HAMISH BENTONITE (Office)

Owner
Harry Hamish, 2805 N.E. Weidler Street, Portland, Oregon.

Area
Four hundred acres of deeded land and 7 claims.

Location
In secs. 4, 5, and 9, T. 38 S., R. 2 E. Camp is at the former location of Climax post office. The principal workings are reached from camp by approximately 1\frac{1}{2} miles of trail. It is 26 miles from Medford by road. This includes approximately 11 miles of paved and 17 miles of dirt and gravelled road, the latter part of which is accessible during the summer months only. Camp is at approximately 3500 feet elevation and the principal workings are located at 4300-4500 feet elevation.

History
Bentonite was first recognized in 1944. Prior to this the property was worked for the medicinal values obtained from the clay and springs, from which the Orwico Products are made . . . *.

In August 1948 seven claims were located in sec. 9 adjacent to the deeded property.

* Department report by H. M. Dole, September 10, 1946.
Dole's petrographic determinations limit the true bentonite clay to samples 5 through 9. These are characterized by a predominance of montmorillonite and by substantial swelling when placed in water.

A possible length in excess of 1500 feet for the bentonite is indicated; however, the continuity of the zone between widely spaced surface cuts has not been established. All of the bentonite cuts visited are in the "slide" area and at no point was the bentonite observed in place with the possible exception of the two cuts in sec. 4. Neither the width nor thickness of the deposit is indicated by present exposures.

Samples 2 and 3 appear to be common clays derived by surface weathering of the tuff. It is doubtful if they are related in origin to the bentonites.

Sample 4 is essentially a tuff rather than a clay. It has, however, been partially altered to a clay which shows some bentonite characteristics.

Of interest is the 5-15 percent feldspar content in all samples.Lowry identified it as either basic oligoclase or acid andesine in Sample P-3277. These grains presumably occurred as phenocrysts in the original tuff.

Note: Complete results of petrographic examination, spectroscopic analyses, and ceramic tests are included in the supplement to this report.

Informant: Harry Hanish
Report by: H. D. Wolfe
Date of Report: February 10, 1949
Petrographic Report: H. N. Dole
Spectroscopic Analysis: Thomas C. Matthews
Ceramic Tests: C.W.F. Jacobs

SUPPLEMENT

to accompany report on

KAMISH BENTONITE PROPERTY

Ashland Mining District - Jackson County

February 10, 1949

Included are:

Sketch map of property
Petrographic report
Spectrographic analyses
Ceramic tests
### Petrographic Report

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Color (Air-dried, Finely-ground)</th>
<th>Percent of Feldspar</th>
<th>Index of Refraction</th>
<th>Amount of Swelling in Water</th>
<th>Color Reaction With Benzidine Base</th>
<th>% Anisotropic</th>
<th>Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Tan-cream</td>
<td>5 - 10%</td>
<td>Circa 1.55</td>
<td>None to extremely slight</td>
<td>Instant - colorless</td>
<td>70</td>
<td>Predom. Halloysite ?</td>
</tr>
<tr>
<td>P-7993</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-249</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>White with tinge of cream</td>
<td>5% ±</td>
<td>&gt; 1.55</td>
<td>Very slight</td>
<td>Very light blue</td>
<td>80</td>
<td>Predom. Halloysite ?</td>
</tr>
<tr>
<td>P-7994</td>
<td></td>
<td></td>
<td>&lt; 1.56</td>
<td></td>
<td>Medium lt. blue 5F pg. 93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-250</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Off-white (grayish tinge)</td>
<td>5 - 10%</td>
<td>Circa 1.54</td>
<td>None to extremely slight</td>
<td>Very lt. blue</td>
<td>75-80</td>
<td>Predom. Beidellite and/or montmorillonite</td>
</tr>
<tr>
<td>P-7995</td>
<td></td>
<td></td>
<td>(1.543) est. to Circa 1.51</td>
<td></td>
<td>Medium dk. blue 40 pg. 95</td>
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</tr>
<tr>
<td>10-251</td>
<td></td>
<td></td>
<td>(1.528)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>Off-white</td>
<td>10 - 15%</td>
<td>&gt; &amp; &lt; 1.51 (Mostly &gt;)</td>
<td>Slight</td>
<td>Dk. blue</td>
<td>50-60</td>
<td>Predom. montmorillonite</td>
</tr>
<tr>
<td>P-7996</td>
<td></td>
<td></td>
<td></td>
<td>1-2 times</td>
<td>Deep bright blue 12F pg. 95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-252</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>White with tinge of cream</td>
<td>10 - 15%</td>
<td>&gt; &amp; &lt; 1.51 (Mostly &gt;)</td>
<td>Estimated 5 x plus</td>
<td>Same</td>
<td>60-70</td>
<td>Predom. montmorillonite</td>
</tr>
<tr>
<td>P-7997</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10-253</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>White with slight tinge of gray</td>
<td>5 - 10%</td>
<td>&gt; &amp; &lt; 1.52 (Mostly &gt;)</td>
<td>Estimated 2-3 times</td>
<td>Same</td>
<td>75-85</td>
<td>Predom. montmorillonite</td>
</tr>
<tr>
<td>P-7998</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>10-254</td>
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</tr>
<tr>
<td>8</td>
<td>White with slight tinge of gray</td>
<td>5 - 10%</td>
<td>&gt; &amp; &lt; 1.52 (About amounts)</td>
<td>Estimated 2-3 times</td>
<td>Same</td>
<td>70-80</td>
<td>Predom. montmorillonite</td>
</tr>
<tr>
<td>P-7999</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10-255</td>
<td></td>
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</tr>
<tr>
<td>9</td>
<td>Pure white</td>
<td>10 - 15%</td>
<td>&gt; &amp; &lt; 1.51 (Mostly &gt;)</td>
<td>Estimated 1-2 times</td>
<td>Lt. blue</td>
<td>50-60</td>
<td>Predom. montmorillonite</td>
</tr>
<tr>
<td>P-8000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Little lighter than above 10X s &lt; 07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-256</td>
<td></td>
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</tr>
</tbody>
</table>
Qualitative spectrographic analyses made on samples 4, 5, 6 and 9 are as follows:

### QUALITATIVE SPECTROGRAPHIC ANALYSIS
(Quantities estimated to nearest power of ten)

<table>
<thead>
<tr>
<th>Sample</th>
<th>Sample</th>
<th>Sample</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>44</td>
<td>45</td>
<td>46</td>
<td>49</td>
</tr>
<tr>
<td>(P-7995)</td>
<td>(P-7996)</td>
<td>(P-7997)</td>
<td>(P-8000)</td>
</tr>
</tbody>
</table>

**Elements present in concentrations over 1%**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Si</td>
<td>Si</td>
<td>Si</td>
<td>Si</td>
</tr>
<tr>
<td>Al</td>
<td>Al</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Elements present in concentrations 1% - 1/2%**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Na</td>
<td>Ca</td>
<td>Al</td>
<td>Na</td>
</tr>
<tr>
<td>Fe</td>
<td>Fe</td>
<td>Ca</td>
<td>Ca</td>
</tr>
</tbody>
</table>

**Elements present in concentrations 1/2% - 0.1%**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Mg</td>
<td></td>
<td></td>
<td>Mg</td>
</tr>
<tr>
<td></td>
<td>Mg</td>
<td></td>
<td>Na</td>
</tr>
</tbody>
</table>

**Elements present in concentrations 0.1% - 0.01%**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ca</td>
<td>Ba</td>
<td>Mn</td>
<td>Ba</td>
</tr>
<tr>
<td>Ti</td>
<td>Sr</td>
<td>Ti</td>
<td>Mn</td>
</tr>
<tr>
<td>Pb</td>
<td>Hf</td>
<td>Mg</td>
<td></td>
</tr>
<tr>
<td>Cr</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Elements present in concentrations 0.01% - 0.001%**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Mn</td>
<td>V</td>
<td>B</td>
<td>Mn</td>
</tr>
<tr>
<td>Ca</td>
<td>B</td>
<td>V</td>
<td>V</td>
</tr>
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</tr>
</tbody>
</table>

**Elements present in concentrations below 0.001%**

<p>| | | | |</p>
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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Cu</td>
<td>Cu</td>
<td>Cr</td>
<td>Cr</td>
</tr>
<tr>
<td>Cr</td>
<td>Cu</td>
<td>Cu</td>
<td>Be</td>
</tr>
</tbody>
</table>
Ceramic tests

Samples 2, 3, 4, 8 and 9 were put through a standard test for clay for the ceramic industry as set up by the American Society of Testing Materials with the following results:

