GLASEZ AND PIGMENTS

Possible sour ce of red ochre

On Camp Creek Road at M.P. 6.2+ Lane County (between Marcola Road and McKenzie Hwy., near tail race of EWEB power plant at end of ditch , Walter ville. Roadcut on East? side of road shows at least 8 fteet of dark red-purple ochre. Not sampled or tested.

Possible source of red ochre Lane County

On Horsepasture road (USFS) off of Horse Creek road. Burnt contq ct in volcanics in roadcut, 8 to 10 inches thick. On steep portion abotout halfway up grade to pass leadning to Horsepasture Mtn. Visible along road for several hundred yards. Other contacts of similar nature likely in vicintiy.

Pyrometric Cones (Heated in Air)

Cone No.	20°C/hr. End point	150°C/hr. End point
022	585°C	605°C
021	595	615
020	625	650
019	630	660
018	670	720
017	720	770
016	735	795
015	770	805
014	795	830
013	825	860
012	840	875
011	875	905
010	890	895
09	930	930
08	945	950
07	975	990
06	1005	1015
05	1030	1040
04	1050	1060
03	1080	1115
02	1095	1125
01	1110	1145
1	1125	1160
2	1135	1165
3	1145	1170
4	1165	1190
5	1180	1205
6	1190	1230
7	1210	1250
8	1225	1260
9	1250	1285
10	1260	1305
11	1285	1325
12	1310	1335
13	1350	1350
14	1390	1400
15	1410	1435
16	1450	1465
17	1465	1475
18	1485	1490
19	1515	1520
20	1520	1530
23	In Arsem	1580
26	furnace at	1595
27	600°C	1605
28	per hr.	1615
29		1640
30		1650
31		1680
32		1700
33		1745
34	1755	1760
35	1775	1785
36	1810	1810
37	1830	1820
38	1850	1835
39	1865	
40	1885	
41	1970	
42	2015	

Art professor says ash has great value as ceramic glaze

ASH WORKS WONDERS — Zeljko Kujundzic, Penn State University art professor, says volcanic ash has great potential as ceramic glaze. Kujundzic is conducting ash experiments at his Entiat, Wash., home.

Associated Press Laserphoto

By TERRI MINTEER

ENTIAT, Wash. (AP) — The results of a Penn State University art professor's experiments with volcanic ash in ceramic glazes are so positive that he's admonishing those who would do away with the stuff to, instead, gather it as quickly and possible and store it anywhere, even in their basements.

The ash will have commercial value, he said, if not now, then as soon as potters around the world find out how well it works.

He isn't the first to say this. A Spokane potter called attention to St. Helens ash for glaze shortly after the first eruption. However, the Penn State professor has arrived at a similar conclusion in independent research and furthermore, he has traveled all the way across the country to pursue the subject.

Zeljko Kujundzic, a Yugoslavian native with a background that includes international recognition for his art work and credit for starting a solar research center at Penn State, is spending the summer in Entiat, using the home he bought by the river as a base for his experiments.

Kujundzic appears to be a strong-willed man, who avoids being pinned down to timetables and committments. His accent is still strong.

He's not tolerant of those who would waste volcanic ash, or any other natural resource.

Americans aren't as enterprising as they're made out to be, he said.

People are going around "like maniacs determined to get rid of the ash," he said, and contaminating it by turning it under the soil, mixing it with rocks and other materials. He admits he may be a little late with his warning, since much of the ash has already gone to dumps or landfills.

He's followed the route of the May 18 ashfall, through Quincy, Moses Lake and Spokane and other sites, collecting different ash mixtures that nature has sifted out. He takes the samples to his home where he tests for different properties in various glaze mixtures.

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(MORE)

ART PROFESSOR SAYS ASH...

His research is funded by a Penn State grant. Kujundzic has been here since the first of July and will leave this fall, but he eventually plans to retire in Entiat.

"For glazes, the ash is excellent," said Kujundzic. Initial tests proved that everything needed for a good glaze base is already there, he said. Other chemicals can be added for esthetic effect or for color or texture.

He's found that a volcanic ash glaze is simple and non-sophisticated for some uses.

Because volcanic ash is so abundant, his aim is to use 60 to 70 percent in his mixtures. He's achieved that ratio without difficulty.

After he found out that ash makes a good glaze base, he tested to see whether it was possible to duplicate commonly used glaze bases. Kujundzic said he suceeded in making glazes with the same properties he's familiar with by adding very little other material.

The third phase of his experimenting is to see if he can produce something new for the art of ceramics with volcanic ash.

He's also convinced there will be a healthy demand by potters for the ash. "The glazes we use now are so expensive it drives you crazy," he said. For example, the price of one of the most used chemicals has risen from $3 to $30 a pound in a few years.

The cost of volcanic ash should be minimal in comparison because it's so abundant and there would be no cost for grinding or refining the substance, since it comes naturally ready-to-use.

There's a much greater sales value to volcanic ash than simply selling it to tourists in little vials, he said. "There's a day when we'll be exporting it very shortly."

