15306 REGOLITH BRECCIA ST. 7 134.2 g

INTRODUCTION: 15306 is a typical glassy regolith breccia. It contains glass as balls and shards, many undevitrified; some lithic (undevitrified) fragments; and numerous mineral fragments in a glassy, opaque brown matrix. It contains one clast which is probably a pristine highlands igneous lithology. Macroscopically, it is brownish-gray, subangular and coherent (Fig. 1). Its surface is irregular and has a few zap pits. 15306 was collected with the soil sample at the rake site on the north-east rim of Spur Crater.

PETROLOGY: 15306 is a regolith breccia (Fig. 2). It has an opaque, brown, glassy matrix. According to Wentworth and McKay (1984) it is subporous, with a density of 2.34 gm/cm^3. Glass spheres and shards are prominent, and include green, yellow, orange, and colorless varieties. Most are undevitrified, but a few are brown because of devitrification. Best and Minkin (1972) included 15306 glass in a series of analyses of Apollo 15 glass, but tabulated only one glass analysis. Much of 15306 consists of mineral fragments.

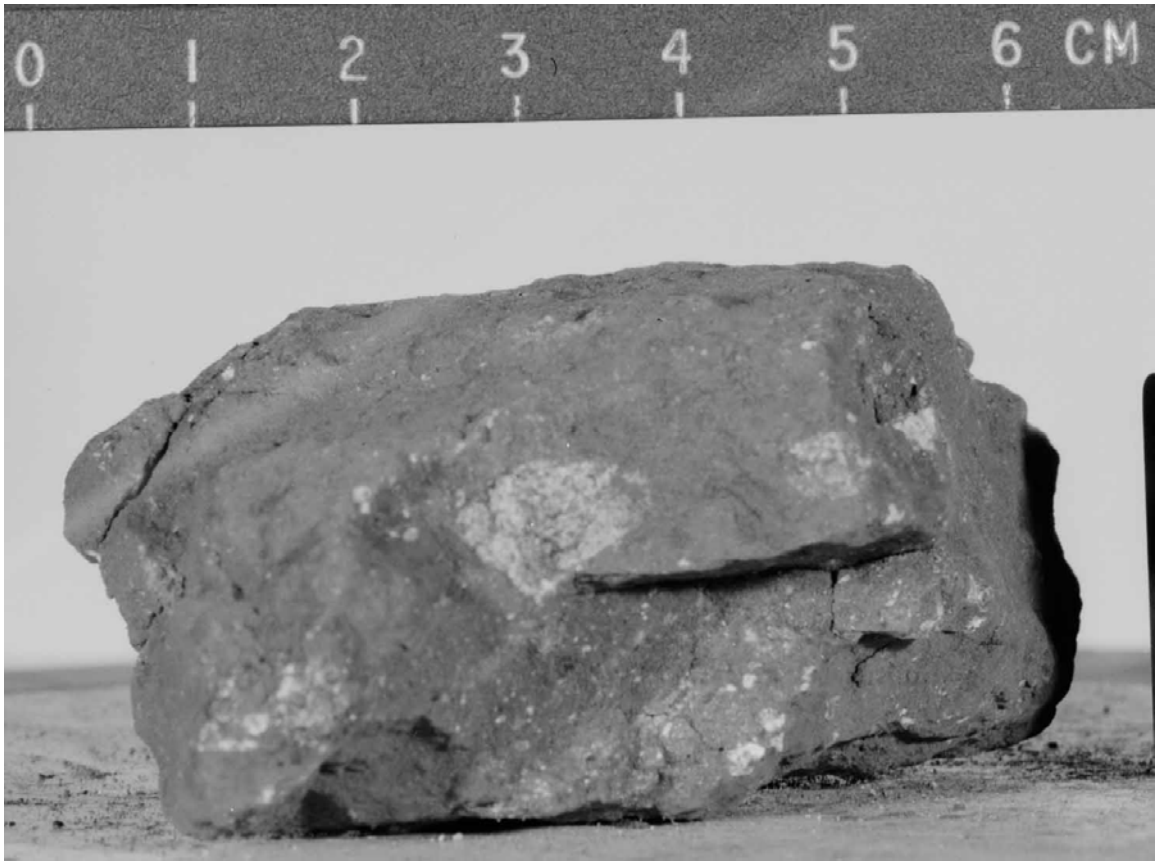

Figure 1. Macroscopic view of 15306,0 following breakage of some splits from the visible side. Prominent clast in center is labeled "A." S-71-44401

