State Department of Geology and Mineral Industries

702 Woodlark Building
Portland 5, Oregon

VOLCANIC ROCK OCCURRENCES (Perlite & Tuff) IN THE EASTERN PORTION OF VIRTUE FLAT
Plus a dissertation on the subject of the age classification of tertiary volcanics in Baker Quad at large.

Pieces of perlite, identical in appearance to the Dooley Mountain perlites, have been brought in to this office from the Lower Powder portion of Virtue Flat. In view;of the fact that the truck haul from this area to the railroad is much less than that of the known Dooley Mountain Perlite deposits, a reconnaisance examination of the area was made to ascertain if any large, potentially mineable occurrences existed there.

No large or even moderately large perlite masses were seen. For the most part the perlite occured as chunks in an agglomerate, the rest of the agglomerate being composed of what appears to be typical Dooley rhyolite breccias and tuffs, etc. As a source of mineable perlite the specific area examined is utterly worthless. Whether or not mineable deposits occur elsewhere in the vicinity would require extensive reconnaisance mapping as Gillily has mapped several patches of the Dooley rhyolite complex there, and numerous other unmapped ones are known to exist as well. For the general file of geologic records a few comments on these unmapped occurrences are in order, and follow.

BRIEF DESCRIPTION OF OCCURRENCES

South of the Baker-Homestead Highway and east of Ritter Creek, in approximately T 8 S; R 42 E; Sec 36 (possible Sec 1 of the adjacent range to the east) there is a cliff-like exposure of assorted types of volcanic materials in a tuff matrix. Fragment sizes range up to several feet in diameter, and fragment composition includes obsidian, perlite and pumice (all small fragments) and basalt and andesite and other stuff (in the larger sizes). The size of some

of the volcanic bombs suggests that the fragments originated from a quite nearby source.

Tertiary Lake beds including diatomite beds, etc. are exposed along Ritter Creek, but near the head of the creek, in about section 15, or possibly 22 there are extensive beds of a tuff which appears to be identical with the Pleasant Valley tuff upon hand inspection. This tuff forms cliffs, the faces of which exhibit deposition to have been accopmlished both by water and by air. A sharp line of demarkation exists, with the stratified tuff being lowest in the section.

The relation of this tuff to the agglomeritic tuff at the mouth of Ritter Creek is uncertain with the limited amount of data at hand, but the tuff on upper Ritter Creek appears basically similar to the matrix of the agglomerate at the foot of the creek. However, the upper tuff seemingly overlies the lake beds while that at the mouth of the creek may underlie them.

Another occurrence of tuff which resembles the Pleasant Valley tuff occurs on Clover Creek in T 7 S; R 42 E, about section 36. Gilluly (USGS 879) does not map or mention this tuff, but instead maps Columbia River basalt and Tertiary lake beds in the section. In discussing samples of this tuff and basalt sent him for inspection, Lowry (letter Aug. 2, 1945) emphasized the similarity between this tuff and the so-called Pleasant Valley tuff which he in turn regards as being essentially the same age as the Rattlesnake. On the basalts Lowry recognized affinities to both Miocene and Pliocene lavas in the various samples submitted. Hyaline opal occured in the samples which resembled the Pliocene basalts.

Another large exposure of tuff resembling the Pleasant Valley tuff occurs in T 8 S; R 43 E, or just west of Sparta. Ross maps this tuff as a distinct formation in itself(Dogami 3). This tuff occurrence is undoubtedly the same as the Clover Creek occurrence mentioned in the preceeding paragraph as Ross

states that it is known to extend on to the west from the border of his map. Ross further makes a point of stateing that this tuff is interbedded with the Columbia River basalt, a large area of which he maps in conjunction with the tuff. Samples sent to Lowry for inspection were regarded as Pleasant Valley-type tuff and young (possibly Pliocene) basalt (correspondence with Lowry Oct. 20 and 23, 1945). The similarity to Pliocene basalts was based upon the presence of hyaline opal, such as was observed in the Clover Creek basalts.

