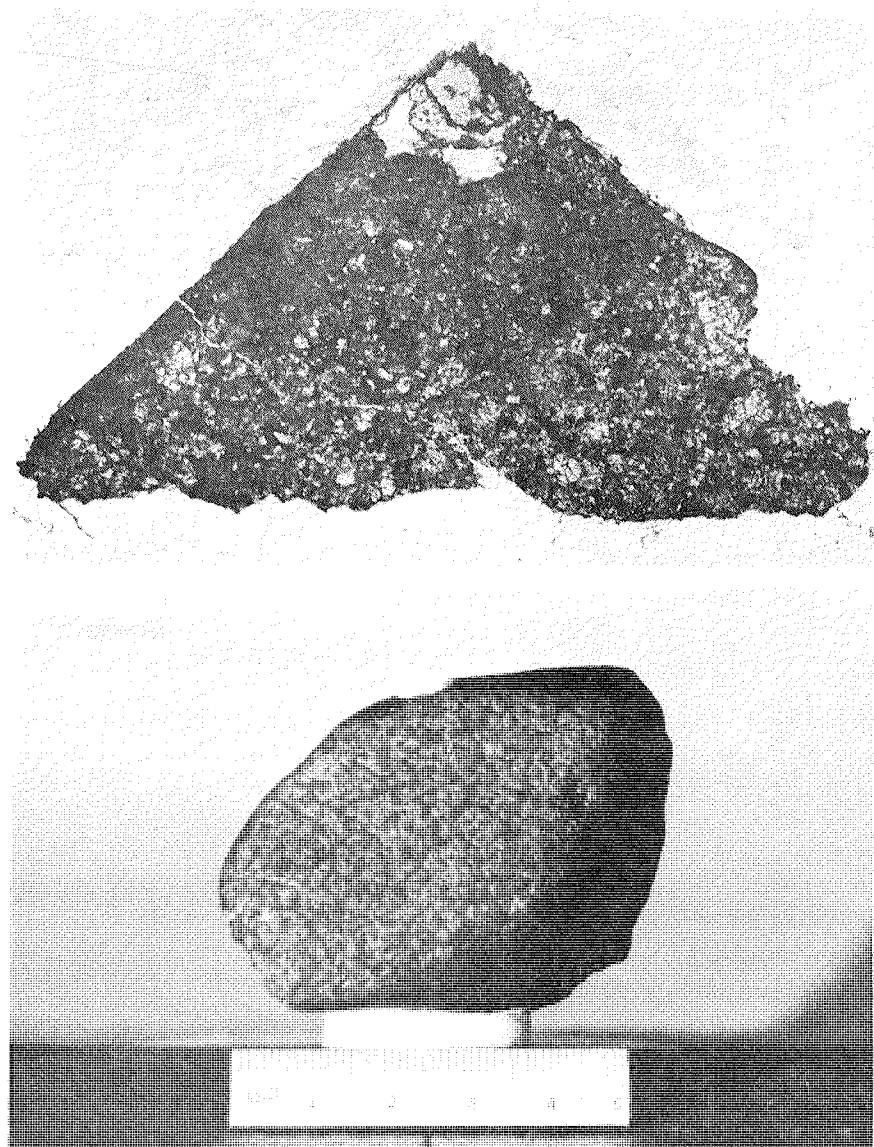
Location: Yamato Mountains, Antarctica
71°49'04"S 36°27'30"E
Original Number: 74120216
Found: Dec. 2, 1974, K. Yanai et al.

Physical Description:

An almost complete stone with brownish-black fusion crust; the interior is medium gray, granular, with traces of chondritic structure. Weathering is limited to rusty halos around some metal grains.

Petrographic Description:

Chondrules are fairly abundant, and are set in a granular groundmass consisting largely of olivine and pyroxene, with minor nickel-iron and troilite. A little limonitic staining is present around the metal grains. Traces of fusion crust rim part of the section. The meteorite is classified as an H5 chondrite.



Yamato-74110,92

L6 Chondrite

Weight: 90.1 gms
 Dimension: 5.6 x 2.9 cm
 Degree of Weathering: C
 Degree of Fracturing:

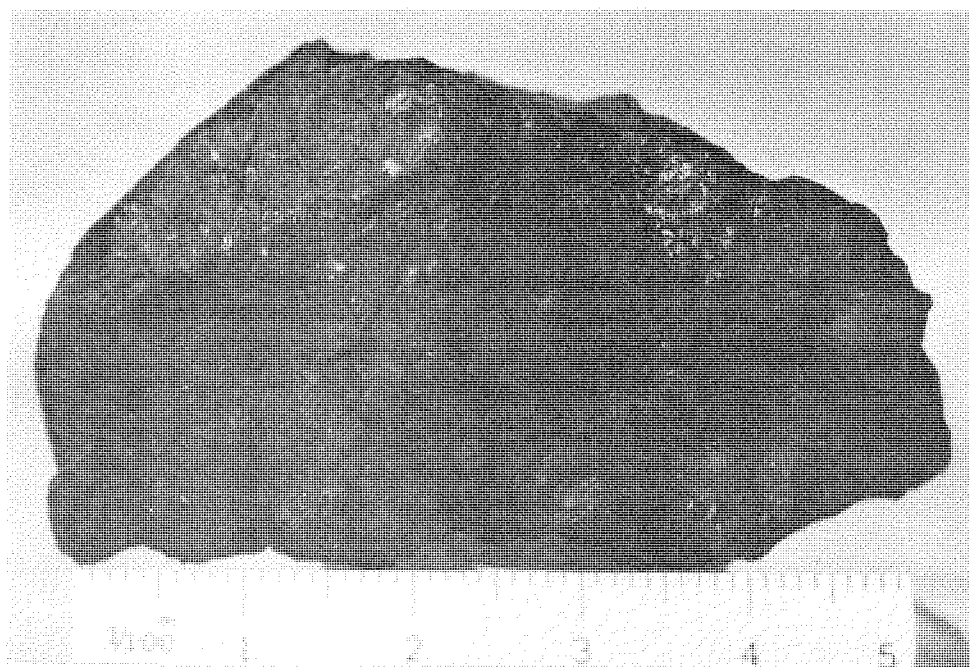
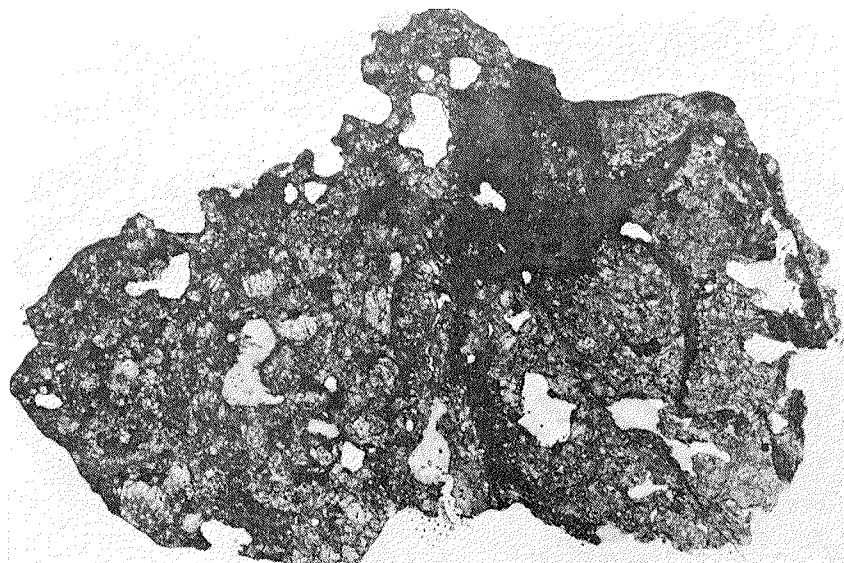
Location: Yamato Mountains, Antarctica
 71°47'15"S 36°18'00"E
 Original Number: 74120218
 Found: Dec. 2, 1974, K. Yanai et al.

Physical Description:

A strongly weathered fragment, with brownish-black fusion crust on two surfaces; the other surfaces are coated with brown limonite which obscures the interior.

Petrographic Description:

Chondritic structure is barely discernable in the granular aggregate of olivine and pyroxene, with minor amounts of nickel-iron and troilite. The section is extensively veined, the veins consisting largely of fine-grained isotropic material, possibly majorite and ringwoodite. Weathering is extensive, with brown limonitic staining throughout the section. Microprobe analysis give the following results: the mean composition of olivine $Fe_{21.4}$, low-Ca pyroxene $Fs_{19.2}$. The meteorite is classified as an L6 chondrite.



Yamato-74115

H5 Chondrite

Weight: 1045.1 gms
Dimension: 12.5 x 10.5 cm
Degree of Weathering: B
Degree of Fracturing:

Location: Yamato Mountains, Antarctica
71°48'30"S · 36°08'15"E
Original Number: 74120301
Found: Dec. 3, 1974, K. Yanai et al.

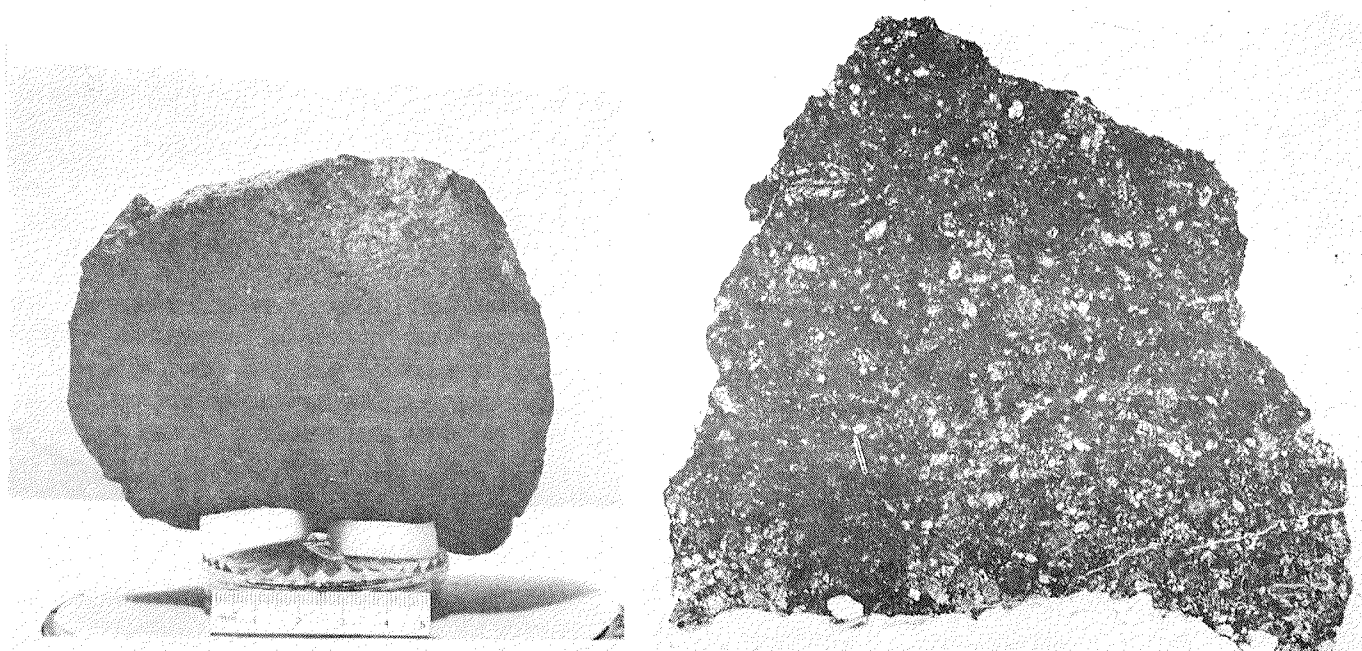
Physical Description:

An almost complete stone, with the shape of a flattered cone; it is covered with brownish-black fusion crust with differing texture on front and rear sides. The interior is pale gray and moderately chondritic, with rusty halos around metal grains.

Petrographic Description:

Chondritic structure is well developed, with a variety of chondrule types; the commonest types are granular olivine and olivine-pyroxene, porphyritic olivine, and fine-grained and radiating pyroxene. The matrix consists largely of finely granular olivine and pyroxene, with minor amounts of nickel-iron and troilite. Weathering is confined to minor limonitic staining around nickel-iron grains. Microprobe analysis give the following results: the mean composition of olivine $Fa_{18.1}$, low-Ca pyroxene $Fs_{16.0}$.

The meteorite is classified as an H5 chondrite.



Bulk chemical composition of the Y-74115,86 meteorite is shown as follow:

SiO ₂	35.60
TiO ₂	0.07
Al ₂ O ₃	1.70
Fe ₂ O ₃	0
FeO	10.23
MnO	0.27
MgO	22.93
CaO	1.60
Na ₂ O	0.72
K ₂ O	0.08
H ₂ O(-)	0.08
H ₂ O(+)	0.3
P ₂ O ₅	0.24
Cr ₂ O ₃	0.46
FeS	5.62
Fe	18.22
Ni	1.73
Co	0.062
<hr/>	
Total	99.91

Yamato-74116

L5 Chondrite

Weight: 68.9 gms
 Dimension: 4.0 x 3.5 cm
 Degree of Weathering: C
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°48'48"S 36°09'50"S
 Original Number: 74120302
 Found: Dec. 3, 1974, K. Yanai et al.

