68115 GLASSY GRAY POLYMICT BRECCIA 1190 g

INTRODUCTION: 68115 is a heterogeneous polymict breccia (Fig. 1) which is heavily shocked. The event forming the breccia melted material, apparently mainly ferroan anorthosite, which then flowed between clasts. These latter are mainly aphanitic and basaltic impact melts. The glass is flow-banded, vesicular, and contains relict white material (Fig. 1).

The sample was the only sample chipped from the 1 m boulder on the southeast rim of a 10-15 m crater. The location and the exposure ages suggest that the boulder is South Ray ejecta. 68115 is medium to medium dark gray, subangular, and tough. Its orientation is known and zap pits occur on all surfaces except that freshly exposed by its break from the boulder.

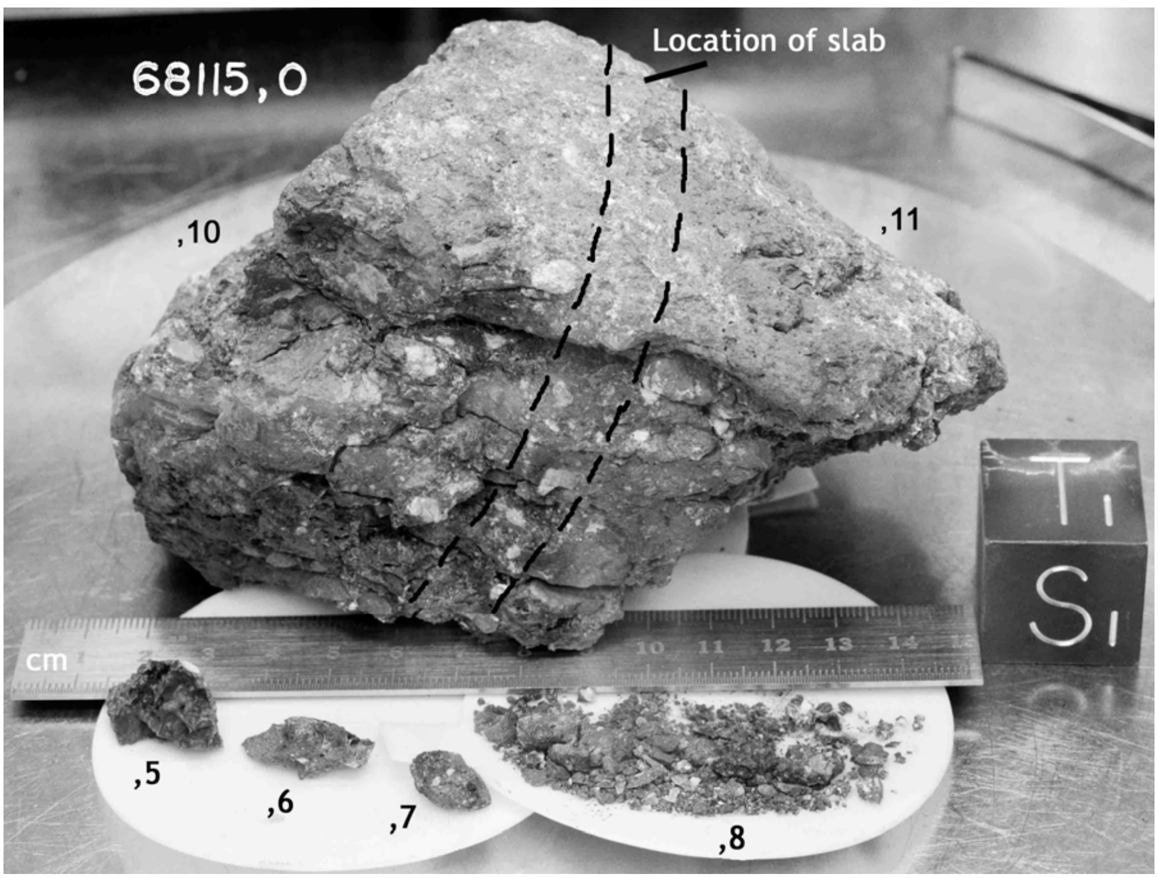

FIGURE 1. S-72-53532.