The perlite occurrence mentioned in the opening paragraphs occurs in T 9 S; R. 42 E; Sec 21. Here white to buff material resembling the Dooley Mountain rhyolite tuff breccia (which is a different sort ofrock than the Pleasant Valley tuff) is to be observed on the summit of a low rounded hill where it appears to exist in a natural manner. On the flanks of this hill, however, and within a few hundred feet of the above material, the formation to be seen is agglomeritic in nature with perlite and rhyolite fragments intermixed with fragments of the other material. Fragment size was generally coarse, 6 to 18" diameters being common, with larger sizes to be noted.

Several ancient prospect pits and short tunnels occur on this slope. One of these tunnels reveals the perlite in unfragmented beds dipping about 40° in an easterly direction. Good appearing perlite is 14 to 16" in thickness and rests on the unfragmented Dooley rhyolite tuff flow breccia. This good appearing perlite is conformably overlain by 5 or 6' of very poor quality perlite. This appears to grade into a very coarse agglomerate at the portal of the tunnel.

The significant point in the foregoing description is not the perlite itself, but its unfragmented occurrence in the tunnel. This, together with similarly unfragmented and steeply dipping rhyolite flows to be seen elsewhere on the same flank of the hill, suggest that these formations may be a part of a former vent.

GENERAL REVIEW OF SOME ASPECTS OF PREVAILING AGE CLASSIFICATION OF TERTIARY VOLCANICS IN THE BAKER, PINE & SUMPTER QUADS

On the basis of observations in Baker and Union counties at large I believe that the advisability of mapping ALL basalt in the Baker quad as Columbia River as has been done is open to question----that while basalt of Columbia River age very likely occurs there, a later basalt occurs too---that failure to distinguish between basalts has lead to confusion and complication in the mapping of associated formations.

Regarding the Clover Creek and Sparta basalts, I very definitely favor a post-Columbia River age in accordance with Lowry's observations. In support of this is Moore's disscussion of diatomite-lakebeds-tuffs and lavas in the vicinity at large (USGS 875). Of specific import is Moore's discussion of the Keating diatomites in Lower Powder, which diatomites are related to , but a short distance from those on Ritter Creek and which diatomites are also closely associated with the Love Creek and Sparta tuff basalt areas. Moore describes the diatomites as commongly underlain by tuffs and also states that "Interbedded with the series are several lava flows that may be related to the underlying Columbia River lava, which is NOT (capitals by me) exposed in this district." Moore very carefully doesn't stick his neck out regarding the age of the interbedded lavas but at the same time he goes out of his way to specify that the Columbia River basalts are <u>not</u> exposed.

Further supporting the existence of two basalt ages is the fact that five of Gilluly's Columbia River areas on the western margin of the quadrangle clash with their counterparts as shown on the map of the Sumpter quad. where these same basalts are mapped as Pardee's "Younger basalts" as contrasted with his "older basic flows". Moore in another place in his report (page 60) does take time out to mention that "The older basic flows of Pardee and Hewett are contin-

uations of the Columbia River lava of the John Day region, and though the individual flows are probably not continuous they are undoubtedly the same series, though not represented in their full thickness."

Why Gilluly would take such a wide departure Pardee's classification without first refuting it with first-hand evidence from Pardee's type sections, I don't know. What I do know is that the more I compare Pardee's section with observations in the Baker quad at large, the more I think that Gilluly's classifications of the entire Tertiary should be disgarded. Applied to the Baker quad, Pardee's section would obviate the situation existing in the instance of Gilluly's Clover Creek tuff and Ross's tuff and their related basalts. Such an application would reduce to simple and orderly terms many other complicated and hard to explain situations in the Baker quad.