Physical Description:

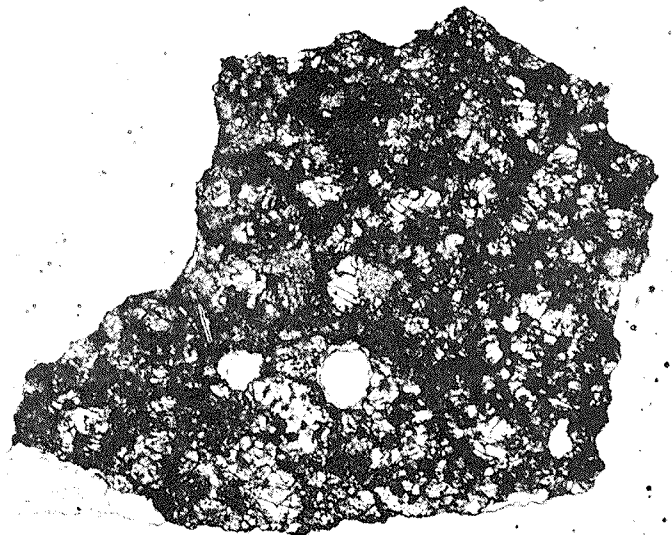
An almost angular stone covered with browish-black fusion crust, the interior is pale gray with a little of chondritic structure. Brown limonitic staining is present on the broken surface and around metal grains.

Petrographic Description:

Chondritic structure is present, but it is obscured by a network of black troilite-rich veinlets, probably a shock effect. Weathering is extensive, with limonitic staining and small areas of red-brown limonite throughout the section. Microprobe analysis give the following results:

	Average	%M.D.	Range
Olivine	Fa _{24.6}	1.2	23.1-25.5
low-Ca pyroxene	Fs _{20.5}	1.4	19.9-21.1
Plagioclase	An _{9.9}		

The meteorite is classified as an L5 chondrite.



Yamato-74118

L6 Chondrite

Weight: 845.1 gms
 Dimension: 8.5 x 7.5 cm
 Degree of Weathering: A
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'27"S 36°11'40"E
 Original Number: 74120304
 Found: Dec. 3, 1974, K. Yanai et al.

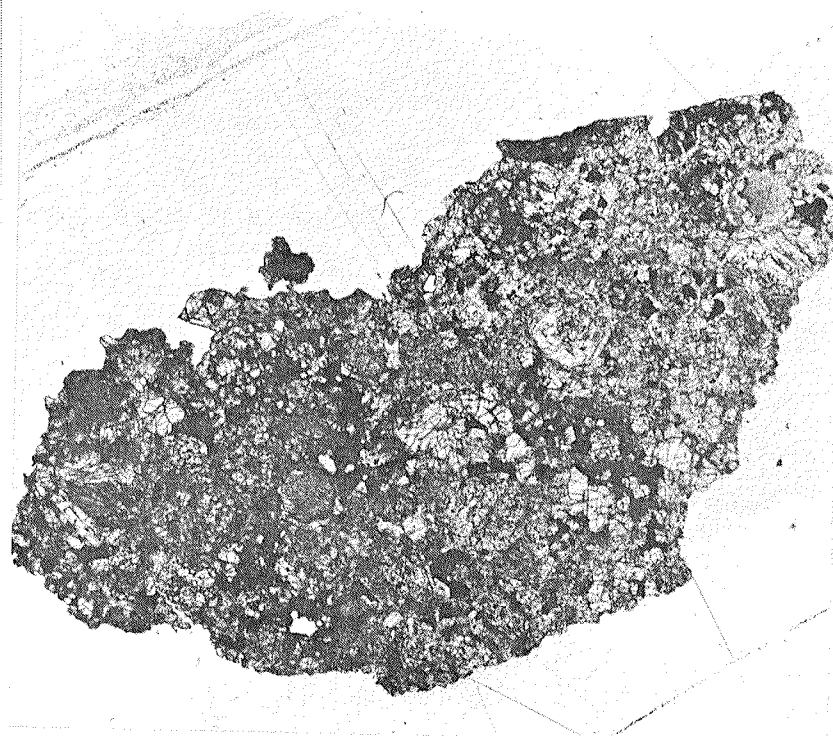
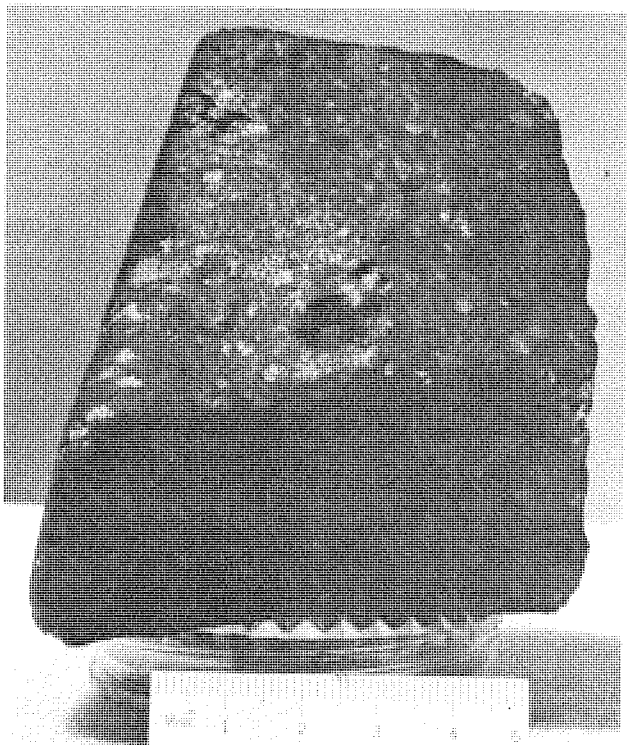
Physical Description:

A complete stone, roughly cube-shaped, covered with black fusion crust differing in texture on different surfaces. The interior is pale gray with visible chondrules. Weathering is limited to rusty halos around some metal grains.

Petrographic Description:

Chondrules are present, but tend to merge with the granular groundmass, which consists of olivine and pyroxene, with minor amounts of plagioclase, nickel-iron, and troilite. Weathering is limited to minor limonitic staining around metal grains. Remnants of fusion crust are present along one edge. The meteorite is classified as an L6 chondrite. Microprobe analysis give the following results:

	Average	%M.D.	Range
Olivine	Fa _{24.5}	1.4	23.4-25.2
low-Ca pyroxene	Fs _{20.8}	1.6	19.7-21.6
Plagioclase	An _{7.5} , 8.3		
Merrillite			



Yamato-74120

L6 Chondrite

Weight: 90.5 gms
 Dimension: 6.5 x 4.2 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'36"S 36°12'10"E
 Original Number: 74120306
 Found: Dec. 3, 1974, K. Yanai et al.

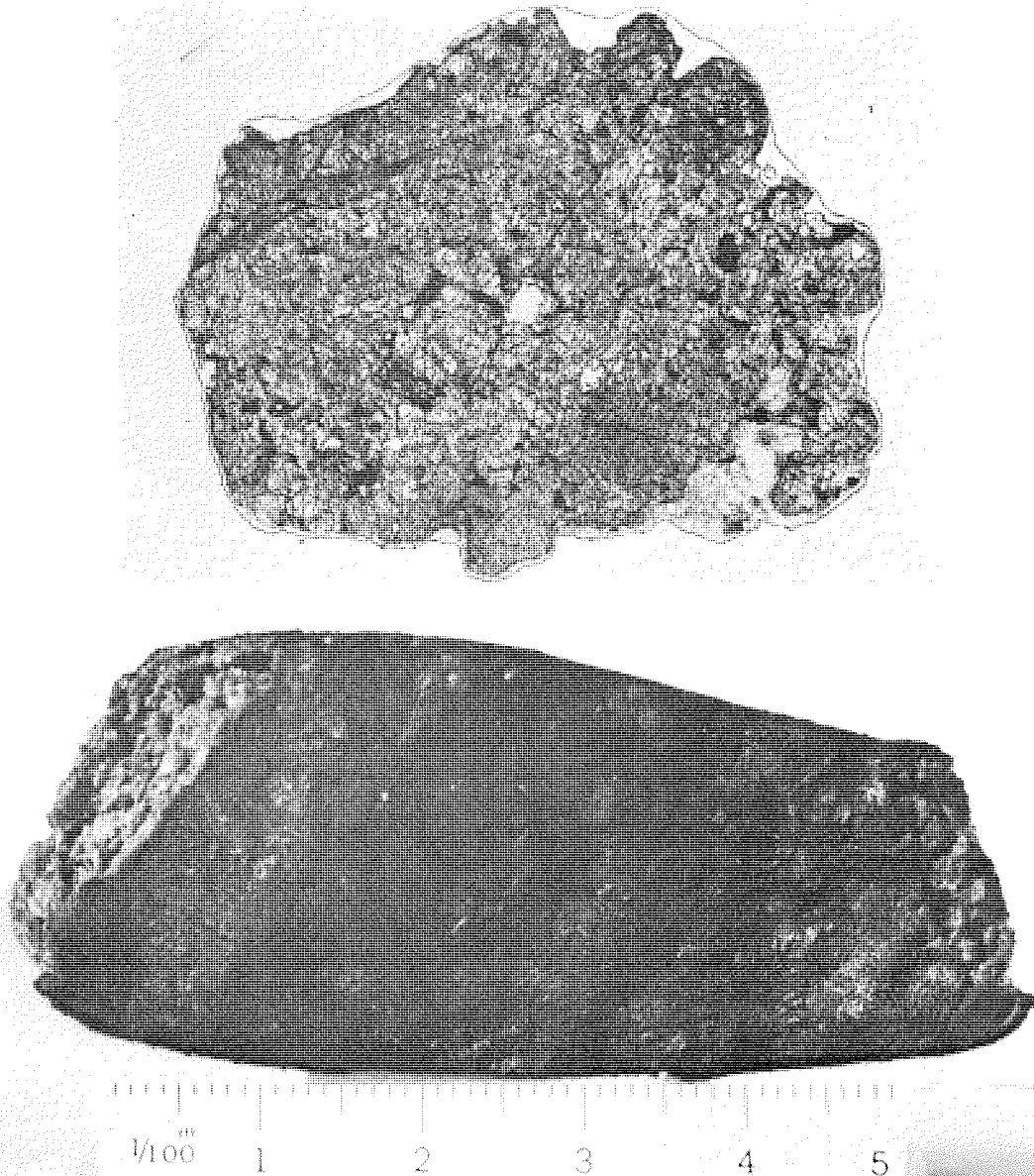
Physical Description:

An almost complete stone covered with brownish-black fusion crust; the interior is pale gray with traces of chondritic structure. Brown limonitic staining is present below the fusion crust and around metal grains.

Petrographic Description:

Chondrules are not prominent; their margins are ill-defined and tend to merge with the groundmass, which consists of olivine and pyroxene with minor amounts of plagioclase nickel-iron, and troilite. The section shows several thin black veinlets probably produced by shock. Weathering is extensive, with brown limonitic staining throughout the section and areas of red-brown limonite replacing metal grains. Microprobe analysis give the following results: the mean composition of olivine $Fa_{25.6}$, low-Ca pyroxene

$Fs_{22.2}$. The meteorite is classified as an L6 chondrite.



Yamato-74123

Ureilite

Weight: 69.9 gms
 Dimension: 4.5 x 3.0 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'41"S 36°12'20"E
 Original Number: 74120309
 Found: Dec. 3, 1974, K. Yanai et al.