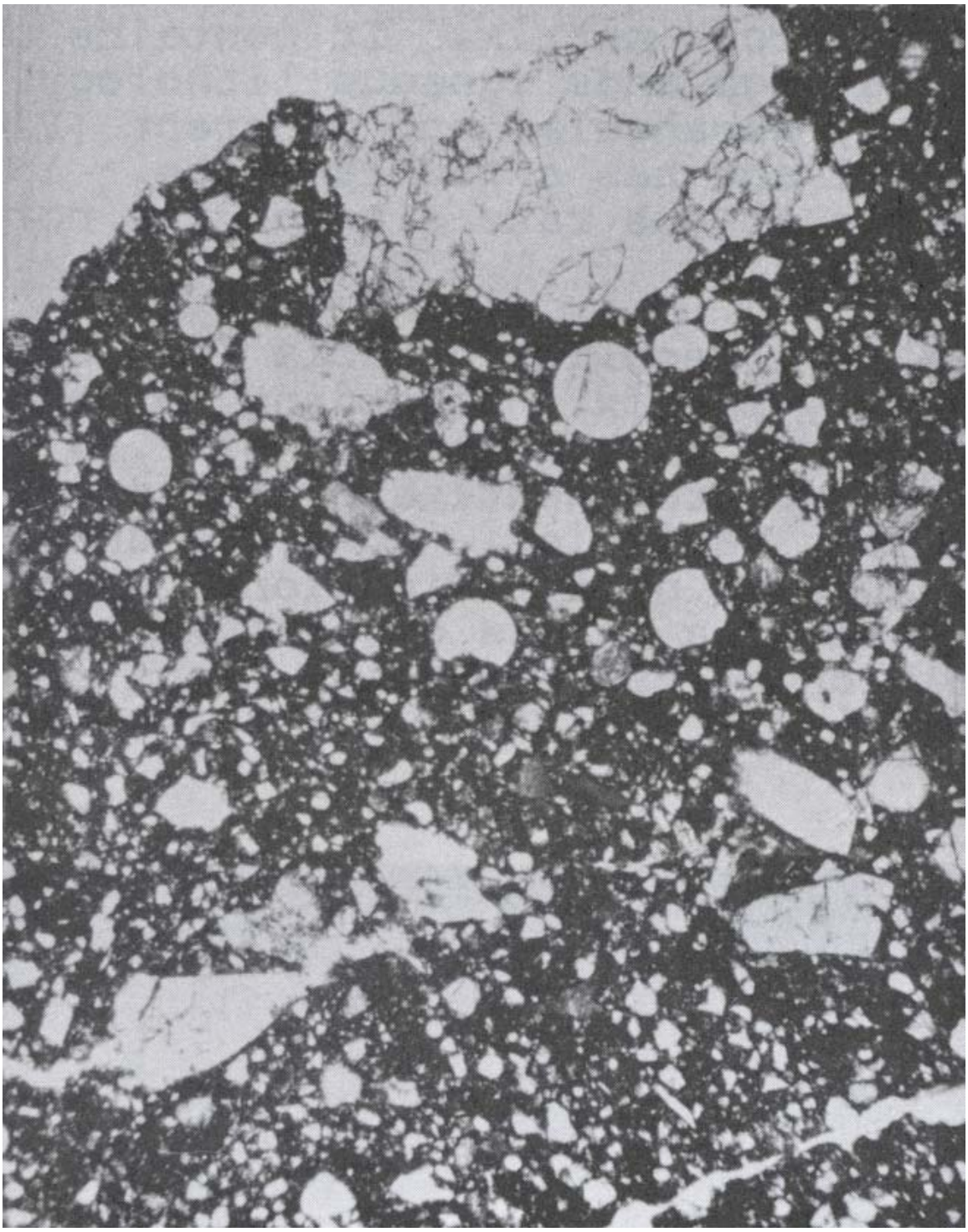

Figure 2. Photomicrograph of 15306,6, general matrix view.
Transmitted light. Width about 2mm.

