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James Doyle Sell Mining Collection

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Silver Bell Area

9-23-64

J.H.C

Hand Specimen & Thin Section

No 3 vitro clastic - fine cg-claflin R. fm. 4mi. N60W  
from El Tiro

No 7 Cat M4 fm. Brown vitreous occurs as disconnected  
blobs - - Loc:  $\pm 1000'$  NE of No 3

24 Vitrified arkose bed in Claflin Fm. -  
3000' NW of Saguaro siding

25 Inclusion in intrusive Tuff - Silver Bell fm type  
 $\pm 1000'$  S of No 24

26 Tuff enclosing enclosing No 25

56 Vitro clastic - arkose bed in Cretaceous -  
west SB mts - see photo

57 Sill or dike in Cretaceous sediments - intrusive tuff?  
west SB mts - see photo

May 13, 1963

Mr. J. H. Courtright  
American Smelting & Refining Co.  
813 Valley National Bldg.  
Tucson, Arizona

Dear Harold:

Enclosed are the petrographic descriptions of the rocks you gave me. Most are welded tuffs but have been in part devitrified. Hydrothermal alteration has effected some of the specimens. Some rocks probably represent sedimentary type accumulation of volcanic derived materials whereas others are more like ash flows. Some of the units like #26 which do not allow a clear interpretation might warrant some more work. In specimen #48 there is a (pyroxene?) mineral which could not be determined. It would be interesting to find out more about this mineral as it is apparently associated with the hydrothermal alteration stage.

With best regards.

Sincerely yours,



Robert L. DuBois

RLD:j

Specimen Number 3

The rock is a welded tuff type probably rhyolitic in composition. Vitric texture predominates, with scattered crystals and crystal fragments of quartz, orthoclase, and plagioclase, and fragments of acidic to basic volcanic rocks and including also some welded tuff types. A crude directional structure is imparted by a rude alignment of small veinlets of recrystallized material. Estimated composition is 25% feldspar, 10% quartz, 5% rock fragments, and a trace of hematite in a partially devitrified glassy matrix. The feldspar is of two types, one of about 20% being highly altered to clay, and a second minor one, somewhat sericized, of andesine composition. The quartz crystals are rounded to subhedral, in part strongly embayed. Areas of essentially fine grained quartz exist along and extending out from a network of veins.

The rock appears to be a normal weld tuff, in which hydrothermal alteration has altered the plagioclase to clays. Silicification, accompanied by recrystallization has been active along a system of small veinlets. The matrix is apparently composed of partially devitrified fragments of tuff or pumice in various orientations and therefore probably represents a reworked matrix, probably by water.

Specimen Number 7

The rock is a type of welded tuff. The specimen consists of two parts, one the hydrothermally altered equivalent of the other. The contact present is the "front" of alteration. The rock is the unaltered part consists of crystals and rock fragments in a glassy matrix, in which a well developed true flow structure is evident. This part contains 5% euhedral to rounded and embayed quartz, 5% acidic plagioclase, 5% sanidine, and 3% calcite as veinlets in a glassy matrix, which is devitrified along certain flow planes. A few fine grained fragments of an acid igneous composition are present. The altered part contains altered equivalents of the plagioclase and sanidine which have been sericitized and kaolinized. Calcite appears both in veinlets and as replacements. Chlorite appears as an alteration product along the flow lines and associated with a little iron oxide. The glassy matrix has undergone a more general devitrification, and sometimes quite pronounced along the margins of small veins.

Specimen Number 24

The rock is volcanic derived rock consisting of 15% K-feldspar and plagioclase, 10% quartz, 5% rock fragments, and a trace of calcite, in a devitrified and recrystallized matrix. In general, the elongated crystals and rock fragments are aligned in the same direction and there are local zones containing a high percentage of crystals parallel to this structure. The plagioclase ranges from albite to oligoclase, and is euhedral to subhedral. K-feldspar is also euhedral to subhedral. The quartz is anhedral, some appear rounded and reworked. The rock fragments are rich in iron oxides, and range from angular fragments to more rounded forms. The matrix is entirely devitrified and recrystallized into a fine grained mixture of quartz and orthoclase (?). Local areas have developed courser grained patches.

The rock appears to be composed entirely of volcanic derived materials which have undergone devitrification. Little evidence of alteration exists, other than minor kaolinization of the plagioclase. The structure and mineral distribution of the larger material suggest a reworking and accumulation by probably water. The matrix was probably composed of reworked and transported ash coming from a local source.