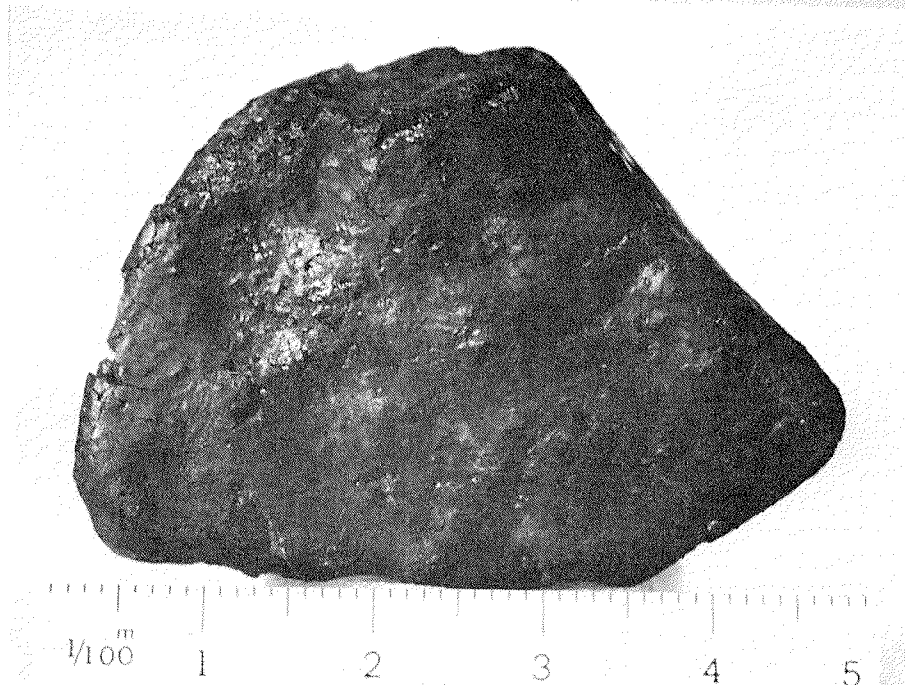
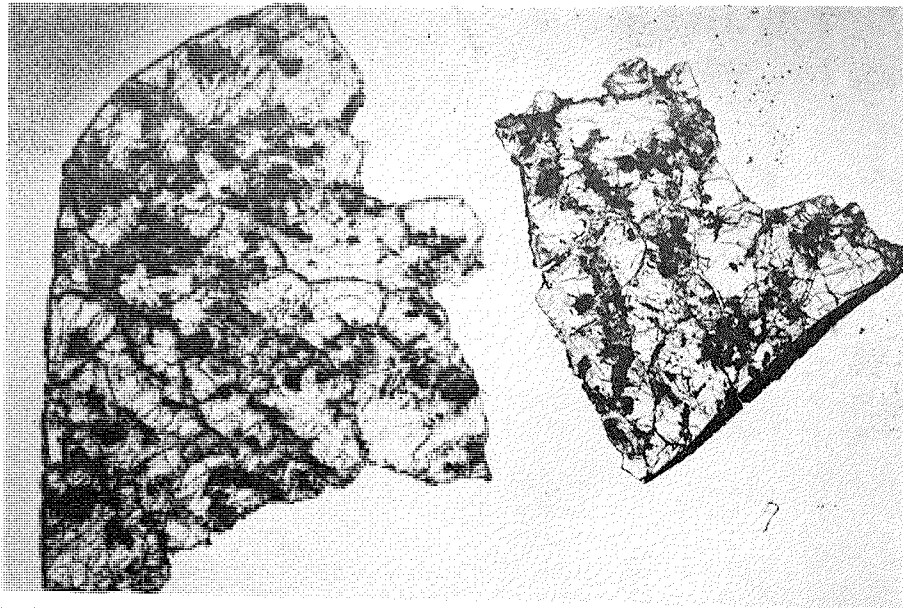
Physical Description:

A fragment from a larger stone, partly covered with dull brownish-black fusion crust; extensive weathering has coated the fracture surfaces with red-brown limonite, obscuring the internal structure, which is a dark gray granular aggregate of mm-sized crystals of olivine and pyroxene.

Petrographic Description:

The meteorite consists largely of anhedral olivine grains, and the grains are bordered by black carbonaceous material. The olivine grains show undulate extinction, evidently the result of shock. A little red-brown limonite is present along grain boundaries. The Fe contents of olivine range from Fa_{13} to Fa_{23} with a common composition of $Ca_{0.5}Mg_{79}Fe_{20.5}$

(Yanai et al, 1979). The meteorite is a ureilite.



Bulk chemical composition of the Y-74123,80 meteorite is shown as follow:

SiO ₂	33.21
TiO ₂	0.08
Al ₂ O ₃	0.90
Fe ₂ O ₃	3.33
FeO	17.34
MnO	0.37
MgO	37.29
CaO	0.55
Na ₂ O	0.03
K ₂ O	0.02
H ₂ O(-)	0.38
H ₂ O(+)	3.37
P ₂ O ₅	0.61
Cr ₂ O ₃	0.73
NiO	0.18
FeS	0.82
<hr/>	
Total	99.57

Yamato-74124,81

H4 Chondrite

Weight: 62.3 gms
 Dimension: 4.3 x 3.6 x 2.8 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'42"S 36°12'25"E
 Original Number: 74120310
 Found: Dec. 3, 1974, K. Yanai et al.

Physical Description:

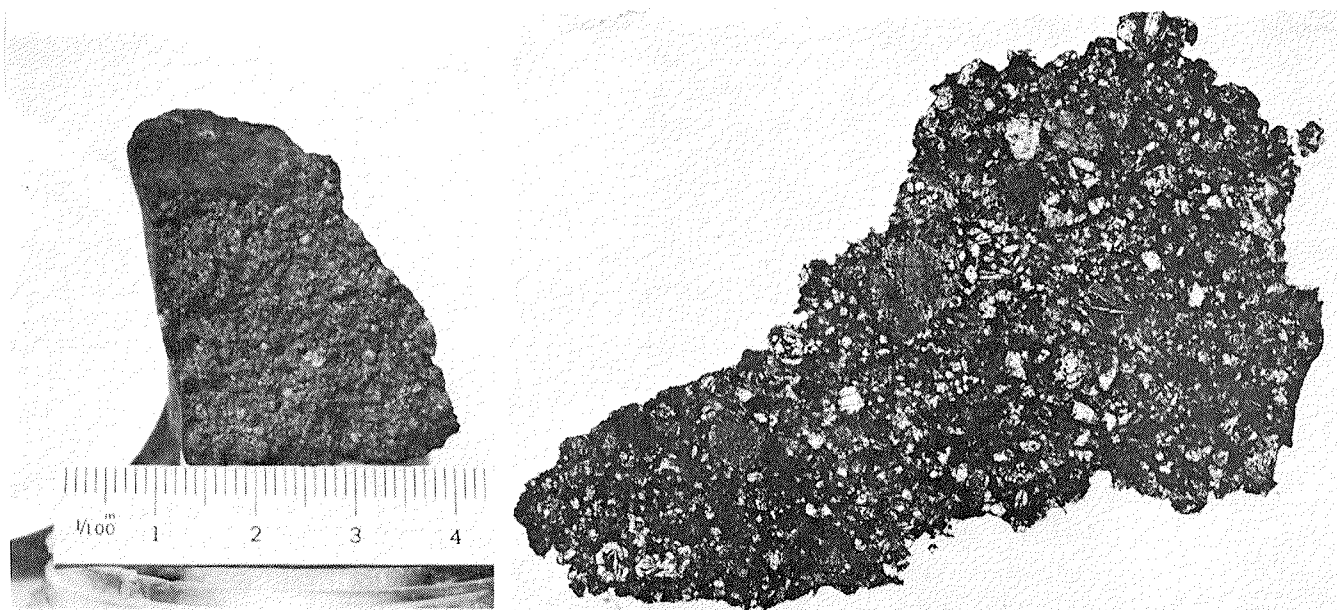
A fragment partly covered with dull brownish-black fusion crust; weathering on a fracture surface has revealed numerous well-developed chondrules. Weathering is concentrated near the surface, and the interior is pale gray in color.

Petrographic Description:

Chondritic structure is well developed, but chondrules and chondrule fragments show extensive integration with granular groundmass, which consists of olivine and pyroxene with nickel-iron and troilite. Several chondrule types are present, including barred olivine and radiating pyroxene. Some pyroxene is polysynthetically twinned. Weathering is extensive, with brown limonitic staining throughout the section. Microprobe analysis give the following results:

	Average	%M.D.	Range
Olivine	Fa _{18.5}	1.7	16.9-19.2
Low-Ca pyroxene	Fs _{15.8}	2.4	14.9-16.7
Clinopyroxene	En _{51.6} Fs _{16.2} Wo _{42.3}		
Plagioclase	An _{12.1}		

The meteorite is classified as an H4 chondrite.



Yamato-74130

Ureilite

Weight: 17.9 gms
 Dimension: 3.0 x 2.7 cm
 Degree of Weathering: C
 Degree of Fracturing:

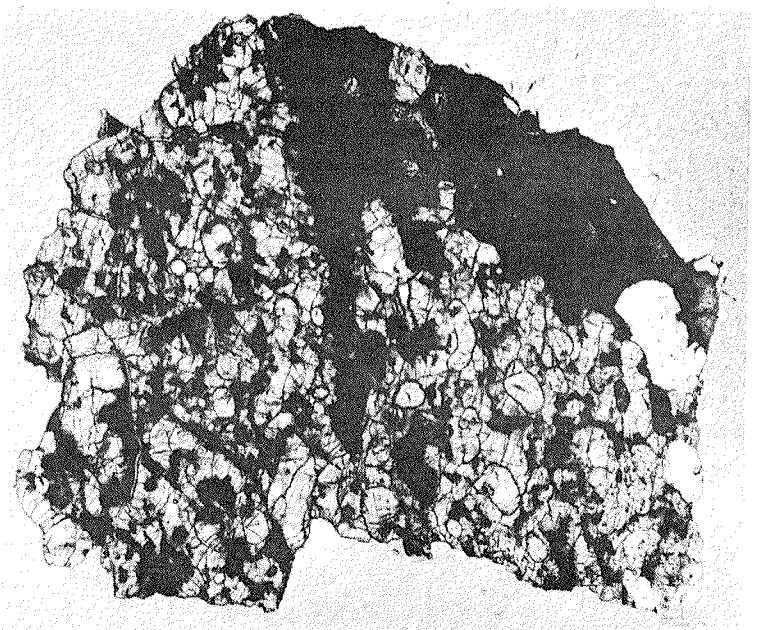
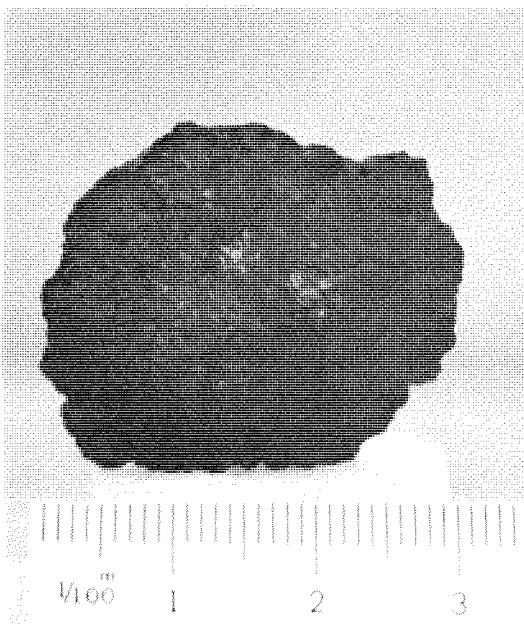
Location: Yamato Mountains, Antarctica
 71°48'31"S 36°15'30"E
 Original Number: 74120316
 Found: Dec. 3, 1974, K. Yanai et al.

Physical Description:

An irregular fragment, partly coated with dull black fusion crust; a fracture surface shows a dark gray granular aggregate of mm-sized crystals of olivine and pyroxene. Brown limonitic weathering pervades the stone.

Petrographical Description:

Takeda (1982) has described as follow: Three thin sections made from a chip (1.151g) of Y-74130,65 have been studied by an optical microscope and electron microprobe. Three pyroxenes have been investigated by the single crystal X-ray diffraction method. Possible orthopyroxene-pigeonite-augite assemblage has been found in Yamato-74130. In contrast to other ureilites, Y-74130 contains olivines (Fa_{22}), augites up to 2mm in size and small pigeonites in augites. The augites are rich in Cr_2O_3 (1.8wt.%) and Na_2O (0.8wt.%). In contact with these minerals with curved boundaries rich in carbon, there is a low-Ca pyroxene $Ca_{4.4}Mg_{77.7}Fe_{17.9}$, 8x4mm in size, which includes round small inclusions of olivine and rare augite and patches of carbonaceous (C) materials. Their X-ray photographs show weak reflections of orthopyroxenes and twinned clinobronzites with (100) in common. This pyroxene may have been originally an orthopyroxene and converted into clinobronzites by a shock or reheating events.



Bulk chemical composition of the Y-74130,65 meteorite is shown as follow:

SiO ₂	42.12
TiO ₂	0.12
Al ₂ O ₃	0.83
Fe ₂ O ₃	5.09
FeO	12.52
MnO	0.35
MgO	32.34
CaO	1.98
Na ₂ O	0.20
K ₂ O	0.20
H ₂ O(-)	0.25
H ₂ O(+)	3.19
P ₂ O ₅	0.08
Cr ₂ O ₃	0.75
FeS	0.41
Ni	0.12
Co	0.003
<hr/>	
Total	100.37

Yamato-74142,81

H3 Chondrite

Weight: 29.5 gms
 Dimension: 3.5 x 3.3 x 1.7 cm
 Degree of Weathering: A/B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'00"S 36°20'30"E
 Original Number: 74120412
 Found: Dec. 4, 1974, K. Yanai et al.