PETROLOGY: Grieve et al. (1974) give a petrographic description, with microprobe analyses, of glasses and impact melt fragments. Misra and Taylor (1975) give a brief petrographic description in their study of metal and schreibersite grains. L.A. Taylor et al. (1976), describing heating experiments on 68115, provide an analysis of glass.

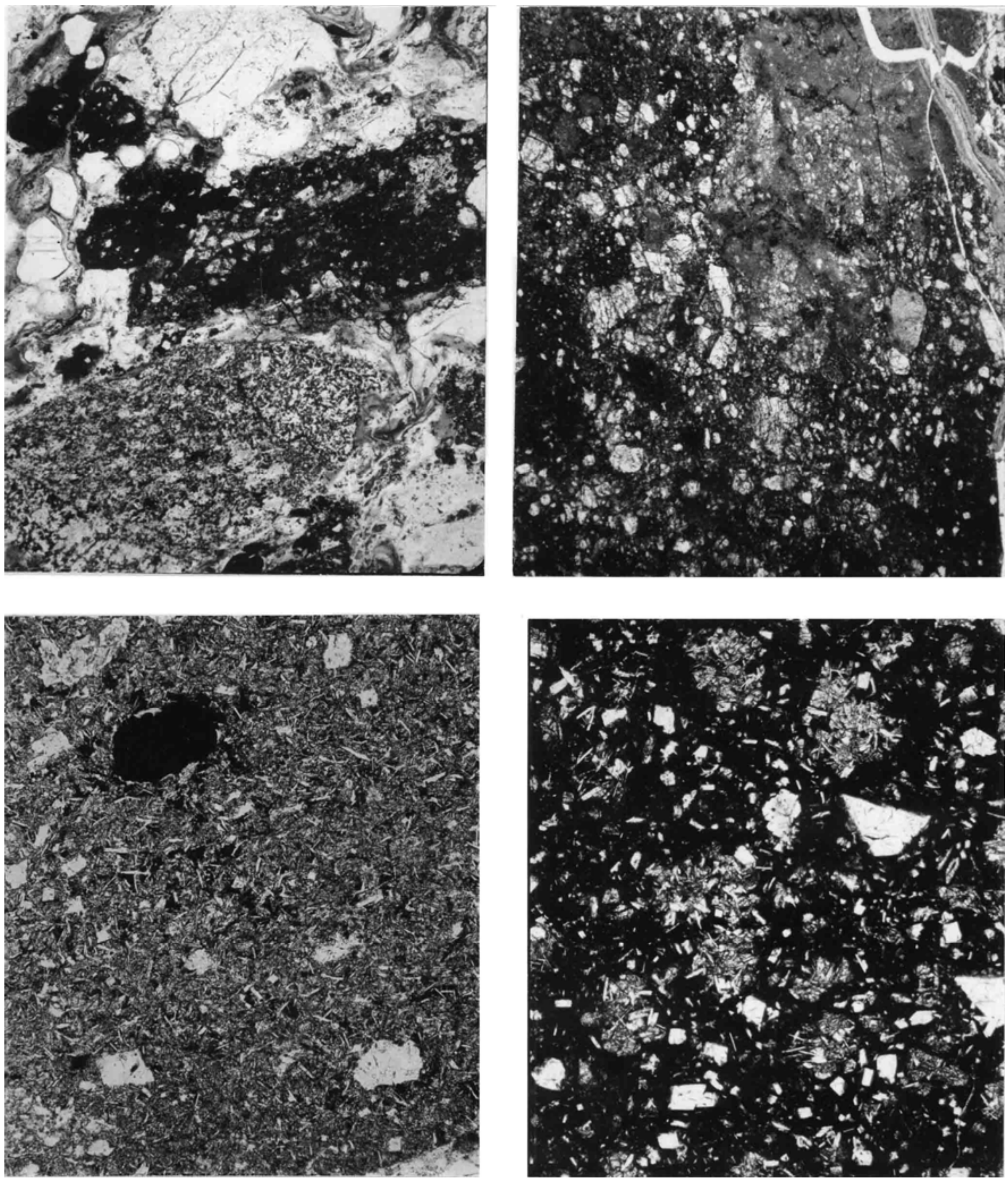

FIGURE 2.
a) 68115,3. General glassy breccia, ppl. Width 2 mm.
b) 68115,3. General glassy breccia: ppl. Width 2 mm.
c) 68115,3. Basaltic melt clast, ppl. Width 2 mm.
d) 68115,98. Glassy basaltic impact melt clast, ppl. Width 2 mm.