CLAY FIRING REPORT

Date: January 20, 1949

Dry color: Cream
Texture: Received pulps
Wet color: Dark cream
Plasticity: Very good
Drying shrinkage: 16%
Dry behavior: Good
Water of plasticity: 51.2%

Firing properties

At: 1950° F 2030° F
Color Buff Shrinkage 1.5% 4.0%
Total shrinkage 17% 20%
Absorption 15% 11.2%

At: 2130° F 2175° F
Color Buff Shrinkage 5.5% 5.5%
Total shrinkage 22% 21%
Absorption 7.2% 7.7%

Firing behavior: Good
CLAY FIRING REPORT

Date: January 20, 1949
Reference number: 3
10-250
F-7994 C-229

Dry color: Lt. cream
Texture: Pulp received
Wet color: Grey cream
Plasticity: Extreme
Dry shrinkage: 15%

Drying behavior: Very poor, great lamination and checking of bars. Did not dry in 7 days at 750 F.

Water of plasticity: 2.5%

Firing properties:

<table>
<thead>
<tr>
<th>At:</th>
<th>Color Buff Shrinkage</th>
<th>Total shrinkage</th>
<th>Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930° F</td>
<td>3.5</td>
<td>18.5</td>
<td>13.0</td>
</tr>
</tbody>
</table>

At: 2175° F

<table>
<thead>
<tr>
<th>Color Buff Shrinkage</th>
<th>Total shrinkage</th>
<th>Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>20.0</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Firing behavior: Poor - spalling and excessive checking.
**CLAY FIRING REPORT**

Date: January 20, 1949

Reference number: 4
IG-251
F-7995 C-228

**Dry color:** Cream

**Texture:** Pulps received

**Wet color:** Grey cream

**Plasticity:** Poor

**Drying shrinkage:** 8%

**Drying behavior:** Good

**Water of plasticity:** 45%

**Firing properties:**

<table>
<thead>
<tr>
<th>At:</th>
<th>Color Pink Shrinkage</th>
<th>Total shrinkage</th>
<th>Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930°F</td>
<td>3</td>
<td>8</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>At:</th>
<th>Color Pink Shrinkage</th>
<th>Total shrinkage</th>
<th>Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>2030°F</td>
<td>9</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

**Firing behavior:** Good
CLAY FIRING REPORT

Date: January 19, 1949
Reference number: 8
10-255
P-7999 C-224

Dry color: Pale cream
Texture: Very fine grain massive
Wet color: Dark cream
Plasticity: Highly plastic
Drying shrinkage: .9% linear
Drying behavior: Poor, great deal of warpage and twisting
Water of plasticity: 54%

Firing properties:

At: 1950°F
    Color  Pink
    Shrinkage  7%
    Total shrinkage  16.4%
    Absorption  9.7%

At: 2050°F
    Color  Pink
    Shrinkage  7.5%
    Total shrinkage  16.5%
    Absorption  0.4%

At: 2130°F
    Color  Grey Pink
    Total shrinkage  17.5%
    Absorption  0.1%

    Color  Pink
    Total shrinkage  17.5%
    Absorption  0.0

Firing behavior: Poor
CLAY FIRING REPORT

January 20, 1949

Dry color:  Lt. grey cream
Texture:  Pulp received
Wet color:  Grey cream
Plasticity:  Extremely plastic
Drying shrinkage:  16%
Drying behavior:  Poor
Water of plasticity:  68%

Firing properties:

<table>
<thead>
<tr>
<th>At:</th>
<th>Color Buff Shrinkage</th>
<th>Total shrinkage</th>
<th>Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>19500 F</td>
<td>4</td>
<td>20</td>
<td>21.6</td>
</tr>
<tr>
<td>20300 F</td>
<td>5</td>
<td>21</td>
<td>16.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>At:</th>
<th>Color Buff</th>
<th>Total shrinkage</th>
<th>Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>21050 F</td>
<td>7</td>
<td>22</td>
<td>12.1</td>
</tr>
<tr>
<td>21750 F</td>
<td>6</td>
<td>22</td>
<td>12.8</td>
</tr>
</tbody>
</table>

Firing behavior:  Fair
**Ceramic tests**

**SUMMARY**

These materials vary as to physical properties. Two, P-7993 and P-7995, are almost nonswelling and have the best drying qualities and lowest water of plasticity. These work more like clays. All the others, P-7994, P-7999 and P-8000, are of the swelling type and are gummy and sticky and show a great deal of warpage and rather high shrinkage. These are much too plastic to be used alone as a raw material for any ceramic product at the present time.