Lithic clasts are generally sparse and small. One depicted in Figure 2 is apparently a plagioclase-poikilitic mare basalt. Warren and Wasson (1980) described and chemically analyzed two clasts, both highlands, one of which is probably pristine. The "probably pristine" clast (CL21) is about 8 x 7 mm in surface expression. It consists modally of about 55% plagioclase, 25% orthopyroxene, 20% olivine, and 1% opaques. Most of the plagioclase is maskelynitized, with the maskelynite slightly more calcic ($An_{94.1}$) than non-maskelynitized plagioclase ($An_{93.2}$). The mafic grains are less than 0.3 mm across and are scattered. Mineral compositions are shown in Figure 3. Metal compositions suggest that the clast is pristine; although the chemical analysis suggest contamination, this might be from 15306 matrix which is difficult to separate from the clast. A second clast (CL25), 5 x 5 mm, is not pristine. It is a noritic anorthosite containing 79% plagioclase, and is essentially a polymict breccia with some granulitic texture. Mineral compositions are shown in Figure 4 and show a wide variation.

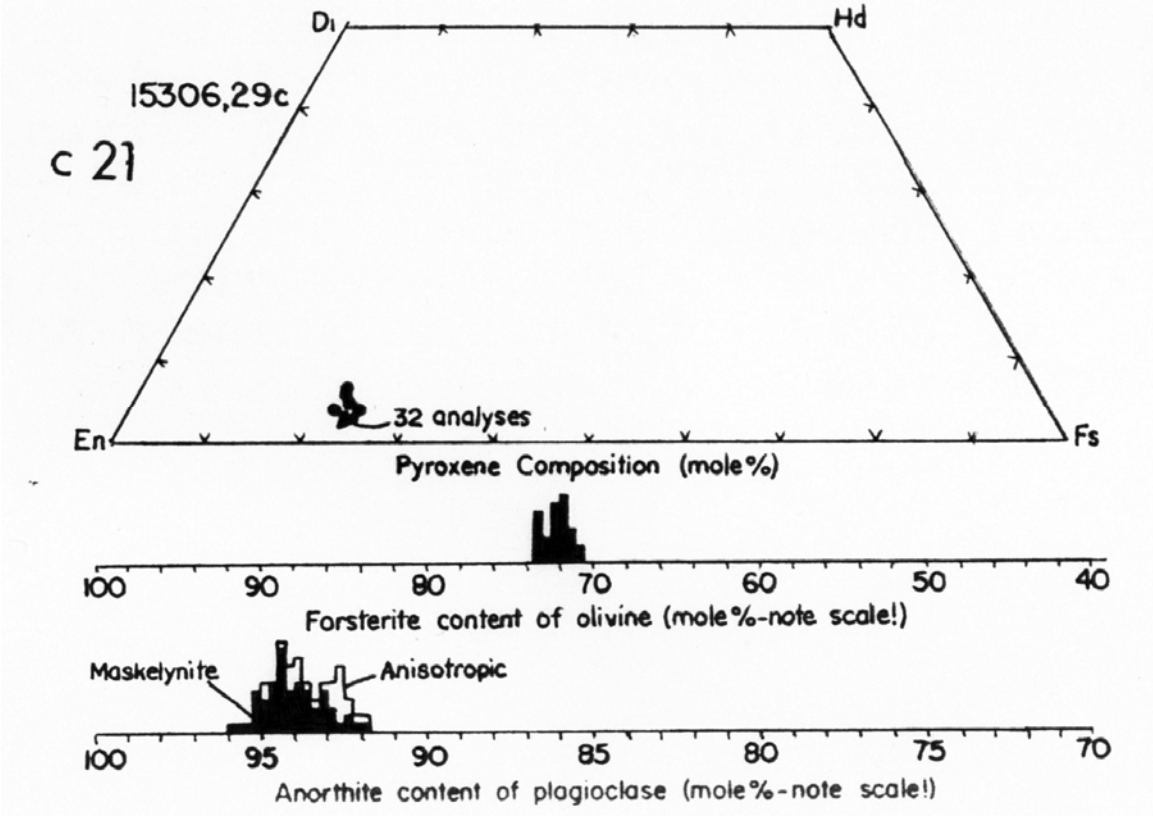

Figure 3. Mineral compositions in C21
(Warren and Wasson, 1980).