68115 is a heterogeneous breccia (Fig. 2) which is welded together by flow-banded glass. The glass varies from colorless to brown, is extremely vesicular, and is aluminous (analyses in Table 1). Plagioclase relicts, shocked and partly isotropized, merge into the glass, commonly with indistinct boundaries; "cumulate" textures occur rarely where mafics are present. The aluminous nature of the glass and the size of the plagioclase relicts (up to two millimeters) suggest a ferroan anorthosite precursor. Most of the clasts, apart from plagioclase, are aphanitic or fine-grained basaltic impact melts (Fig. 2); some are over 1 cm in diameter. They are varied in texture. The melts contain varied amounts of clastic material, mainly plagioclases, but some lithic clasts. These melts contain 21-26% Al_2O_3 (Grieve et al., 1974).

Metal grains analyzed by Misra and Taylor (1975) have features suggestive of crystallization from melts. Their compositions show some spread in Ni values (Fig. 3) with an average of 5.4% Ni and 0.4% Co. Schreibersite is also present; metal-schreibersite tie-lines do not match experimentally determined tie-lines in the Fe-Ni-P system. Fe-metal/troilite intergrowths are common. Kerridge et al. (1975b) report three values of total Fe^0 in 68115: 0.39, 1.07 and 1.62 wt%.

<u>CHEMISTRY</u>: S.R. Taylor et al. (1974) and Fruchter et al. (1974; analysis erroneously tabulated as 67455,13) analyzed some major and trace elements (including rare earths); Rancitelli et al. (1973b) provide U, Th, and K abundance data; and Ganapathy et al. (1974) provide meteoritic siderophile and volatile element abundances. Drozd et al. (1974) list a U abundance and Kerridge et al. (1975b) provide C and S abundances as well as analyses for carbon compounds. All these analyses are of bulk rock or matrix, and the differences between the analyses (Table 1) demonstrate the heterogeneity of the rock although the two rare earth patterns (Fig. 4) are similar. Remarkable is the difference between the siderophile and alkali contents measured by S.R. Taylor et al. (1974) and Ganapathy et al. (1974) on two chips which were similar in appearance; the analysis of Ganapathy et al. (1974) corresponds to a meteorite-free, pristine lithology (Hertogen et al., 1977).

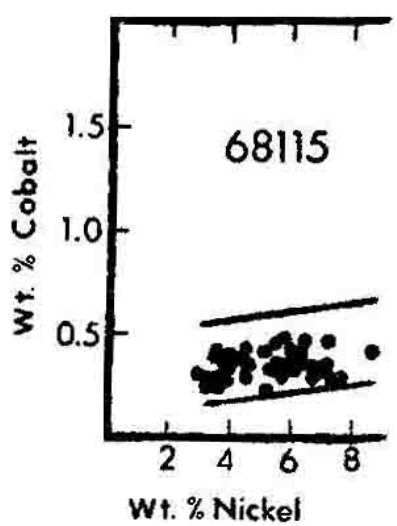

FIGURE 3. Metals; from Misra and Taylor (1975).

STABLE ISOTOPES: Kerridge et al. (1975b) report a $\delta^{13}C$ value of -25.8 and a $\delta^{34}S$ value of +1.9, which contrast with values for local regolith of +11 and +9 respectively.

RARE GASES AND EXPOSURE AGES: Drozd et al. (1974) report Kr isotopic and spallation spectra and give a spallation ^{81}Kr-Kr age of 2.08 ± 0.14 m.y. ^{21}Ne and ^{38}Ar ages of 1.75 ± 0.41 and 1.63 ± 0.67 m.y. respectively are tabulated. Bogard and Gibson (1975) report ^{22}Ne ages of 2.2 and 2.1 m.y. and ^{38}Ar ages of 1.3 and 0.9 m.y. Rancitelli et al. (1973a) report ^{22}Na and ^{26}Al data but because the sample was shielded from solar flares the information is not relevant to exposure (Yokoyama et al., 1974).