In samples P-7992 and P-7995 the shrinkage between 0/04 and 0/02 is rather high on a percentage basis. While in the other samples the shrinkage is not so great in this temperature range.

These samples were put through a standard test for clay for the ceramic industry as set up by the A.S.T.M. and the comparisons are therefore against a somewhat different material.

The only recommendation that could be made for these materials is for samples P-7994, P-7999 and P-8000. These could be used in the ceramic industry as a floatative for enamel and glaze slips in percentages of $\frac{1}{2} - 1\%$ and as a plasticizer or binder for plastic bodies in the amounts of $1 - 2\%$. 
State Department of Geology and Mineral Industries

702 Woodlark Building
Portland, Oregon

Report by H. M. Dole
September 10, 1946

Ormico (Hamish) Bentonite
Ashland Mining District
Jackson County

Owner:
Ormisco Products
Harry Hamish, pres.
P. O. Box 345
Medford, Oregon

Wilford Long, Sec.
401 Pittock Block
Portland, Oregon

Area:
400 acres of deeded land.

Location:
In sections 4 and 5, T. 38S, R. 2E. Camp is at the former location of Climax P. O. The headwaters of Antelope Creek run through the property. It is 28 miles from Medford and 16 from Ashland by road.

History:
Bentonite was first recognized in 1944. Prior to this the property was worked for the medicinal values obtained from the clays and springs, from which the Ormico Products are made. Present work consists of leaching the "medicine" clay and preparation of their product.

Topography:
Typical landslide topography.

Development work:
One small (4' wide by 8' deep) cut and several hand auger holes for the bentonite. The "medicine clay" has been "opened up" by a few small cuts. There are several sheds to hold the "crystals" of the "medicine clay" and one building for the curing and bottling of the tonic.

Geology:
The Preliminary Geologic Map of the Medford Quadrangle (Wells '39) shows this to be a landslide area in the Tertiary lava series of the Western Cascades. A fault is mapped at this locality as forming the contact between the lava series and the overlying white rhyolitic tuff. One mile to the southeast is Shale City where Wells reports a "very thinly laminated, carbonaceous, tuffaceous shale containing leaf prints", and Mr. Hamish stated that coal seams are found on Grizzly Peak one mile to the southwest.

As far as could be determined, the bentonite and "medicine clay" has been explored only along the fault zone.
The area that was visited and in which the exploration has been done is typical landslide topography: hummocky, small blocks tipped at all angles, disrupted drainage, and uneven slopes. Springs and seeps are common and evidently mark the fault mapped by Wells. It is believed that percolating waters along the fault have been largely responsible for the alteration of the ash. Throughout the shifted blocks there are spots of altered material which appear to be of a fairly good grade of bentonite and much better quality than the cut visited. These spots were not continuous and were mixed with the soil so are not of economic size. However, they indicate that alteration and saturation by solutions is the reason for the bentonite and the landslides. Therefore, if any bentonite is to be found it will be near the fault zone and its quantity would be determined by the amount left after movement.

Mining:

None.

Economics:

The continuity of the bed exposed by the cut I saw is questionable. But if tests prove this to be a good grade of bentonite it is likely that the horizon could be found in place without too much expense.

Mr. Hamish states that in the cuts made, a thickness of 15' to 20' is indicated. He also stated that a small drift in bentonite was driven last year about a mile north of the one cut visited. This drift is now caved so was not seen. But if this is also of good quality considerable tonnage is indicated.

If possible, several new cuts and drifts are to be made this autumn to try and determine the exact attitude of the bentonite horizon. If this work is done I will revisit the property.

At the present time the road from Medford to the property is only a fair weather road and in many spots is very rough. The last 3/4 to a mile must be made on foot. Next month, October, a logging outfit is supposed to start putting in a gravelled road which will connect with the road to Ashland. If this is done the property will be readily accessible.

Samples:

P-5218 From the 4'x3' cut visited. This has been exposed for some time and is somewhat weathered. The material is light yellowish-green in color, somewhat sticky, and has a "soapy" feel.

P-5219 Float from just below the bunkers of the "medicine clay". White in color, unctious, and has a conchoidal fracture. This is probably just a common clay. Mr. Hamish thought it might be dessicated "medicine clay".
P-5220 Float from various places along the trail from end of the road to the mineral springs. Similar to #2.