Physical Description:

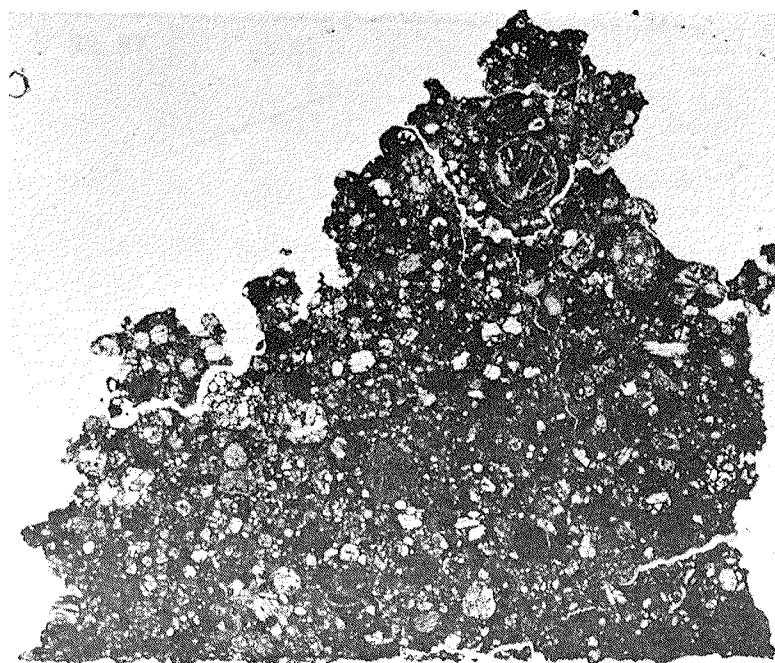
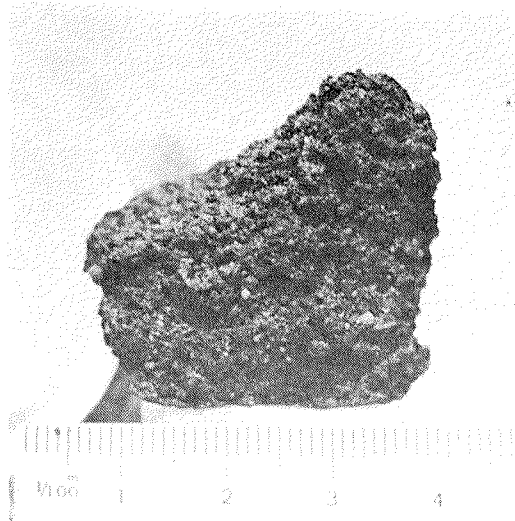
A fragment from a larger stone, partly coated with dull brownish-black fusion crust; weathering on a fracture surface has revealed a highly chondritic structure. The interior is medium gray with brown halos around metal grains.

Petrographic Description:

Chondritic structure is well developed. The section shows an aggregate of chondrules and chondrule fragments, in a moderate amount of fine-grained matrix partly stained with brown limonite. The chondrules are granular and porphyritic olivine and olivine-pyroxene, barred olivine, and fine grained radiating pyroxene, with interstitial glass; some glass is brown to pale brown in color and some is turbid. Most of the pyroxene is polysynthetically twinned. Minor amounts of nickel-iron and troilite are present. Some limonitic staining is present especially around nickel-iron grains. Microprobe analysis give the following results:

	Average	%M.D.	Range
Olivine	Fa _{16.9}	8.3	10.9-27.9
Low-Copyroxene	Fs _{13.4}	21.8	1.0-16.9

The meteorite is classified as an H3 chondrite.



Bulk chemical composition of the Y-74142,71 meteorite is shown as follow:

SiO ₂	34.07
TiO ₂	0.07
Al ₂ O ₃	1.31
Fe ₂ O ₃	0
FeO	12.14
MnO	0.23
MgO	23.67
CaO	3.42
Na ₂ O	0.71
K ₂ O	0.07
H ₂ O(-)	0.06
H ₂ O(+)	0.3
P ₂ O ₅	0.20
Cr ₂ O ₃	0.42
FeS	5.46
Fe	16.01
Ni	1.66
Co	0.076
<hr/>	
Total	99.87

Yamato-74144,93

L6 Chondrite

Weight: 141.4 gms
 Dimension: 4.3 x 3.9 cm
 Degree of Weathering: B
 Degree of Fracturing:

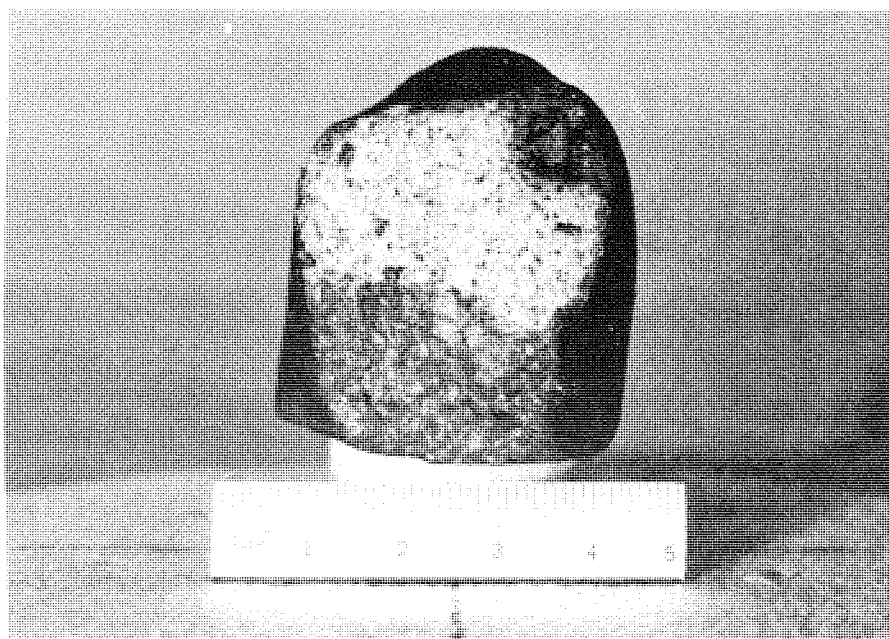
Location: Yamato Mountains, Antarctica
 71°47'01"S 36°15'55"E
 Original Number: 74120414
 Found: Dec. 4, 1974, K. Yanai et al.

Physical Description:

A cuboidal stone with dull brownish-black fusion crust on five faces; the sixth face is a fracture surface. Weathering has developed brown limonitic staining below the fusion crust and around metal grains.

Petrographic Description:

The small section shows only traces of chondritic structure. It consists of a fine to medium grained aggregate of olivine and pyroxene, with minor amounts of nickel-iron and troilite. Fusion crust is present along one edge. Brown limonitic staining pervades the section. Microprobe analysis give the following results: the mean composition of olivine $Fa_{24.8}$, low-Ca pyroxene $Fs_{21.9}$. The meteorite is classified as an L6 chondrite.



Yamato-74155, 74156 (matching pieces) H4 Chondrite

Weight: 3073.4 gms
 Dimension: 15.0 x 14.0 cm
 Degree of Weathering: A
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'06"S 36°07'10"E
 Original Number: 74120702-1
 Found: Dec. 7, 1974, K. Yanai et al.

Physical Description:

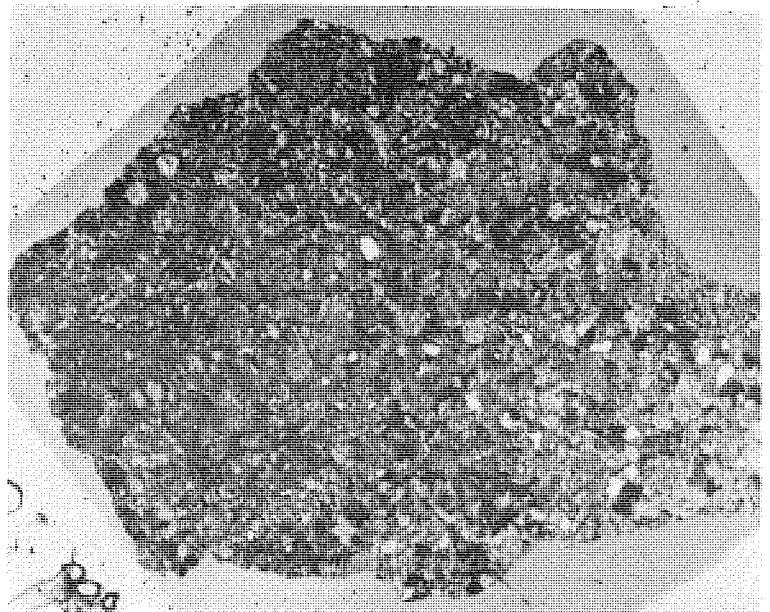
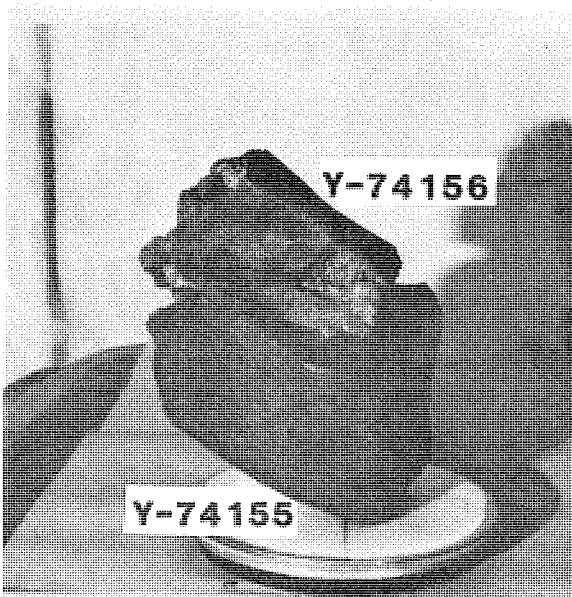
The matching pieces form a roughly cuboidal stone, covered with dull black fusion crust. Chondritic structure is prominent on weathered fracture surfaces, and internal fractures with black slickensides are visible. The interior is medium gray in color and essentially unweathered.

Petrographic Description:

Chondritic structure is well developed, and a variety of chondrule types is present; the commonest are granular and porphyritic olivine and olivine-pyroxene, and fine-grained pyroxene. Turbid devitrified glass is present within some chondrules. Much of the pyroxene is polysynthetically twinned clinobronzite. The matrix between the chondrules is fine-grained olivine and pyroxene and coarser-grained nickel-iron and troilite. The meteorite is somewhat weathered, with brown limonitic staining around metal grains. Microprobe analysis give the following results:

	Average	M.D.	Range
Olivine	Fa _{18.5}	1.8	17.6-19.2
Low-Ca pyroxene	Fs _{16.0}	4.0	14.5-17.9

These meteorites are classified as an H4 chondrite.



Bulk chemical composition of the Y-74155,52 meteorite is shown as follows:

SiO ₂	35.44
TiO ₂	0.07
Al ₂ O ₃	1.61
Fe ₂ O ₃	0
FeO	10.16
MnO	0.25
MgO	22.94
CaO	1.49
Na ₂ O	0.72
K ₂ O	0.08
H ₂ O(-)	0.03
H ₂ O(+)	0.2
P ₂ O ₅	0.28
Cr ₂ O ₃	0.43
FeS	6.21
Fe	18.53
Ni	1.69
Co	0.074
<hr/>	
Total	100.20

Yamato-74158

L6 Chondrite

Weight: 91.5 gms
 Dimension: 4.6 x 3.0 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°49'02"S 36°07'40"E
 Original Number: 74120703
 Found: Dec. 7, 1974, K. Yanai et al.

Physical Description:

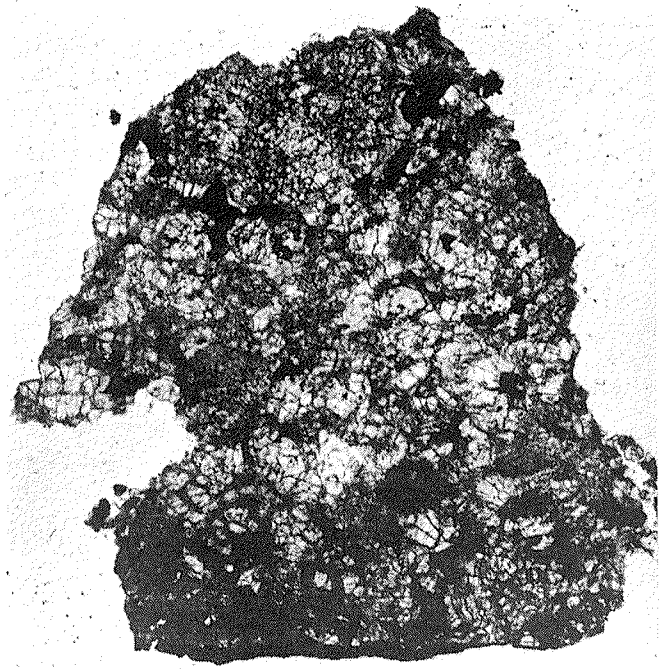
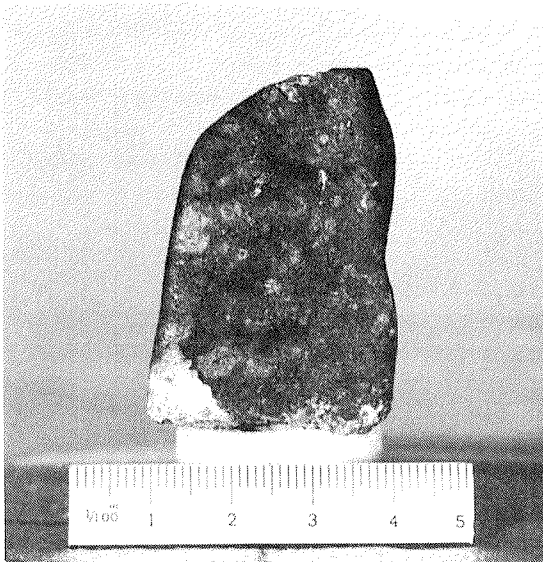
This specimen matches with Yamato-74157 to form a wedge-shaped stone coated with dull brownish black fusion crust. The interior is pale gray, granular, and chondrules are not visible. Weathering is limited to brown limonitic staining on fracture surfaces and around metal grains.