With regards to the Dooley mountain rhyolite it is apparent that at least a portion of the horizons that Gilluly includes in that formation are the equivalent of Pardee's rhyolite flows and tuff horizon, for, as in the case of the basalts, Gilluly maps as his Dooley Mountain rhyolite the same formations that Pardee maps as his "Rhyolite flows and tuffs". The usage of the word "rhyolite" in each of their formational names makes it appear at first glance that Pardee and Gilluly are in accordance on this correlation. Such is however, not the case, as Pardees rhyolite and tuff horizon overlies his "Older basic lavas" which as pointed out before, Moore says are definitely to be correlated with the Columbia River of the John Day Country. Yet Gilluly's Dooley Mt. Rhyolite is overlain by both his Tertiary Lake beds and his Columbia River lava. Furthermore, perlite and Pleasant Valley tuff are to be found associated with many of the numerous smaller patches of the Dooley rhyolite formation which Gilluly has mapped. To cite an instance, the northern flank of the Powder River between Sumpter Valley and Baker appears to about an equal extent on both the Sumpter and Baker quad maps. On the Sumpter map small patches of Pardee's rhyolite are

mapped at the headwaters of the various small creeks which cut back into the hills. On the Baker quad Gilluly shows his Dooley rhyolite in the equivalent places,----to wit, California Gulch and at Auburn. Gilluly shows far less extensive amounts of his rhyolite than does the Sumpter map, but then Gilluly commonly ignores the Pleasant Valley tuff as a formation and just lumps it in with his Lake beds. I have seen Pleasant Valley tuff at Auburn underlying the "Columbia River lava" in the place where Gilluly shows his Dooley Mt. rhyolite. I have also seen the tuff on Griffin Gulch to the east of Auburn. Gilluly maps only Columbia River Lava and Lake beds there. Pardee comments on the similarity of the gray tuff associated with his rhyolite thus----"the gray tuffaceous beds of the rhyolite group as exposed for instance in some of the benches of Whitney Valley appear not unlike the tuff quarried at Pleasant Valley (page 72). Thus, on the basis of the "Pleasant Valley" tuff which is associated with many of Gilluly's mapped outliers of Dooley Mt. rhyolite, and in consideration of the equivalency of some of these mapped outliers to the Pardee rhyolite and tuff horizon, it follows that at least part of the formations included in Gilluly's Dooley Mountain complex represent Pardee's formation.

Lowry has expressed the opinion that The Dooley Mountain Rhyolite formation is Clarno, if I understand correctly, I am not familiar enough with the Clarno to be justified in making any comments on that conclusion, but in saying as I did in the preceeding paragraph that part of the Dooley Mountain Rhyolite is the same as the Pardee formation I mean no contradiction of Lowry's conclusion. On the contrary I favor Lowry's conclusion for the bulk of the Dooley Mt. formation as exposed in the mass of Dooley Mountain proper.

My contention is that Gilluly may have lumped the later rhyolitic horizon with the other components of his Dooley Mt. formation, in much the same manner as he lumped the Pleasant Valley tuff with the lake beds. Thus, generally speaking, the perlitic portions of the Dooley Mt. formation, together with some

associated rhyolite, would perhaps be more correctly placed if considered as belonging to the later rhyolitic horizon.

In short, my revision of the Baker Quad map could show the bulk of the Dooley Mt. formation on the mountain as Clarno. The numerous small outlying patches of Gilluly's Dooley Mt. rhyolite would appear as either Clarno or Pardee's later rhyolite, or both, depending on their nature. Pleasant Valley tuffs would not be ignored, but would be mapped as part of the later rhyolitic horizon. Most of Gilluly's Columbia River lava would appear as Pardee's "Younger basalts". The Tertiary Lake beds would for the most part still be Tertiary Lake beds except for possible local refinements.

By way of summary it can be said that the evidence at hand points toward the feasibility of using Pardee's section as a proper basis for Gillyly's Baker quad---that the use of Pardees section eliminates in a simple, logical and orderly manner numerous complexitites and contradictions with respect to the mapping of the Tertiary formations in the Baker Quad. At least, the situation warrants careful study and consideration.

N. S. Wagner

May 29, 1947

Submitted, not as a report, but as notes summarizing a situation for the general geological reference file.