

HARNEY COUNTY HISTORY PROJECT

AV-Oral History #146 - Side A

Subject: Diamond Craters

Place: Burns, Oregon

Date:

Interviewer: Pauline Braymen

MAN: ... as an example, how well ... we're talking there about, those particular flows are probably around ten millions of years which were covered in the ash, with the ash then stripped away by the wind, this pahoehoe that is fresher than anything you see around here. So, this is, you know, you get into a judgmental thing until we get a date. And we talked about ... and that is one of the things that, you know, these are fresh lavas, young lavas geologically, but it would be a mistake to say that they are uniquely young. There is no evidence; I think, no professional opinion which would suggest that these are for instance anywhere near the youngest in Oregon. They are very young geologically, but it wouldn't be fair to say, you know, that these are anywhere near the age of the stuff of McKenize Pass or Newberry. So, they are very young, but we can't say that young.

Now again, I don't know, you know, let me just say and I --- this would be repeating some of the things I said while you guys were up flying. Let me give you the bottom-line first, the conclusion. And it has been my conclusion; my feeling for a long time, and George Walker bares this out, and is willing to be, you know, he is going to be in print on it. That neither one of us is aware of a area of basaltic volcanism which has such diversity in such a small area, anywhere in North America. And I'll go a step farther, I certainly haven't looked at, you know, basalts every-where, but I have looked at them over a very wide area, and I'm familiar, reasonably familiar with the literature. I don't know anything in

the world, now that's dangerous to say that. But, certainly we feel very safe --- in North America. There just isn't anything like it in terms of diversity. You can find single features, you know, other places. But they're all packed into what is geologically a very small area. When it comes to management, it's not a small area, but you know, geologically, wow, it's right there. So that's in a sense the bottom line, and again just --- George --- Connie knows who George Walker is --- Mr. Oregon Geology, a Map of Eastern Oregon, which is a standard reference for anybody doing anything out here. Essentially the personal work of George Walker. Most of his 35 years has been out here, and he is a practical man, he has been a branch chief of mineral resources, that kind of thing. And he feels very strongly about protection. Ah ---

ELLEN BENEDICT: Where is he located?

MAN: He is with the USGS in Menlo Park. Where is he? At this moment he is probably in Menlo Park. But he has been in the field here about a month or so, and he's coming back up in a few weeks. Ah --- I guess there, it is hard to even summarize, the approach that is simplest in talking about this area, is to say that --- just first off it's a museum of basaltic volcanic features. It is important to emphasize that this is a basaltic volcanism; we do not have a chemical diversity here. This isn't Newberry, in that we run from rhyolites to basalt. But for basaltic volcanism, we have what you could --- you know, you could just say it's a museum. I can't think of a feature associated with a basaltic volcano that can't be found in this small area. I can't think of a thing, and ---

ELLEN: This is what makes it so important speleologically, for volcanic types of caves, because it has every feature in miniature that you would find anywhere else in the world in terms of lava tubes, surface tubes, semi-trenches. Just all sort of formations, it's all there.

That's why when I bring my cave ecology class out here; we spend a couple days partly doing what we're doing right now. Working in a very small area here.

MAN: And that in itself is, you know, very, very important. It's --- as Ellen has said its use here is very heavy, education --- I'm positive that we have no realistic handle on the number of students who go through here because --- boy, everybody I know brings their classes out, but you know, out here. And the average group makes a tour, and they're gone, and you really don't know, there could be, you know 30 people go through and they're gone. I'm certain, you know, conservatively that several thousand geology types see this per year. I know that sounds stupendous, but I don't know of a school in the northwest that doesn't come down here.

Certainly in Oregon, everybody I know by now, is really turned on to it, and that in a sense, one of the things is neat is that you can see all these things in one place. It's just -- I come here, you know, all year round, I mean there are entries in there from every month of the year. Because, you know, the weather isn't that bad here, you just don't get --- Cascade type snow.