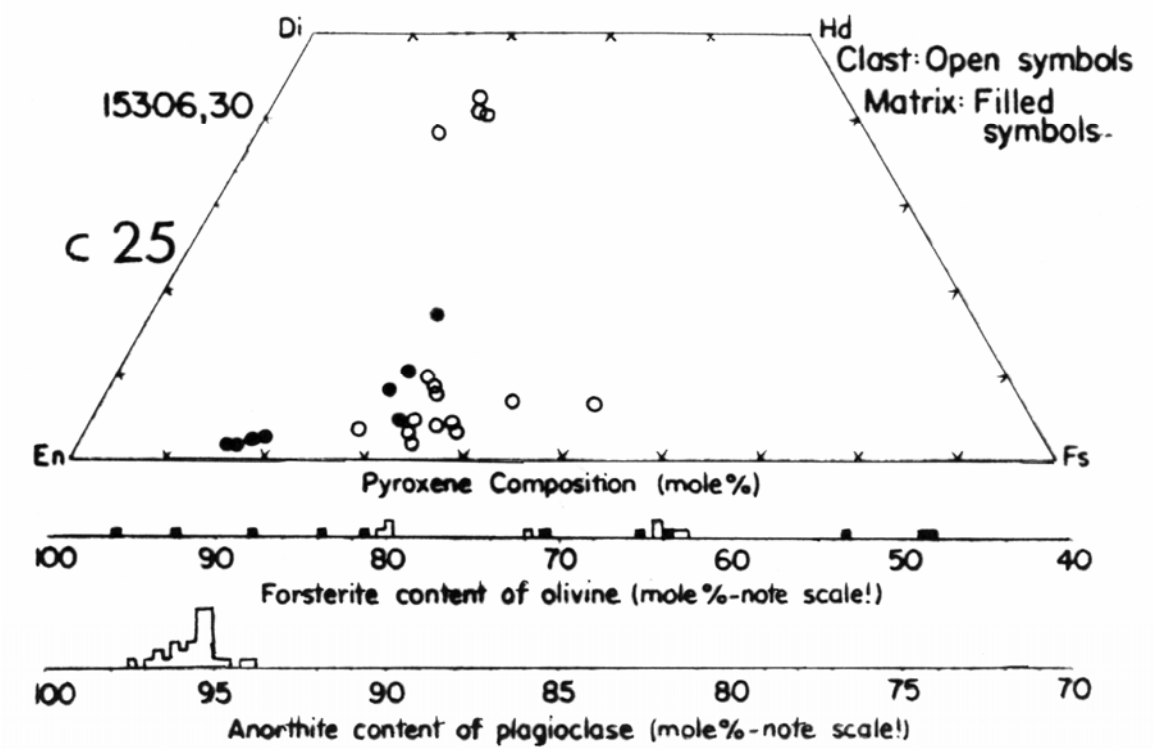

Figure 4. Mineral compositions in C25
(Warren and Wasson, 1980).

CHEMISTRY: Only C, N, and S analyses have been reported for the bulk matrix (Table 1). Two clasts were analyzed for major and trace elements (Table 1); their rare earth patterns are shown in Figure 5. The chemistry suggests that both clasts are contaminated with meteoritic material, but Warren and Wasson (1980) suggest that CL21 is "probably pristine," on the basis of homogeneous mineral compositions and metal compositions, even though its siderophiles are high and its rare earth pattern is essentially that of KREEP. The non-pristine clast CL25 also has a KREEP rare earth pattern.