Petrographic Description:

Chondritic structure is obscured by recrystallization, the margins of the chondrules merging with the granular groundmass, which consists of olivine and pyroxene, with minor amounts of nickel-iron and troilite. Traces of fusion crust are present along one edge. Brown limonitic staining occurs in association with metal grains. Microprobe analysis give the following results:

	Average	%M.D.	Range
Olivine	Fa _{24.8}	1.6	23.6-25.7
Low-Ca Pyroxene	Fs _{20.5}	1.7	19.7-21.8
Plagioclase	An _{10.0} , 10.8		
Merrillite			

The meteorite is classified as an L6 chondrite.



Yamato-74159

Eucrite (polymict)

Weight: 98.2 gms
 Dimension: 8.0 x 3.6 cm
 Degree of Weathering: A
 Degree of Fracturing:

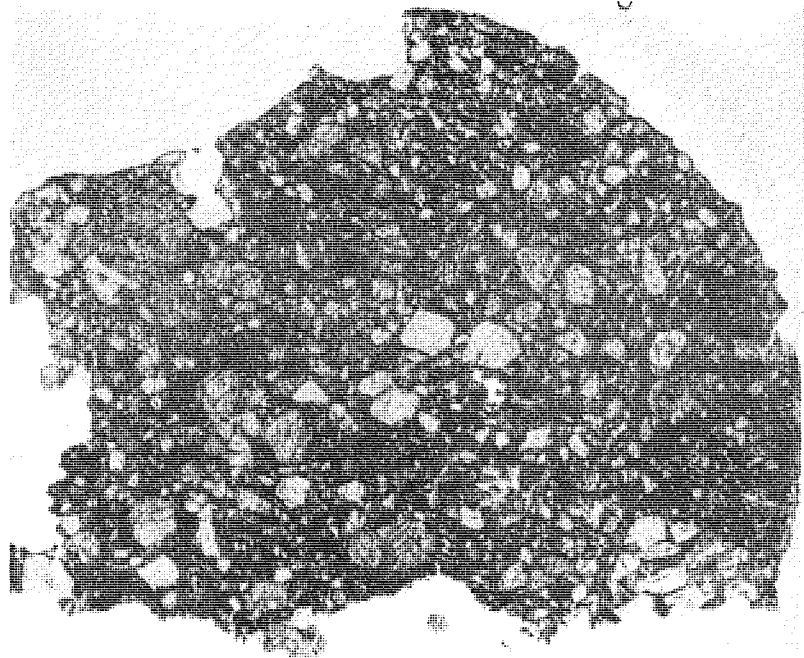
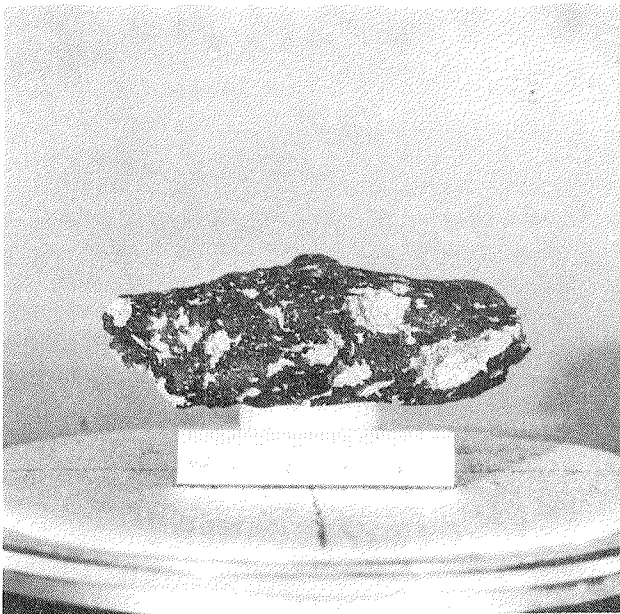
Location: Yamato Mountains, Antarctica
 71°45'45"S 36°04'50"E
 Original Number: 74120801
 Found: Dec. 8, 1974, K. Yanai et al.

Physical Description:

A nearly complete stone, coated with partly abraded lustrous black fusion crust; the interior shows a fine-grained light gray matrix with white plagioclase grains, and dark gray appanitic clasts up to 1 cm across.

Petrographical Description:

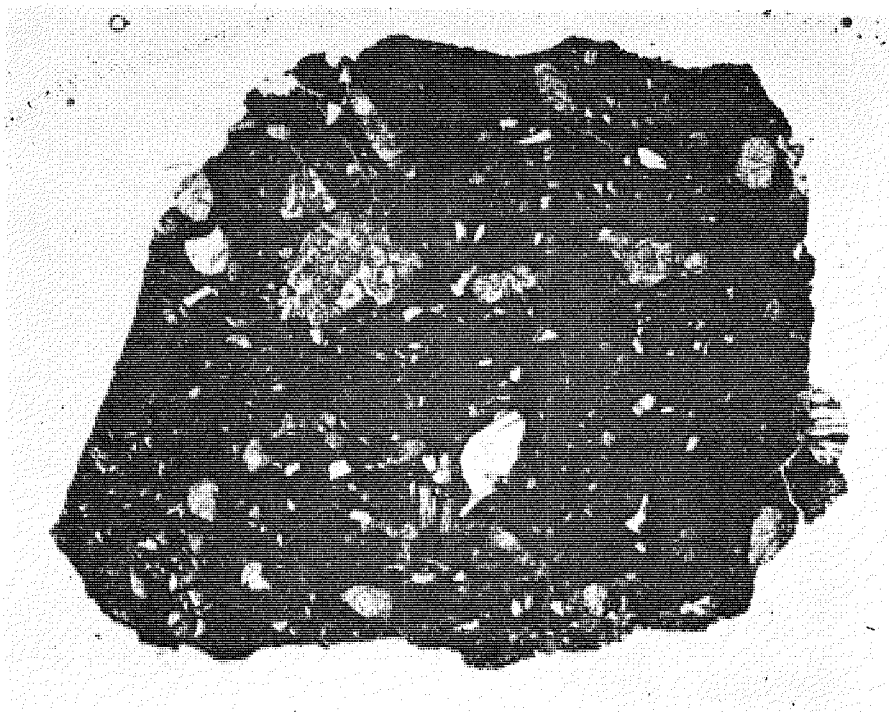
Takeda et al. (1978a) have described Y-74159 as follows: "This meteorite is a complex mixture of basaltic rock fragments have textures including ophitic, subophitic, variolitic and vitric types, with grain sizes generally less than 1-2 mm. The meteorite clearly is polymict in terms of lithic variability but carries no magnesian orthopyroxene of the type found in howardites. As all the clasts are basaltic, and its bulk composition is similar to other eucrites, it is tentatively classed as a eucrite. The pyroxene variations for several rock fragments are similar to those of Pasamonte, showing distinct iron-enrichment and calcium-enrichment trends. Pigeonites in some rock fragments show distinct exsolution lamellae of augite" This meteorite also contains fragments of the Binda-like cumulate eucrites.



Bulk chemical composition of the Y-74159,85 meteorite is shown as follow:

SiO_2	49.04
TiO_2	1.09
Al_2O_3	10.35
FeO	19.23
MnO	0.53
MgO	8.29
CaO	9.48
Na_2O	0.58
K_2O	0.07
$\text{H}_2\text{O}(-)$	0.00
$\text{H}_2\text{O}(+)$	0.32
P_2O_5	0.07
Cr_2O_3	0.44
NiO	0.003
FeS	0.15
Co	0.003

Total	99.646



Yamato-74160

LL6-7 Chondrite

Weight: 31.4 gms.

Dimension: 3.2 x 2.5 cm

Degree of Weathering: A

Degree of Fracturing:

Location: Yamato Mountains, Antarctica

71°45'10"S 36°05'20"E

Original Number: 74120802

Found: Nov. 8, 1974, K. Yanai et al.

Physical Description:

This stone is very well rounded and abraded individual with a black-shiny fusion crust and interior shows a poorly brecciated structure of the olivine yellow-pale bluish grey clasts in white matrix.

Petrographic Description:

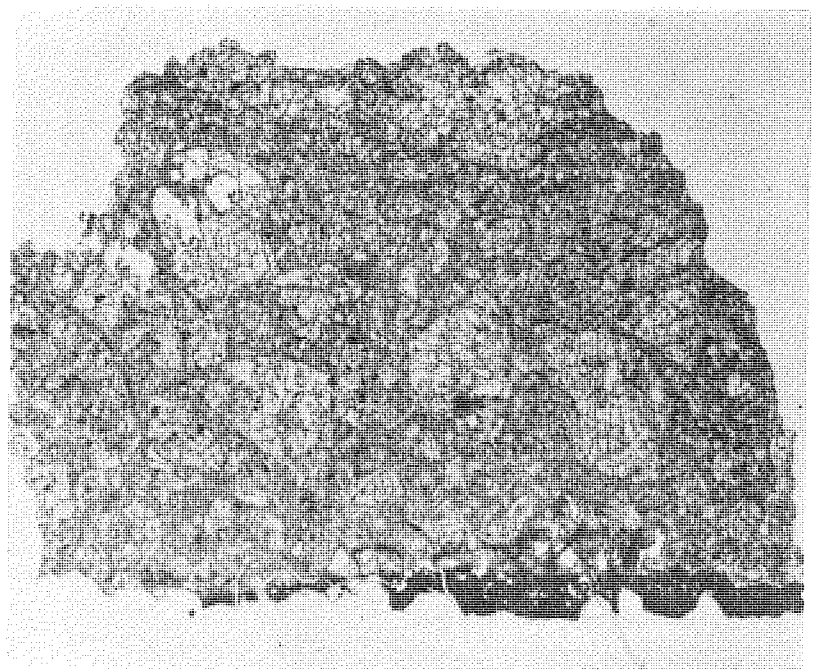
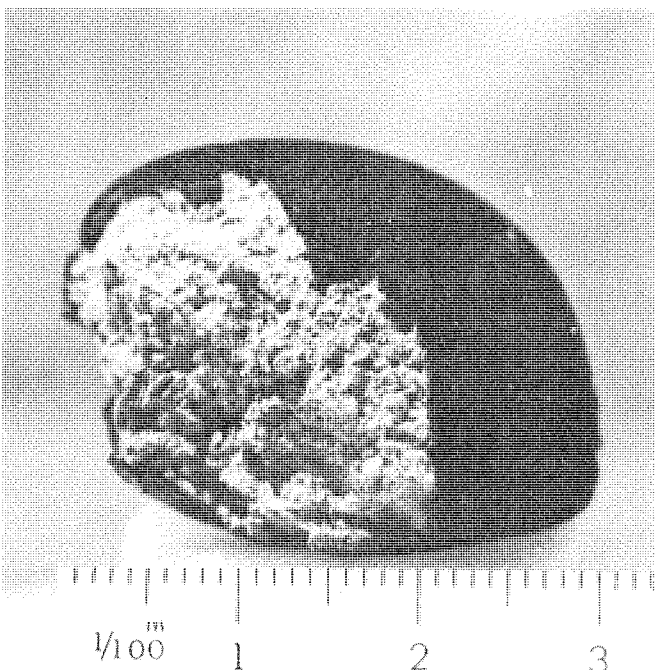
The sections show a brecciated texture with extensively recrystallized clast. It is composed olivine, low-Ca pyroxene, augite and albite with small amount of chromite, troilite and Ca phosphate. Metal contains very rare.

Y-74160 has been described by Takeda et al. (1979) as follows: The meteorite is brecciated and a thin section examined is composed of subangular recrystallized clasts, which consist of olivine ($\sim 49\%$), low-Ca pyroxene (orthopyroxene) ($\sim 29\%$), augite ($\sim 9\%$), plagioclase ($\sim 8\%$), chromite ($\sim 3\%$), troilite ($\sim 2\%$) and Ca phosphate ($\sim 0.5\%$). Metal (Fe_{50.0}, Co_{2.3}, Ni_{46.7} wt. %)

has been detected with chromite and troilite in very small amount. Microprobe analyses show olivine (Fa₃₀), orthopyroxene (Ca₄Mg₇₄Fe₂₄), augite (Ca₄₃Mg₄₆Fe₁₁)

of uniform composition. The percent mean deviation of Fa content in olivine is about 1%, and Fs content of pyroxene is about 2.5%. The plagioclase shows a small range of compositions from An₇ to An₂₅. The silicate minerals in the

clasts exhibiting a granoblastic texture have rounded grain boundaries. The brecciated matrix itself appears to be recrystallized and became transparent.