ELLEN: Chad was here in January when it was 12 degrees Fahrenheit, and it was really pretty pleasant if you're down inside the lava tubes.

CHAD BACON: The wind was blowing a little bit up on top ---

MAN: Oh yeah, but if you're dressed for it, you can at least see the rocks.

CHAD: Oh yeah. Right, very seldom has a snow cover out here. It will snow and maybe stay on for a week or so at a stretch. It's unusual to have snow much longer than that here, in the Diamond Valley.

MAN: Huh.

CHAD: One thing we were talking about on the same stance, when you were both flying, we're in a position right now where we have to look at the total 16,000 acres, as one alternative which would take congressional action to set aside. Or a 5,000 acre alternative that the secretary --- authority, under-secretary can set aside. We have a

tremendous amount of pressure from the commercial users of the building stone, to open up a portion or--- of the craters here to let them go. And I --- we need supportive data on the value of the whole 16,000 acres, and also we need to look realistically at a 5,000 acre area that is critical or crucial that we could move toward setting aside. We have to have final action by 1991, 15 years after the Federal Land Management Policy Act was implemented, and professed in '76. And failing to do that, it opens it all up to commercial exploitation again. So ---

ELLEN: What kind of immediate dates are you talking about?

CHAD: The more I find out about it, I'm not sure on the speed. I originally thought by the end of the summer we would be able to go, but I think probably it would depend on the amount of information that we have available this summer. And probably Gary and Esther will have a great deal of input into the gaps and the holes that we have. We're going to have to see --- I think that when we make a move, no matter which direction, we're going to have to have it pretty well documented and covered thoroughly with a high degree of credibility in it. And I don't want to move faster than we can get this information, but I don't want to dray our feet and ... generate a whole new wave of really high caliber geologic information, and reference that is critical, I really think that what happens to Diamond Craters ---

MAN: One of the, again this is repeating --- some of the things I said before to some of the people here, but one of the reasons that a larger than usual area is important, is not so much just the size of the museum, and including a lot of features, but one of the things here --- I'm not saying this very well --- one of the things here that is particularly ... worrying about saying unique, but particularly unusual, is the presence of a number of domal structures in the basalts which were structural features. That is the sights where very high-level intrusion of magma has actually bent up the flows and to form them. And

there are five of these domes, they elongate as it happens, the shape is controlled by the fractures in the basement, as you would expect, and they really express actually structures in the --- along the various fault zone. And the relationship to this to where the fault zone is a whole other story in itself. And as it happens, each one of these shows a different degree of development, in these five domes. There's one where the lavas have simply been up --- let me back up a moment --- when you see steep slopes, which we see out there, there's no way that those steep slopes could be primary slopes on a volcano. There is no way you can stack up fluid lava, ten or so meters thick, at a slope like that. These thick flows originally were flat line. We'd come along after the initial eruption here; this would be flat as a pancake, in fact, probably a pool, if anything.

And so they have been up arched since. Now, the upper arching, as I say we see different stages of it. There is a dome way out to the west, where all we see is this bending up, and it's just kind of a long turtle back. There's another one out that way, which you might have, probably saw from the helicopter, which have been bent up, and because these lavas are brittle, there are a series of breaks. They just broke. So that's a step farther. Now the thing you have to remember is the up arching is a result of injecting liquid high into the crust, under this common cover. And of course if the cover breaks, then we may have collapse of the roof into that liquid, leaving essentially a kind of a caldera. That's why the gap up there is --- that's a situation where we bend up, it fractured, it lost strength, and it's central block dropped down. So that's --- you see a step a little farther along, a little more distention, farther collapse, further collapse. Still, no eruptive activity along there. The removable support, you see if you imagine as something which is poked, pushed up over there, bowed up with lava liquid material, magma beneath it. What happened was that there was rupturing, and we had this, these lavas spilled out, and this is the stuff which was under that dome there. I haven't said that

very well, but essentially this represents the material, which spilled out from under this thing which was domed up. It's as if it were a balloon, you poke it --- or water bomb, poke it the water runs out, then collapses. In that case, it being brittle, it broke down.