Specimen Number 26

The rock is fine grained, and has a fairly well developed directional fabric. It consists of 10% sericite, 5% quartz, 5% K-feldspar and plagioclase, 1-2% calcite, a trace of iron oxides, and a few scattered small rock fragments in a devitrified matrix. The quartz is anhedral angular to rounded, and occasionally embayed. The feldspar is subhedral to anhedral and is considerably altered to sericite and clays. The calcite occurs as replacements of the plagioclase and in veinlets. The rock fragments have been in part basic (basaltic), with one area of calcite possibly representing recrystallized limestone. The matrix is mostly devitrified, but contains areas where it has been altered to sericite. Relict devitrified shards are abundant and they have a common orientation. In some instances they are oriented around phenocrysts as by original flowage. Numerous devitrified and sericitized pumice fragments also oriented parallel to the structure are present. Some hydrothermal action is evident in the introduction of calcite and the sericitization of the plagioclase and pumice fragments. The origin of this rock is not clear. The matrix was originally made up of shards, all having a planar orientation. Pumice fragments with a similar orientation were present as were other rock fragments and volcanic derived crystals. This could be a true welded tuff or ash flow or it could be a reworked and water laid ash, pumice and crystal material. I tend to favor the last explanation but there is nothing conclusive in this thin section.

Specimen Number 48

The rock appears to be an altered welded tuff type, consisting of crystals and fragments of medium sized quartz, plagioclase and orthoclase in a finely crystalline matrix. No preferred orientation now exists. The rock is composed of 10% corroded and embayed anhedral quartz, some 10% of altered feldspar, a trace of zircon, epidote, and calcite, and pyroxene? Considerable hydrothermal alteration and recrystallization is present which tends to hide the original features. The features of texture and composition are like that of 49 and therefore the two rocks are considered the same.

Specimen Number 49

The rock is a welded tuff type. It consists of medium sized crystals and fragments of quartz, plagioclase and sanidine in a fine grained devitrified matrix. Relic flow structures remain where not destroyed by devitrification or replacement. The rock consists of 15% quartz, 10% plagioclase, 5% sanidine, 4% epidote, 2% calcite, 1% chlorite, sericite and a trace of iron oxides. The quartz is anhedral angular to rounded and embayed. The plagioclase is subhedral to anhedral, low calcic, and considerably altered to sericite and clay. The sanidine is subhedral to anhedral, and less altered than the plagioclase. The epidote occurs in veinlets, as scattered grains, and as a replacement, with calcite, iron oxides and chlorite, of hornblende (?). Other calcite occurs as individual grains, some of which display a high degree of angularity.

The rock is a welded tuff which has undergone hydrothermal alteration and devitrification. The abundance of the crystal fragments and their angular shape either suggests an ash flow associated with extensive explosive activity or an accumulation of reworked and transported volcanic derived materials. A presence of sedimentary metamorphic fragments can be explained either way. The flow structures attest movement in a plastic state, which may favor the idea of an ash flow. The idea of subaqueous flows might be considered as might some sort of a process of flowage of sedimentary accumulated material promoted by passage of hot gases. This also does not exclude the possibility of a simple ash flow.

Specimen Number 50

The rock was probably originally a tuffaceous sediment but at present has undergone extensive hydrothermal silicification and recrystallization. It consists predominately of irregular quartz grains in a quartz-feldspar (albite(?)) matrix. The minerals are 50% quartz, 45% plagioclase in sericitized and kaolinized grains and in the matrix, with traces of biotite, calcite, apatite, zircon, opaques, chlorite and sericite. The feldspar is forming in this rock as a result of a process of crystallization which associated with a general recrystallization has formed the present fabric. The original material is considered to have been a fine grained sediment which probably had some tuffaceous derived material.

Specimen Number 56

The rock is a crystal tuff, fine grained, and with no preferred orientation apparent. It consists of 15% orthoclase and plagioclase, 15% quartz, 2-3% calcite, and sericite in a finely crystalline matrix. The plagioclase is low calcic, albite to oligoclase, and is euhedral to subhedral. It has undergone considerable alteration to sericite and clay. The orthoclase is generally euhedral and partly altered to clay. The quartz is euhedral to anhedral angular or rounded, and occasionally embayed. Secondary calcite is common, both in the plagioclase and in the matrix. Two small grains of a clinopyroxene (?) are present.

The rock appears to be a normal tuff of quartz latite composition, which has been devitrified, and calcite introduced and probably represents accumulation in a thin pyroclastic unit. The physical characteristics of the quartz and feldspar suggest igneous conditions of crystallization prior to emplacement.