Bulk chemical composition of the Y-74160,81,82 meteorite is shown as follow:

SiO ₂	44.03
TiO ₂	0.14
Al ₂ O ₃	2.81
Fe ₂ O ₃	0.25
FeO	19.05
MnO	0.35
MgO	28.21
CaO	2.30
Na ₂ O	1.06
K ₂ O	0.08
H ₂ O(-)	0.00
H ₂ O(+)	0.17
P ₂ O ₅	0.20
Cr ₂ O ₃	0.60
FeS	0.34
Ni	0.09
Co	0.003
<hr/>	
Total	99.68

Yamato-74163

H5 Chondrite

Weight: 134.2 gms
 Dimension: 6.1 x 3.6 cm
 Degree of Weathering: C
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°44'30"S 35°55'10"E
 Original Number: 74120805
 Found: Dec. 8, 1974, K. Yanai et al.

Physical Description:

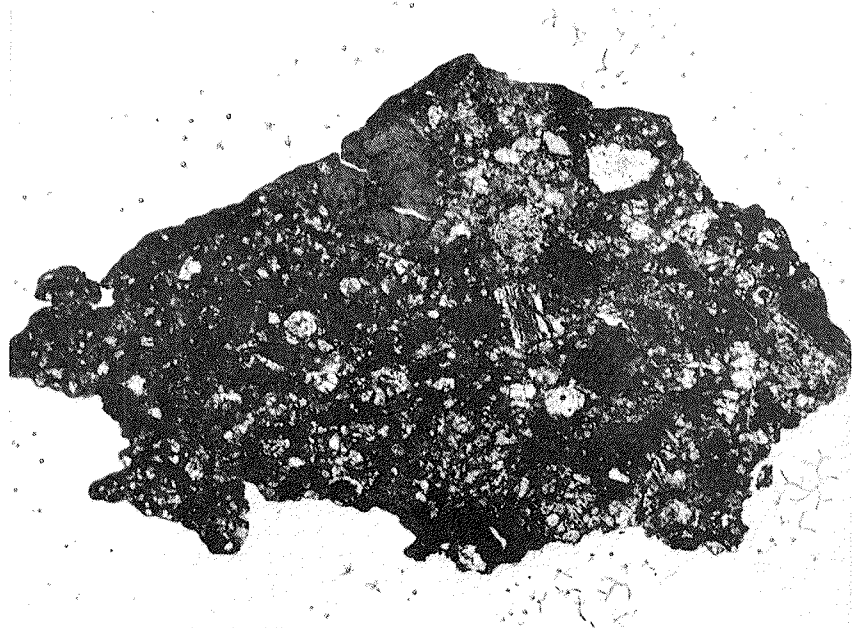
The specimen is about four-fifths of a complete stone, covered with dull brownish-black fusion crust except for one fracture surface, on which numerous chondrules are visible. Brown limonitic staining coats the fracture surface and is present as halos around metal grains.

Petrographic Description:

Chondrules and chondrule fragments are present, and occur in a granular groundmass of pyroxene and plagioclase, with minor amounts of nickel-iron and troilite. Traces of fusion crust are present. The meteorite is extensively weathered, with limonitic staining throughout the section. Microprobe analysis give the following results:

	Average	%M.D.	Range
Olivine	Fe _{17.7}	1.9	16.7-18.6
Low-Ca pyroxene	Fs _{15.8}	2.0	15.0-16.5

The meteorite is classified as an H5 chondrite.



Yamato-74164

L6 Chondrite

Weight: 284.8 gms
Dimension: 8.0 x 4.5 cm
Degree of Weathering: A
Degree of Fracturing:

Location: Yamato Mountains, Antarctica
71°44'15"S 35°53'30"E
Original Number: 74120806
Found: Dec. 8, 1974, K. Yanai et al.

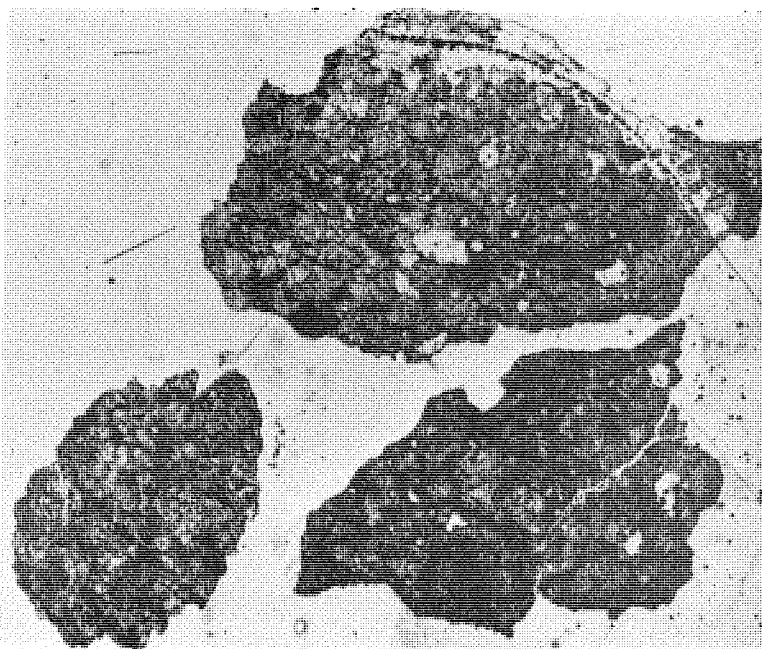
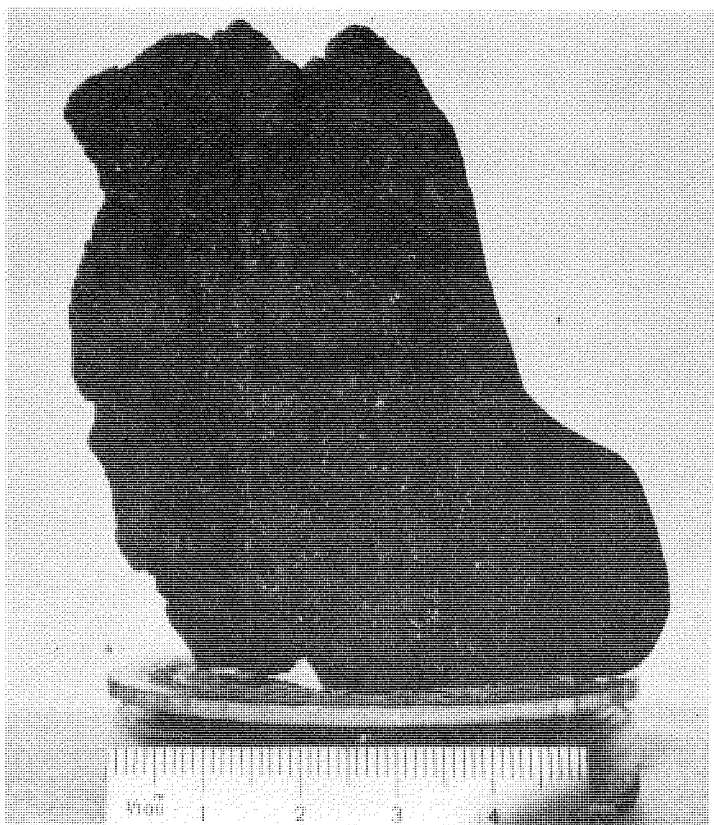
Physical Description:

An irregular fragment partly coated with dull black fusion crust; chondrules are visible on weathered fracture surfaces. Brown limonitic staining is present on fracture surfaces, but the interior is pale gray and essentially unweathered.

Petrographic Description:

Chondrules are present, but most of them are poorly defined and merge with the granular groundmass, which consists of olivine and pyroxene with minor amounts of plagioclase, nickel-iron and troilite. Some limonitic staining and small areas of red-brown limonite are present, usually in association with metal grains. Microprobe analysis give the following results: the mean composition of olivine $Fa_{25.1}$, low-Ca pyroxene Fs_{21} . The meteorite

is classified as an L6 chondrite.



Bulk chemical compositions of the Y-74164,71 meteorite is shown as follow:

SiO ₂	39.07
TiO ₂	0.14
Al ₂ O ₃	2.29
Fe ₂ O ₃	0
FeO	15.33
MnO	0.32
MgO	25.09
CaO	1.61
Na ₂ O	0.85
K ₂ O	0.06
H ₂ O(-)	0.07
H ₂ O(+)	0.4
P ₂ O ₅	0.14
Cr ₂ O ₃	0.50
FeS	6.30
Fe	6.49
Ni	1.24
Co	0.019
<hr/>	
Total	99.91

Yamato-74165

L4 Chondrite

Weight: 203.4 gms
 Dimension: 7.7 x 6.3 cm
 Degree of Weathering: C
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°44'05"S 35°52'30"E
 Original Number: 74120807
 Found: Dec. 8, 1974, K. Yanai et al.

Physical Description:

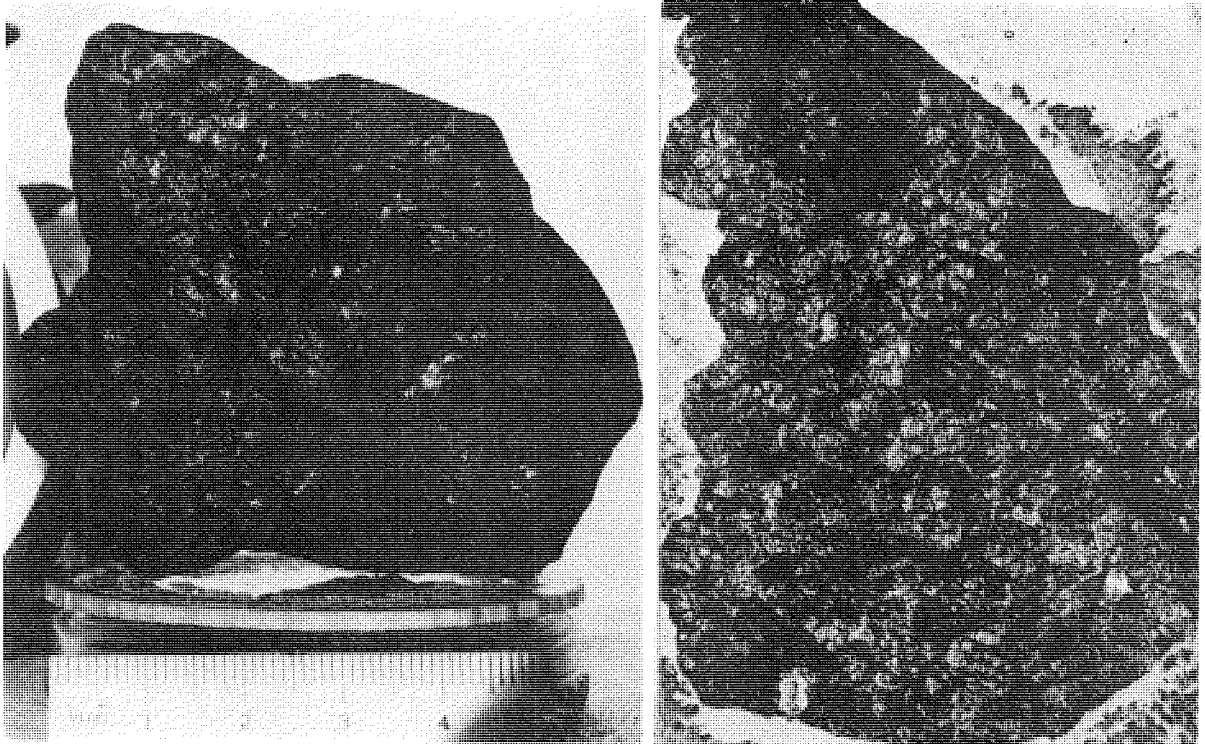
A fragment partly coated with dull black fusion crust; the specimen has one large flat fracture surface showing slickensides. The stone is pervaded with brown limonite which obscures the internal structure.

Petrographic Description:

Chondrules are abundant, but have been deformed and fragmented, probably by shock, since the olivine grains show undulose extinction. The section is traversed by numerous thin black veinlets, probably also the result of shock. Weathering is extensive, with limonitic staining and small areas of red-brown limonite throughout the section. Microprobe analysis give the following results:

	Average	Range
Olivine	Fa _{25.2}	24-27
Low-Ca pyroxene	Fs	19-25

The meteorite is classified as an L4 chondrite.



Yamato-74167

H3 Chondrite

Weight: 2.1 gms
 Dimension: 1.3 x 1.2 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°45'30"S 35°02'00"E
 Original Number: 74120901
 Found: Dec. 9, 1974, K. Yanai et al.