Now, there are two stages beyond that. Sometimes with the collapse of the summit area, magma has erupted and we have two examples of that to the west. The most spectacular is that Central Crater Complex. You see all the holes, that's the same sort of feature as this elongate hole up here, except that there, for reasons that are not entirely obvious the --- there was a great deal of eruptive activity and more than thirty vents in that one complex. And that's not counting, you know, places where there would be a dozen little one at one site. That's thirty more or less map able vents, and there were probably, you know, fifty or a hundred places where lava came to the surface in there. That's ridiculous. Ah, that's not the kind of thing to say. I'm worried about --- anyway, it's unusual.

Now, okay, what I'm trying to paint is the situation where we see the development, it's as if we had in one site, just neatly co-existing an eagle egg, and then, you know, an eagle with no feathers, and then I guess they grow feathers, and they learn to fly, and then you have mature birds, just all lined up there and all co-existing very nicely. When in a sense, what we have in these domes are different degrees of development. And that's a very unique sort of thing. This kind of dome in itself is very unusual, and you see them in various stages of development. It's very, very unusual.

Now the --- because these high spots aren't the original volcanoes, to work out the sequence of events here, and the original sources, and to know where the lavas originally came from, we need to do a couple of things. One scheme is to work with the flow textures on the surface of the lava. And I guess that is where we get down to the pahoehoe thing. Quite apart from aesthetics, once the slab of pahoehoe is tripped away,

one can no longer demonstrate, or infer, or talk in terms of flow directions. And therefore the original source, we have to bare in mind that the original source for these lavas does not necessarily coincide, apparently does not coincide with what are highs now. That's an unusual situation for a volcano. Usually you see a high hill, and the top of the hill is more or less where the stuff came from, Mount Bachelor, Mount Hood, that sort of thing. Of course you have flank eruptions.

Here, remember, originally we had the flows, and then they were blown up. A very different situation. The other real key to working out the eruptive history of any volcano is to look at the stuff which has been thrown out, explosively. What we call tephra, we use the term ash. And there are hundreds, hundreds of craters ... (Helicopter noise)

...

CHAD: ... Okay, what I was thinking about is to finish up with the helicopter, and do those things, and then we can have the tour here, and drive around and look at the damage area and that sort of thing. But the things that are within the center that anybody wants to look at, or photograph on the ground, why ---

ELLEN: There is always sort of a sensitive problem dealing with the media in terms of some of the features like --- some of them are --- would be very susceptible to vandalism

...

PAULINE BRAYMEN: I know for a fact, Ellen, that what you are saying is true ---

ELLEN: But we might be able to show you something else, that would be just as spectacular. It's just a difficult problem. ...

PAULINE: A feature on green obsidian resulted in a whole mountainside being hauled away, you know. ...

ELLEN: And that's the problem. The National Speleological Society has come full circle on this problem. They used to feel, there is no way they can ... especially in the west ...

people that are managing the resource, such as Chad and the BLM people must know that the resource ... (Inaudible)

CHAD: ... over here in a minute to pick you up. ...

PAULINE: Well what I was wondering, you said to me awhile ago about, maybe you were going to do this again, and it's really more important that Connie get everything that she needs, because she is not going to be available again. I could ---

CHAD: We may not have the expertise in Bruce again in here.

PAULINE: Well, I would love to go if ---

CHAD: Well, we've got enough room if you, and Connie, and Bruce want to go look ---

PAULINE: Okay.

MAN: Let's review --- one of the many, many things that is so impressive here is the diversity in terms of the kinds of craters, the ways in which holes can be formed in the ground. This is the game we play when we map ... you guys, but --- anyway. Just about every, well as far as I know, every mechanism that can be used in volcanic field ... (helicopter noise)

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