Note: It is thought that insufficient exposures were seen to warrant anything but a cursory examination. As a result it is but a preliminary report and should be recognized as such. Also the whole thing seems quite "iffy" to me but I believe it is worthy of some kind of a report.
Hamish Bentonite

Remarks

This report is intended primarily as a means of recording the various test work made on the clay, until such time as a regular report is justified.

The status of the property has not changed appreciably since Dole's report in 1946. The road connection to the Ashland road mentioned in the report has never been constructed, and the property is as inaccessible as ever.

Development work since Dole's report consists of several location cuts, most of these are in obvious slide material and of little worth in determining the extent of the deposit.
Ormico (Hamish) Bentonite

Owner:
Ormico Products
Harry Hamish, pres.

Wilford Long, sec.

Area:
400 acres of deeded land.

Location:
In sections 4 and 5, T. 38 S., R. 22 E. Camp is at the former location of Climax P. O. The headwaters of Antelope Creek run through the property. It is 26 miles from Medford and 18 from Ashland by road.

History:
Bentonite was first recognized in 1940. Prior to this the property was worked for the medicinal values obtained from the clays and springs, from which the Ormico Products are made. Present work consists of leaching the "medicine" clay and preparation of their product.

Topography:
Typical landslide topography.

Development work:
One small (4' wide by 10' deep) cut and several hand auger holes for the bentonite. The medicine clay has been "opened up" by a few small cuts. There are several sheds to hold the "crystals" of the medicine clay and one building for the curing and bottling of the tonic.

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The Preliminary Geologic Map of the Medford Quadrangle (Wells '39) shows this to be a landslide area in the Tertiary lava series of the Western Cascades. A fault is mapped at this locality as forming the contact between the lava series and the overlying white rhyolitic tuff. One mile to the southeast is Shale City where Wells reports a "very thinly laminated, carbonaceous, tuffaceous shale containing leaf prints", and Mr. Hamish stated that coal seams are found on Grizzly Peak one mile to the southwest.

As far as could be determined, the bentonite and "medicine clay" has been explored only along the fault zone.
The area that was visited and in which the exploration has been done is typical landslide topography: hummocky, small blocks tipped at all angles, disrupted drainage, and uneven slopes. Springs and seeps are common and evidently mark the fault mapped by Wells. It is believed that percolating waters along the fault have been largely responsible for the alteration of the ash. Throughout the shifted blocks there are spots of altered material which appear to be of a fairly good grade of bentonite and much better quality than the cut visited. These spots were not continuous and were mixed with the soil so are not of economic size. However, they indicate that alteration and saturation by solutions is the reason for the bentonite and the landslide. Therefore if any bentonite is to be found it will be near the fault zone and its quantity would be determined by the amount left after movement.

Mining:
None.

Economics:
The continuity of the bed exposed by the cut saw is questionable. But if tests prove this to be a good grade of bentonite it is likely that the horizon could be found in place without too much expense.

Mr. Hamish states that in the east slope, a thickness of 15' to 20' is indicated. He also states that a small drift in bentonite was driven last year about a half mile north of the one cut visited. This drift is now saved so was not seen. But if this is also of good quality considerable tonnage is indicated.

If possible several new areas and drifts are to be made this autumn to try and determine exact attitude of the bentonite horizon. If this work is done I will revisit the property.

At the present time the road from Medford to the property is only a fair weather road and in many spots is very rough. The last 2 to a mile must be made on foot. Next month, October, a logging outfit is supposed to start putting a gravelled road which will connect with the road to Ashland. If this is done the property will be readily accessible.

Samples:
1. From the 4' x 5' cut visited. This has been exposed for some time and is somewhat weathered. The material is light yellowish-green in color, somewhat sticky, and has a "soapy" feel.

2. Float from just below the bunkers of the "medicin clay". White in color, unctious, and has a conchoïdal fracture. This is probably just a common clay. Mr. Hamish thought it might be dessicated "medicine clay".

3. Float from various places along the trail from end of the road
to the mineral springs. Similar to #2.

Note:
This is put on pink paper because it is thought that insufficient exposures were seen to warrant anything but a cursory examination. As a result it is but a preliminary report and should be recognized as such. Also the whole thing seems quite "iffy" to me but I believe it is worthy of some kind of a report.