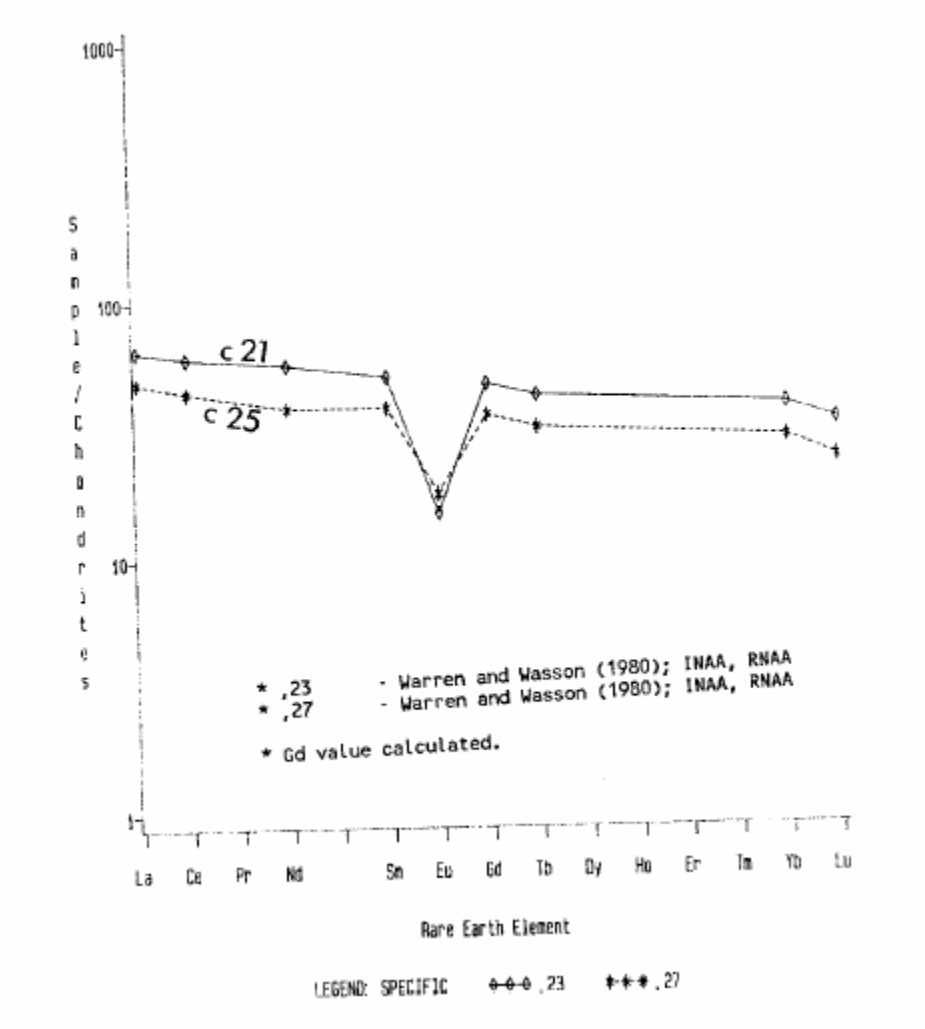

Figure 5. Rare earths in two clasts in 15306.

PROCESSING AND SUBDIVISIONS: Although 15306 is coherent, it was fractured and a few pieces fell off, and early allocations made from them. One of those fragments (,4) was used to make the matrix thin sections ,5 and ,6, with much of potted butt ,4 remaining. One of the allocations for the c]ants analyzed by Warren and Wasson was made from a clast in ,1 (CL25). The probably pristine clast (CL21) was labeled "B" in data packs and was scraped from ,0. The genealogy of those two samples is shown in Figure 6. The clasts visible in Figure 1 include "A" (large, center) which was sampled but stored and not allocated. The two other small ones to the right in Figure 1 are "C" and "D" respectively and have not been allocated.