Physical Description:

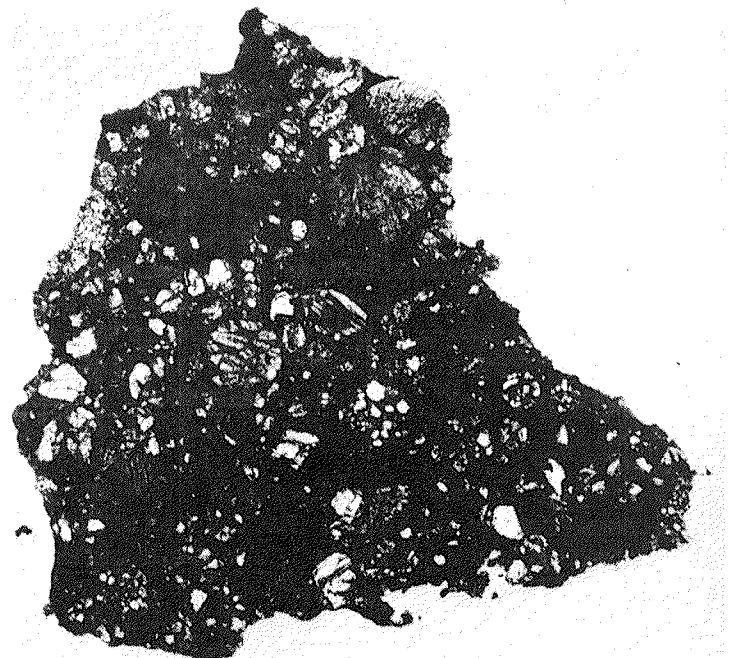
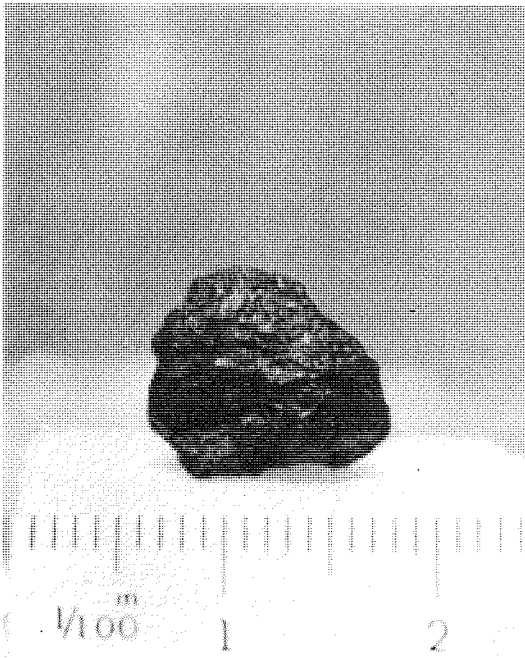
A small weathered fragment showing numerous chondrules; 74166, 168, 169, and 170 are similar fragments grouped in the field as pieces of a single meteorite.

Petrographic Description:

The small section shows a close-packed aggregate of chondrules and chondrule fragments, in a minor amount of fine-grained matrix heavily infiltrated with red-brown limonite. The chondrules are mainly granular and porphyritic olivine and olivine-pyroxene. Most of the pyroxene is twinned clinobronzite. Minor amounts of nickel-iron and troilite are present, the metal extensively corroded by weathering. Microprobe analysis give the following results:

	Average	%M.D.	Range
Olivine	Fa _{18.1}	1.6	17.6-19.4
Low-Ca pyroxene	Fs _{15.5}	5.2	13.8-16.4

The meteorite is tentatively classified as an H3 chondrite.



Yamato-74175

L6 Chondrite

Weight: 23.1 gms
 Dimension: 3.2 x 2.2 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°44'05"S 35°27'00"E
 Original Number: 74121001
 Found: Dec. 10, 1974, K. Yanai et al.

Physical Description:

An irregular fragment partly coated with dull brownish-black fusion crust; fracture surfaces have brown limonitic staining, but the interior is pale gray and relatively unweathered.

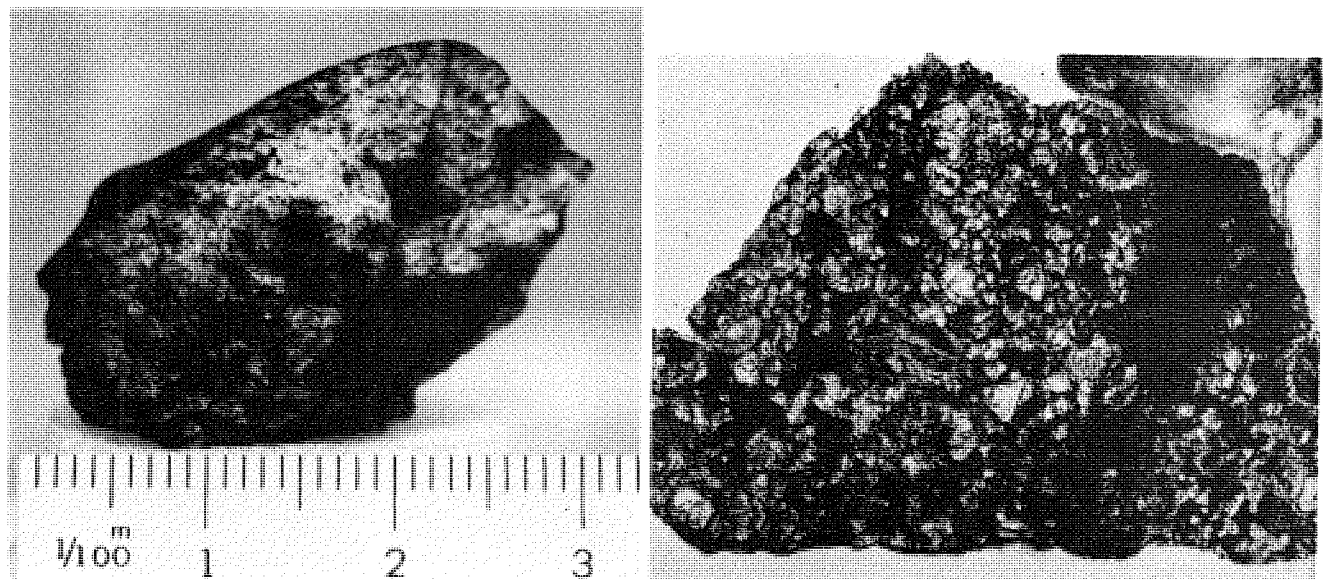
Petrographic Description:

Chondritic structure is poorly developed, the outlines of many of the chondrules being obscured by recrystallization and integration with the groundmass. The groundmass consists of granular olivine and pyroxene, with minor nickel-iron and troilite, and possibly a little plagioclase. Some areas are fine-grained and blackened, probably the result of shock. Some limonitic staining is present, especially around nickel-iron grains.

Microprobe analysis give the following results:

	Average	M.D.	Range
Olivine	Fa _{24.0}	1.3	23.1-24.9
Low-Ca pyroxene	Fs _{20.3}	3.1	19.7-22.5
Clinopyroxene	En _{46.6} Fs _{7.4} Wo _{46.0}		
Plagioclase	An ₁₁		

The meteorite is classified as an L6 chondrite.



Yamato-74187

H5 Chondrite

Weight: 6.5 gms
 Dimension: 1.9 x 1.6 cm
 Degree of Weathering: C
 Degree of Fracturing:

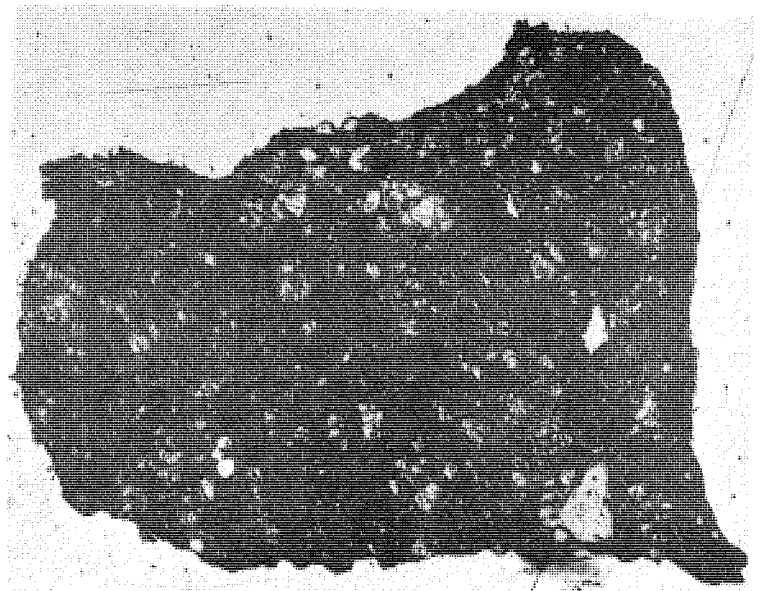
Location: Yamato Mountains, Antarctica
 71°48'15"S 35°23'50"E
 Original Number: 74121004-1
 Found: Dec. 10, 1974, K. Yanai et al.

Physical Description:

Yamato-74187 and 188 fit together perfectly to form a wedge-shaped stone partly coated with dull brownish-black fusion crust. Brown limonitic staining pervades the stone and obscures the internal structure.

Petrographic Description:

Chondritic structure is well developed, but the chondrules show extensive integration with the granular groundmass, which consists of olivine and pyroxene with minor amounts of nickel-iron and troilite. Weathering is extensive, with brown limonitic staining throughout the section. Microprobe analysis give the following results: the mean composition of olivine $Fa_{18.0}$ (range 16-22), low-Ca pyroxene $Fs_{17.1}$ (range 16-18). The meteorite is classified as an H5 chondrite.



Yamato-74190

L6 Chondrite

Weight: 3235.7 gms
 Dimension: 13.0 x 12.5 cm
 Degree of Weathering: A
 Degree of Fracturing:

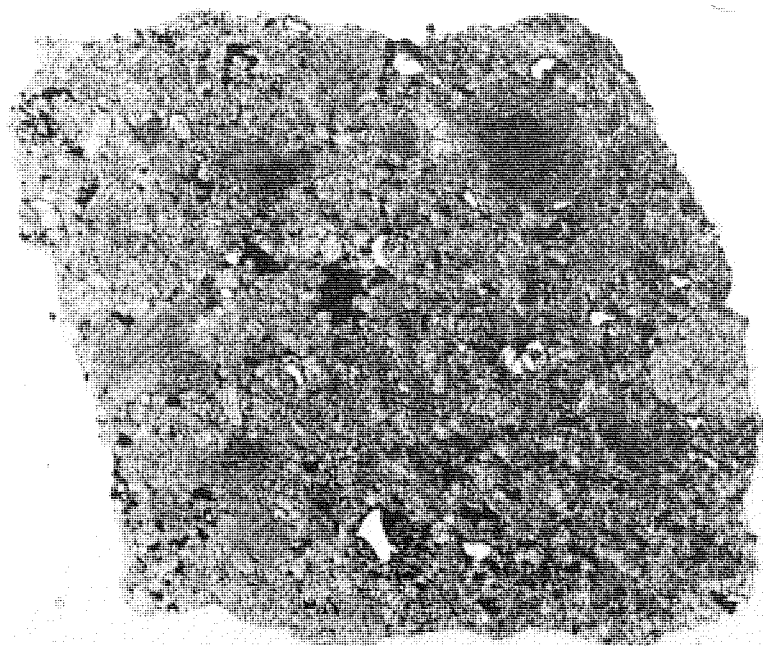
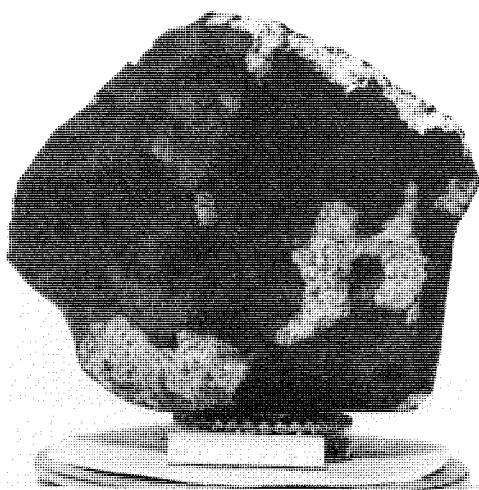
Location: Yamato Mountains, Antarctica
 71°49'50"S 35°26'40"E
 Original Number: 74121006
 Found: Dec. 10, 1974, K. Yanai et al.

Physical Description:

A complete irregular-shaped stone largely covered with dull black fusion crust; some brown limonitic staining is present on exposed surfaces, but the interior is pale gray with few visible chondrules and with minor limonitic staining around metal grains.

Petrographic Description:

Chondritic structure is barely perceptible, the chondrules being integrated with the groundmass as a granular aggregate of olivine and pyroxene, with minor amounts of plagioclase, nickel-iron, and troilite. The meteorite is completely fresh and unweathered, probably a recent fall. Microprobe analysis give the following results: the mean composition of olivine $Fa_{24.6}$, low-Ca pyroxene $Fs_{21.1}$. It is an L6 chondrite.