Bogard and Gibson (1975) report Kr and Xe isotopic abundances for different temperature releases. The data are unusual in that the concentrations released were higher than expected and were associated with the release of chemically active species including hydrocarbons. H_2O and CO_2 were also released and suggest terrestrial contamination. It is probable that the high Kr and Xe releases can be explained as strongly adsorbed atmospheric gases introduced, with other species, at an unknown time.

PROCESSING AND SUBDIVISIONS: Following removal of a few chips, a slab was cut from 68115 in 1973 leaving two large end-pieces ,10 (760 g) and ,11 (252 g) (Figs. 1 and 5). The slab and ,11 have been extensively subdivided (Fig. 5) but ,10 remains intact.

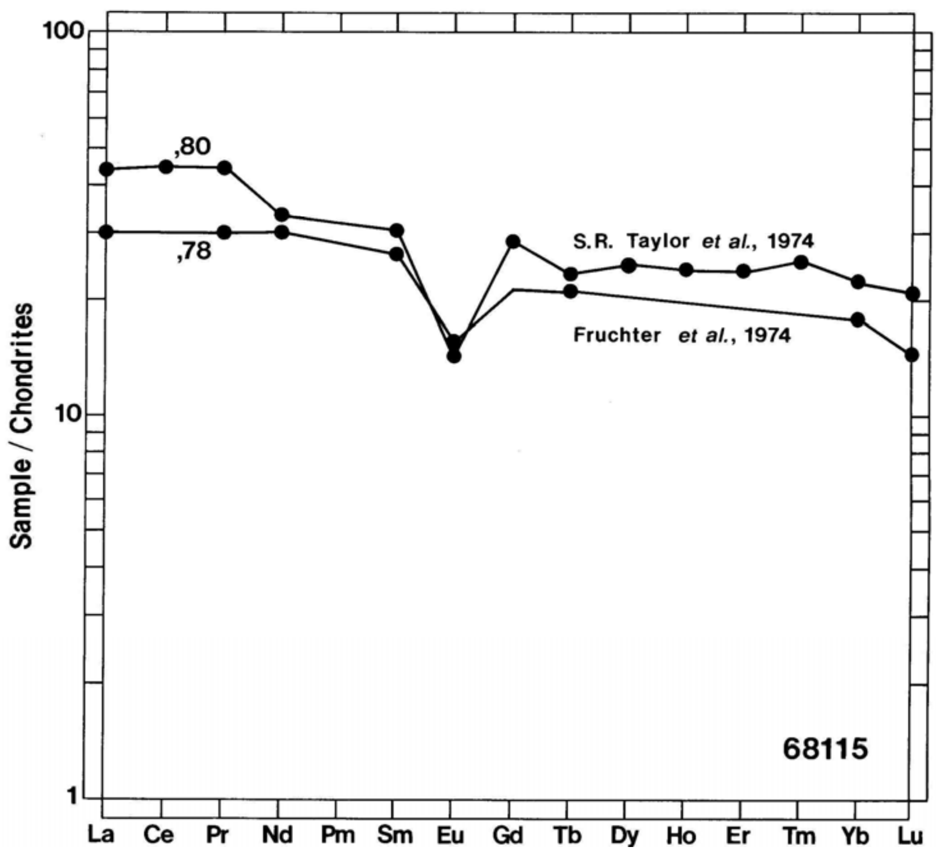

FIGURE 4. Rare earths.

TABLE 1. Chemical Analyses of chips of 68115.

	A	B	C	D	E	F
SiO_2	44.8				44.2	44.5
TiO_2	0.34				0.10	0.22
Al_2O_3	27.6	31.6			34.4	29.4
Cr_2O_3	0.10	0.09			0.01	0.06
FeO	5.10	3.2			1.18	3.3
MnO					0.04	0.00
MgO	5.79				0.86	3.6
CaO	15.4				18.7	17.5
Na_2O	0.47	0.45			0.47	0.68
K_2O	0.06				0.06	0.12
P_2O_5						
Sr						
La	14.3	9.8				
Lu	0.7	0.5				
Rb	2.6			0.043		
Sc	9	5.2				
Ni	2000			$\leq$7		
Co	105	19.4				
Ir ppb				0.04		
Au ppb				0.005		
C			13-112			
N						
S			600-800			
Zn						
Cu	17					

Oxides in wt%; others in ppm except as noted.