Though his work is just with the ceramics aspects, Kujundzic had a list of other uses for volcanic ash.

It's a good abrasive for polishing, grinding or cleansing; it's an excellent basis for colored glass and it has valuable qualities for fertilizing crops, he said.

A market could be found by simply putting ads in ceramic or industrial magazines, he said.

Most people underestimate the importance of the ceramic industry, he believes, and aren't aware of the many current and potential uses for ceramics.

Ceramics are being used in clothing and gloves for workers in high temperature industries; in space research, as in the lining of the bottom of space shuttles; and in tires, where ceramics impregnated in them makes them extremely tough, said Kujundzic.

He also said that a ceramic car engine has been devised that might last forever.

Kujundzic warns not to waste the ash. He screwed up his face into a disapproving expression when he described a sight he saw in Yakima. "They just bullozed it all, into dumps and vacant lots," he said.

"If they had tons of dried apricots falling from the sky, they wouldn't waste them."

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(END)

PRELIMINARY REPORT ON VOLCANIC ASHES AS GLAZE FLUXES

A series of experiments are being made to determine the practicability of Oregon volcanic glasses or ashes as a glaze constituent. This is a progress report on the experiments to date and should not be taken as complete or conclusive in any way. The bare surface of the testing has been scratched and it is hoped that more time will be available for work in the future.

Nelson ash (grey Nelson) Clay is more proper name.

Location: Near St. Helens

Analysis:

SiO_2	55.51
Fe_2O_3	7.23
Al_2O_3	22.17
MgO	1.50
K_2O	.15
Na_2O	.20
Moisture and loss on ignition	13.10

(Mineralogical formula)

MgO	.885	Al_2O_3 5.34	SiO_2 22.4
K_2O	.039	Fe_2O_3 1.11	
Na_2O	.078		
		Weight	2313

P.C.E.: Cira C/16 (much higher than feldspars)

Color: Dark brown

Note: This material is more of a clay substance than an ash.

Tests were run as fusion buttons to C's - /03-6

Ash 100% - infusible.
a. Ash 80% + colemanite 20% C/1 medium button.
Ash 60% + colemanite 40% C/03 low button.

Ash 80% + cryolite 20% C/2 low button.
b. Ash 70% + cryolite 30% C/2 flat.
Ash 60% + cryolite 40% C/01 flat.

Ash 90% + dolomite 10% C/2 high unfused mass.
c. Ash 80% + dolomite 20% C/6
Ash 70% + dolomite 30% C/2

Ash 90% + whiting 10% hard cinter.
d. Ash 80% + whiting 20% hard cinter.
Ash 70% + whiting 30% hard cinter.

Ash P-8373

Location: Wheeler Co. Hyway 19 3 miles west of Spray.

Analysis: Volcanic Glass 95%
mineral grains 5% Dominantly feldspar.

P.C.E.: Cira C/02 Good fusion, light brown color.

Ash P-8442

Location: Sec. 4, T. 7 S., R. 41 E.

Analysis: Volcanic glass est. 75-85%

Mineral grains est. 15-25% (feldspar dominant)

P.C.E.: C/2 Badly bloated.

Ash P-8444

Location: NE¼ SE¼ sec. 9, T. 27 S., R. 9 E.

Analysis: Volcanic glass est. 85-90%

Mineral grains est. 10-15% (feldspar dominant)

P.C.E.: C/3 Good fusion, dark brown.

Ash P-8443

Location: NE¼ SE¼ sec. 9, T. 27 S., R. 9 E.

Analysis: Volcanic glass est. 80-85%

Mineral grains est. 15-20% (feldspar dominant)

P.C.E.: C/3 Same as P-8444.

Ash P-8441

Location: Sec. 32, T. 2 S., R. 2 E.

Analysis: Volcanic glass 60-70%

Mineral grains 30-35%

Diatoms 2- 5%

P.C.E.: C/4 Bloating

Ash P-8481

Location: Sec. 23, T. 33 S., R. 1 E.

Analysis: Volcanic glass est. 70-80%

Mineral grains est. 10-15% (feldspar dominant)

Rock grit 5%

Pumice grit 5-10%

P.C.E.: C/4 Good fusion, dark brown.

Ash P-8480

Location: Sec. 23, T. 33 S., R. 1 E.

Analysis: Volcanic glass 60-65%

Mineral grains 35-40% (feldspar dominant)

P.C.E.: C/2 Dark color, fusion good.

Ash P-8479

Location: Sec. 23, T. 33 S., R. 1 E.

Analysis: Volcanic glass 60-65%

Mineral grains 25-30% (feldspar dominant)

Pumice fragments 5-10%

P.C.E.: C/3 Dark color, fusion good-fair.

Ash P-8484

Location: From Merle Sleeper pit 1 mile west of Bend, Oregon.

Analysis: Volcanic glass 95%

Mineral grains 5% (feldspar dominant)

P.C.E.: C/3 Light brown fusion.

Ash P-8483

Location: From Sleeper pit approximately 1 mile west of Bend, Oregon.