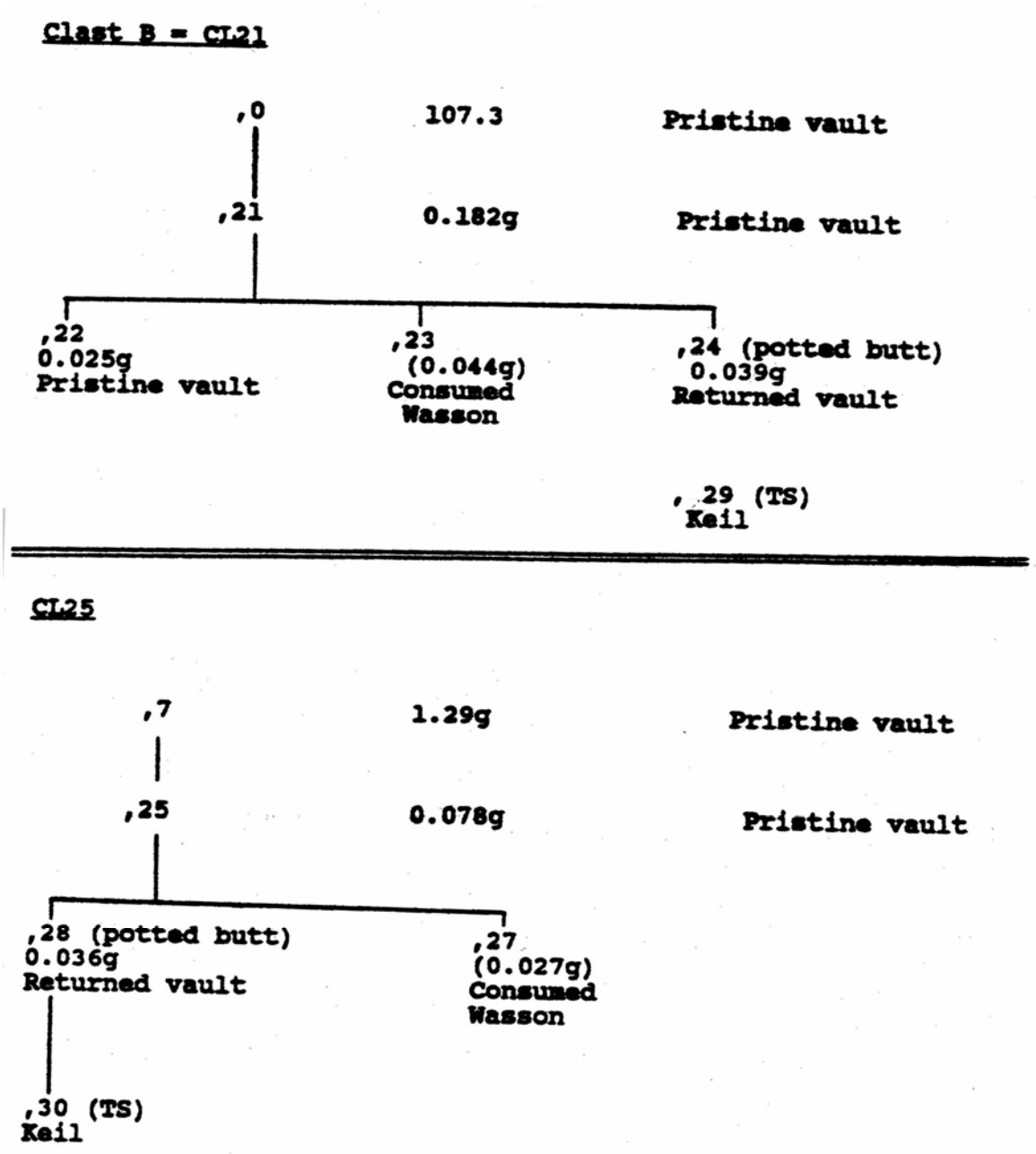

Figure 6. Genealogy of two 15306 clasts allocated to Wasson, with current masses and locations.

TABLE 15306-1. Chemical analyses of matrix (,11) and two clasts (,23 and ,27)

		Matrix ,11	(CL21) ,23	(CL25) ,27
Wt %	SiO2		47.3	45.8
	TiO2		1.8	0.43
	Al2O3		18.0	27.8
	FeO		8.9	4.6
	MgO		12.9	4.6
	CaO		10.1	16.0
	Na2O		0.427	0.495
	K2O		0.050	0.197
	P2O5			
(ppm)	Sc		16.3	8.8
	V			
	Cr		2790	642
	Mn		1040	520
	Co		28.7	17.2
	Ni		26	29
	Rb			
	Sr			
	Y			
	Zr		480	290
	Nb			
	Hf		10.7	5.5
	Ba		420	1640
	Th		4.4	3.3
	U		1.6	0.81
	Pb			
	La		21.4	16.0
	Ce		53	39
	Pr			
	Nd		34	23
	Sm		9.18	6.93
	Eu		1.05	1.24
	Gd			
	Tb		2.0	1.5
	Dy			
	Ho			
	Er			
	Tm			
	Yb		7.7	5.7
	Lu		1.13	0.81
	Li			
	Be			
	B			
	C	170		
	N	83		
	S	810		
	F			
	Cl			
	Br			
	Cu			
	Zn		0.45	1.52
(ppb)	I			
	At			
	Ga		2.7	3.3
	Ge		0.0089	0.027
	As			
	Se			
	Mo			
	Tc			
	Ru			
	Rh			
	Pd			
	Ag			
	Cd		<0.005	0.006
	In		4.0	2.6
	Sn			
	Sb			
	Te			
	Cs			
	Ta		2500	660
	W			
	Re			0.063
	Os			
	Ir		0.61	1.54
	Pt			
	Au		0.36	0.21
	Hg			
	Tl			
	Bi			
		(1)	(2)	(2)

References and methods:

(1) Cripe and Moore (1975), Moore and Lewis (1976); combustion-titration, combustion and gas chromatograph

(2) Warren and Wasson (1980); INAA, RNAA, microprobe fused bead.