A) ,80 S.R. Taylor *et al.* (1974)
B) ,78 Fruchter *et al.* (1974)(erroneously listed as 67455,13)
C) ,67 Kerridge *et al.* (1975b)
D) ,77 Ganapathy *et al.* (1974)
E) L.A. Taylor *et al.* (1976)-microprobe data: glass
F) Grieve *et al.* (1974)-microprobe data: average glass matrix and injection vein

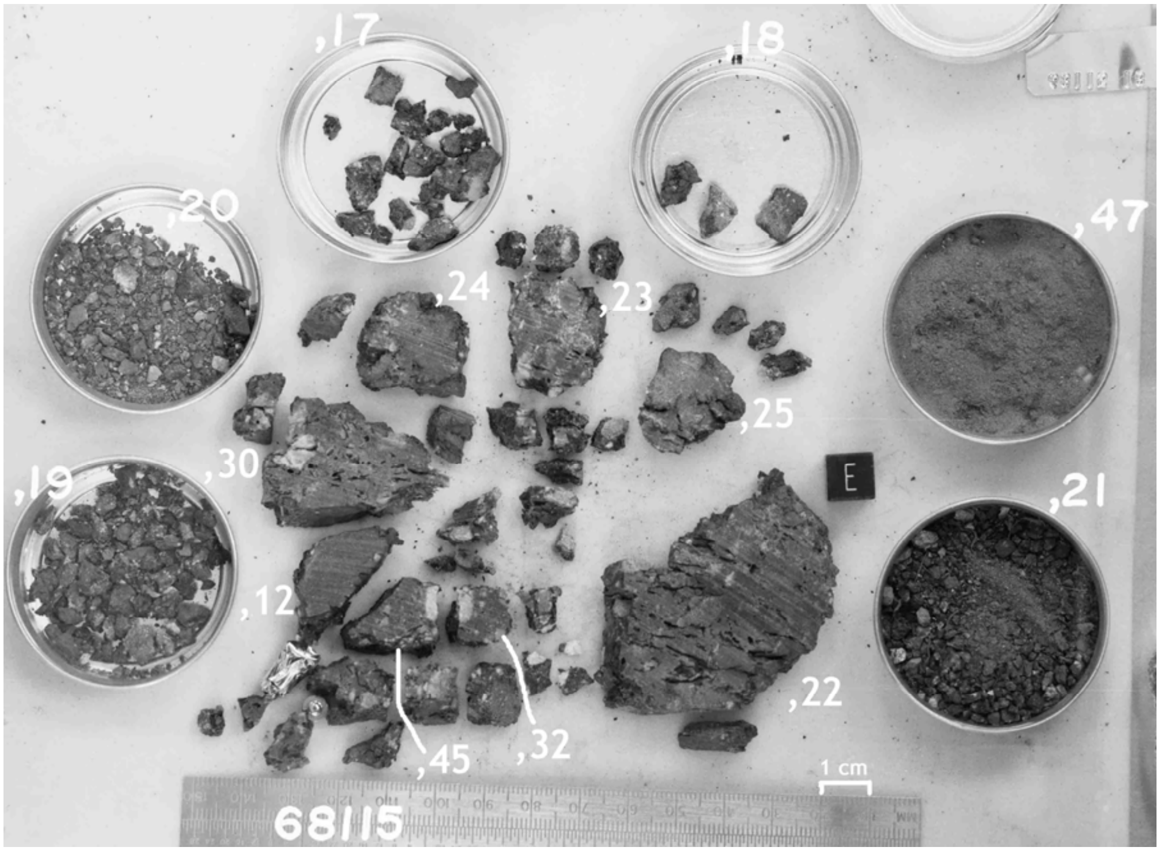

FIGURE 5. Splits of slab. S-73-22427.