Analysis: Volcanic glass 85%

Mineral grains 10%

Rock fragments 5%

P.C.E.: C/4 Fusion dark brown.

Note: Ashes P-8483, P-8484, P-8481 — All started to tip at minus C/2 but did not bend completely until given temperatures.

Sample P-8519

Location: Adair, Oregon, E½ of SE¼ sec. 33, T. 31 S., R. 46 E.

Analysis: Volcanic glass 95% (Highest percent of volcanic glass submitted to date)

Mineral grains (negligible)

P.C.E.: C/8 Gray translucent fusion. Highest temperature to date, also lightest in color of all ashes reported in this paper.

Ash P-8519

Was made as mixture with whiting and colemanite and fired to C/2.

Ash 90% + whiting 10% Some glassy fusion, did not wet surface, crawling to marked degree.
Ash 80% + whiting 20% Same as above but less crawling present.

Ash 95% + Colemanite 5% Some glassy fusion, did not wet surface, crawling to marked degree.
Ash 90% + Colemanite 10% Same as above but less crawling.
Ash 85% + Colemanite 15% Good fusion, crawling evident but less than any mixes in this group.

Ashes tentatively selected for further work:

P-8373
P-8443
P-8484
P-8519

All others were eliminated due to:

1. darkness
2. bloating
3. uneven fusion and/or unpleasant effects of fusion.

New ashes received up to January 1, 1950:

P-9231
P-8596 (Removed from testing because of high plastic content. Probably bentonite)
P-9321
P-9229

Ash P-9231

Location: Secs. 1, 2, 7, 8, 11, and 12, T. 18 S., R. 12 E.

Analysis: Volcanic glass est. 95%

Mineral grains est. 5% (mainly feldspar)

P.C.E.: C/2 Good glass, dark gray color at C/6 as a glaze, no crazing present.

Ash P-9330

Location: Secs. 1, 2, 7, 8, 11, and 12, T. 18 S., R. 12 E.

Analysis: Volcanic glass 95%

Mineral grains 5% (mainly feldspar)

P.C.E.: C/2 Dark glass, good fusion at C/6, crazing present.

Ash P-9229

Location: Sec. 24, T. 6 S., R. 13 E.

Analysis: Volcanic glass 99% (exploded perlite)

P.C.E.: C/4 Light colored glass, clean fusion at C/6 as glaze, bubbles present (probably caused by insufficient grinding of bubbles in the bloated perlite).

The ashes tested so far produced in all cases, except one (P-8519), dark-firing glasses at temperatures in the neighborhood of C/1-5, most of them about C/4 or 2150° F. P-9519 produced a light gray to white fusion at C/8 or 2300° F.

All the ashes with the exception of P-8519 have no use as a feldspar substitute. They could be used as fluxes for building products production or as low-grade fluxes for dark-colored, low temperature glazes for use on architectural facing tile, roofing tile, etc.

The commercial glasses (Frits) used as fluxes at this time run in the neighborhood of $80.00 to $120.00 per ton f.o.b. plant. These glasses have a standard known composition and are usually compounded for a specific plant's use by the manufacturer.

Whether or not the low cost of the ashes would or could offset the standard materials and practice is a moot question. There is one plant, however, using volcanic ash of a light-firing color and a fusion of circa C/3. This plant is in Kansas and manufactures a low price art-ware for the florist trade. They have had success in the use of their ash as a glaze base to which other oxides are added. Not much has been reported on their production or the quality of the ware produced.

The ashes selected for the testing will be used as constituents of a group of glazes at C/04 as well as C/2-4. The higher range seems more practical from the sale of the ash, since more could be used. There is a chance that eutectics may be reached which will produce glasses for use at the lower temperatures which will contain an appreciable ash content.

Charles W. Parmelee

END POINT, BENDING INTERVAL, AND CONE INTERVALS OF ORTON STANDARD PYROMETRIC CONES

Cone No.	End Point			Bending Interval		Cone Interval	
Rate° C/hr.	20° C.		150° C.	20° C.	150° C.	20° C.	150° C.
07	1787° F.	975° C.	990° C.	35° C.	50° C.	30° C.	25° C.
06	1841	1005	1015	25	35	25	25
05	1886	1030	1040	30	30	20	20
04	1922	1050	1060	40	40	30	55
03	1976	1080	1115	40	35	15	10
02	2003	1095	1125	35	35	15	20
01	2030	1110	1145	50	45	15	15
1	2057	1125	1160	30	45	10	5
2	2075	1135	1165	30	45	10	5
3	2093	1145	1170	30	40	20	20
4	2129	1165	1190	40	35	15	15
5	2156	1180	1205	40	50	10	25
6	2174	1190	1230	40	35	20	20
7	2210	1210	1250	40	60	15	10
8	2237	1225	1260	45	55	25	25
9	2282	1250	1285	65	115	10	20
10	2300	1260	1305	40	95	25	20
11	2345	1285	1325	70	80	25	10
12	2390	1310	1335	80	45	40	15