Bulk chemical compositions of the Y-74190,77,78 meteorite is shown as follow:

SiO ₂	39.24
TiO ₂	0.10
Al ₂ O ₃	2.83
FeO	14.05
MnO	0.32
MgO	25.86
CaO	1.91
Na ₂ O	0.97
K ₂ O	0.12
H ₂ O(-)	0.00
H ₂ O(+)	0.1
P ₂ O ₅	0.25
Cr ₂ O ₃	0.51
FeS	6.13
Fe	6.55
Ni	1.11
Co	0.04

Total 100.09

Yamato-74191

L3 Chondrite

Weight: 1091.6 gms
 Dimension: 12.0 x 10.0 cm
 Degree of Weathering: A
 Degree of Fracturing:

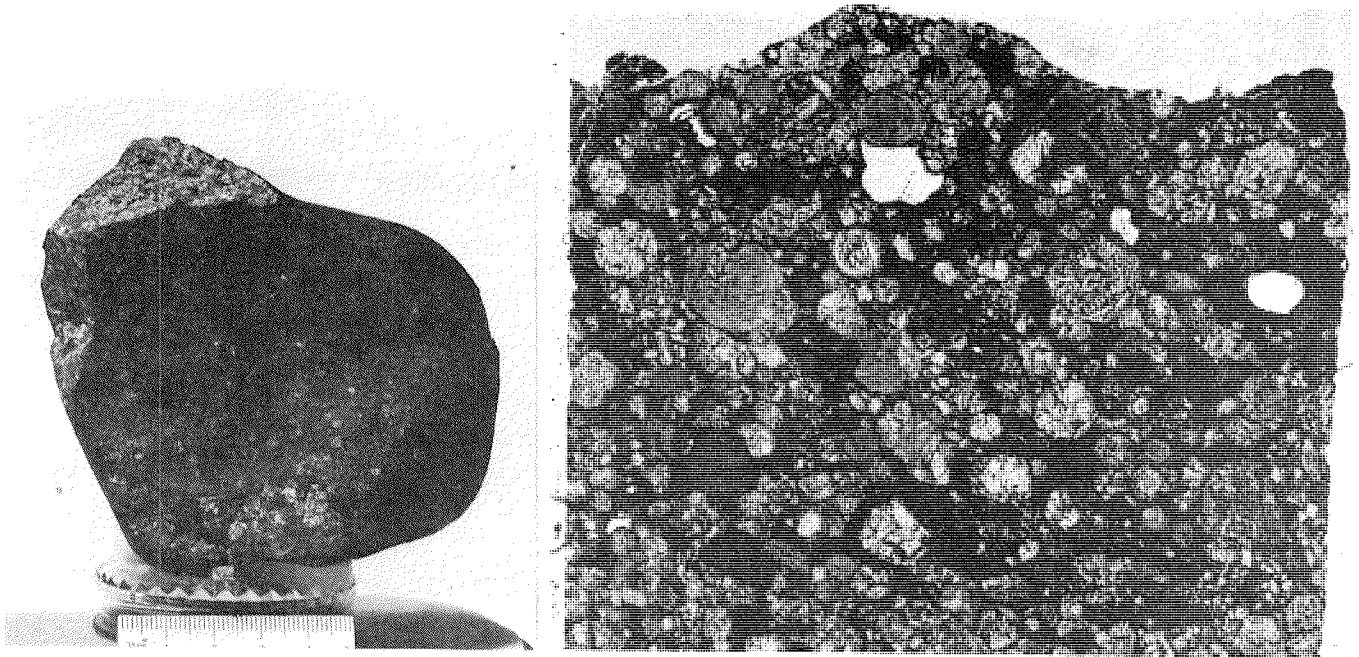
Location: Yamato Mountains, Antarctica
 71°50'00"S 35°31'10"E
 Original Number: 74121007
 Found: Dec. 10, 1974, K. Yanai et al.

Physical Description:

About two-thirds of a complete stone, partly covered with brownish-black fusion crust; exposed surfaces show numerous chondrules in a medium gray matrix. Weathering is limited to brown limonitic staining around metal grains.

Petrographic Description:

The section shows a close-packed aggregate of chondrules and chondrule fragments, with little interstitial fine-grained matrix, and some larger grains of nickel-iron and troilite. A variety of chondrule types is present the commonest being granular and porphyritic olivine and olivine-pyroxene, with interstitial glass (some glass is transparent and pale brown in color, some is turbid and partly devitrified). Most of the pyroxene is polysynthetically twinned. Some examples of chondrules within chondrules are present. Brown limonitic staining is associated with the nickel-iron grains. Microprobe analysis give the following results: the mean composition of olivine $Fa_{18.8}$ (range 12-25), low-Ca pyroxene Fs_{4-25} . The meteorite is an L3 chondrite.



Bulk chemical composition of the Y-74191,86 meteorite is shown as follow:

SiO ₂	40.09
TiO ₂	0.24
Al ₂ O ₃	2.89
FeO	14.68
MnO	0.35
MgO	24.89
CaO	1.79
Na ₂ O	0.97
K ₂ O	0.13
H ₂ O(-)	0.05
H ₂ O(+)	1.13
P ₂ O ₅	0.20
Cr ₂ O ₃	0.75
FeS	5.01
Fe	5.66
Ni	0.85
Co	0.032
<hr/>	
Total	99.712

Yamato-74192

H5 Chondrite

Weight: 420.3 gms
Dimension: 7.5 x 6.3 cm
Degree of Weathering: C
Degree of Fracturing:

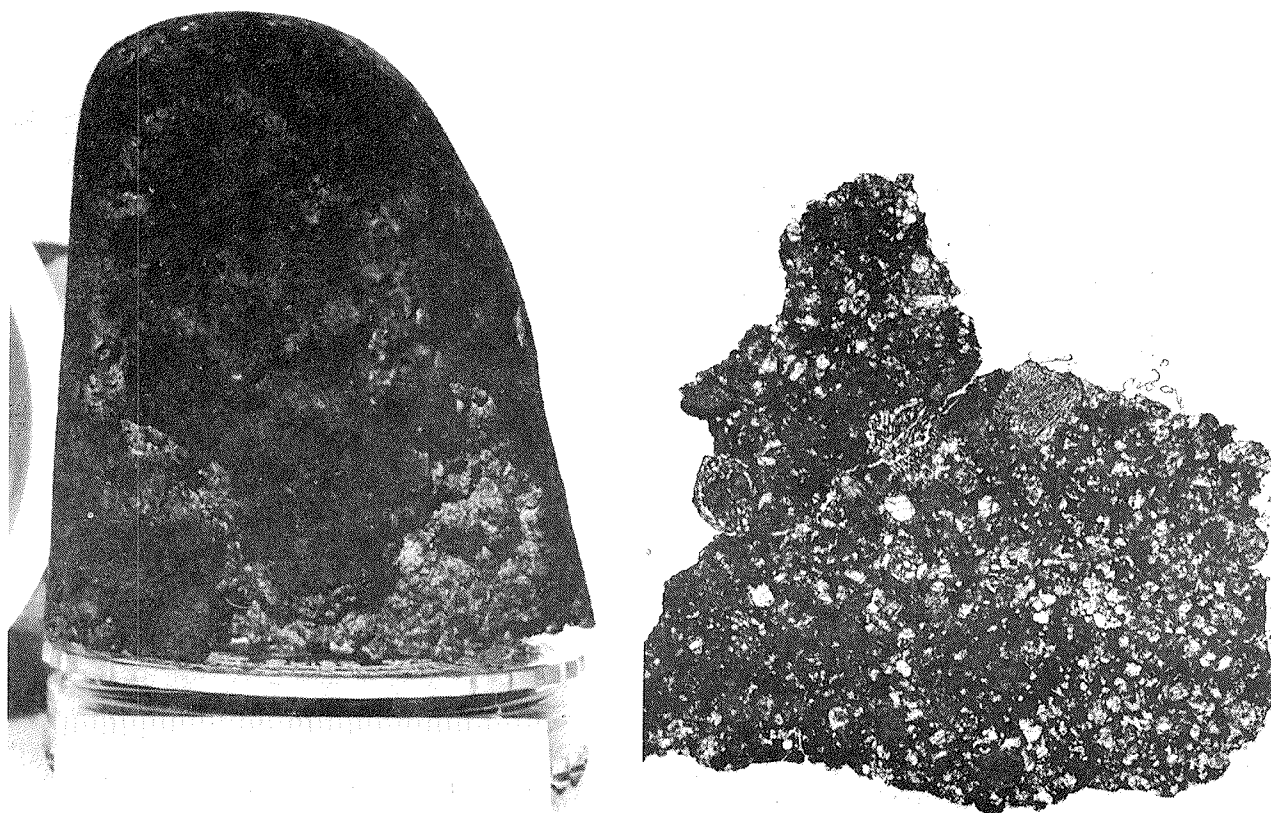
Location: Yamato Mountains, Antarctica
71°36'42"S 35°15'30"E
Original Number: 74121101
Found: Dec. 11, 1974, K. Yanai et al.

Physical Description:

About one-half of a complete stone, with dull brownish-black fusion crust on all sides except for one fracture surface. The interior shows chondritic structure. Brown limonitic staining is extensive.

Petrographic Description:

Chondrite structure is well developed, but many of the chondrules are irregular in outline and tend to merge with the groundmass. The groundmass consists largely of granular olivine and pyroxene, with minor amounts of nickel-iron and troilite; it is weathered, with brown limonitic staining throughout. Microprobe analysis give the following results: the mean composition of olivine $Fa_{18.2}$, low-Ca pyroxene $Fs_{15.8}$. The meteorite is classified as an H5 chondrite.



Bulk chemical composition of the Y-74192,77 meteorite is shown as follow:

SiO ₂	35.62
TiO ₂	0.11
Al ₂ O ₃	2.87
FeO	12.12
MnO	0.31
MgO	23.77
CaO	1.66
Na ₂ O	0.78
K ₂ O	0.07
H ₂ O(-)	0.21
H ₂ O(+)	0.8
P ₂ O ₅	0.23
Cr ₂ O ₃	0.53
NiO	0.74
FeS	5.32
Fe	13.60
Ni	1.10
Co	0.008
<hr/>	
Total	99.84

Yamato-74193

H5 Chondrite

Weight: 1818.5 gms
 Dimension: 12.0 x 8.5 cm
 Degree of Weathering: B
 Degree of Fracturing:

Location: Yamato Mountains, Antarctica
 71°38'35"S 35°35'40"E
 Original Number: 74121701
 Found: Dec. 17, 1974, K. Yanai et al.

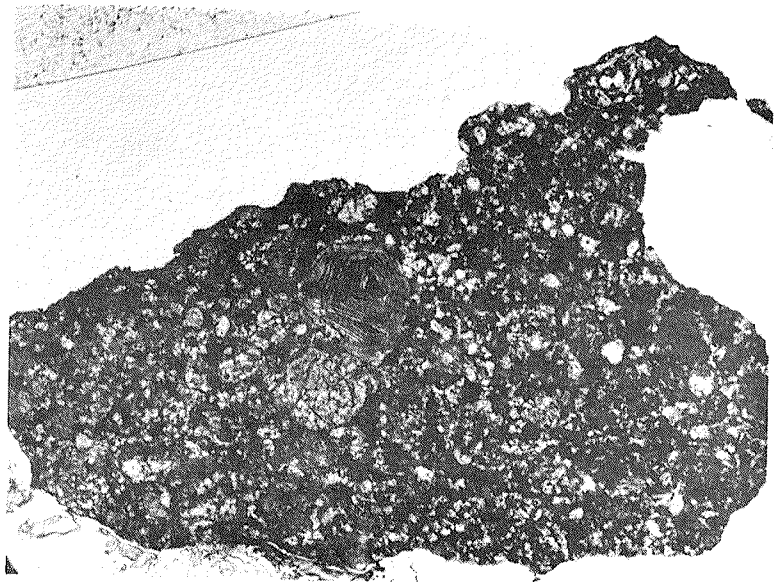
Physical Description:

A complete pyramidal stone with dark brown weathered fusion crust and many deep fractures.

Petrographic Description:

A few well-developed chondrules are present, but most of the section is a granular aggregate of olivine and pyroxene, with minor amounts of nickel-iron and troilite. Weathering is extensive, with brown limonitic staining concentrated around metal grains. Microprobe analysis give the following results: the mean composition of olivine $Fa_{19.1}$, low-Ca pyroxene $Fs_{17.3}$.

The meteorite is classified as an H5 chondrite.



Yamato-74194 - 74342 H5 Chondrite

Weight:	Location: Yamato Mountains, Antarctica
Dimension:	71°44'30"S 35°51'00"E
Degree of Weathering: C	Original Number: 74121901
Degree of Fracturing:	Found: Dec. 19, 1974, K. Yanai et al.

Physical Description:

A collection of weathered fragments, some of them with fusion crust.

Petrographic Description:

This is a series of 148 specimens which were identified in the field as pieces of a single meteorite. Most of them are weathered fragments weighing less than 10 grams; some have areas of fusion crust. The composition of olivine and pyroxene in several of them has been reported by Miyamoto et al. (1979) and Nishida et al. (1979). Nishida et al. classified them as H5, and this appears to be generally appropriate, however, texture varies somewhat in different specimens, and Miyamoto et al. classified one as H4-5, one as H5-6, and one as H6.

Microprobe analysis give the following results: the mean of olivine $Fa_{19.1}$, low-Ca pyroxene $Fs_{17.7}$

