

SNAKE RIVER LIMESTONES--Reconnaissance  
 exam in connection with reported  
 phosphate content.

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NAME		OLD NAMES	PRINCIPAL ORE	MINOR MINERALS
<u>6 S</u>	<u>48 E</u>	(limestone lenses in greenstone at Homestead)		
T	R	S		
Baker .....		COUNTY	<u>PUBLISHED REFERENCES</u>	
Homestead .....		AREA	Pamphlet 74, Idaho Bureau Mines & Geology (W. R. Wagner) Base & Geology of Snake River Canyon (map) U. S. Engineers	
.....		ELEVATION	<u>MISCELLANEOUS RECORDS</u>	
.....		ROAD OR HIGHWAY	Homestead Area, Reconnaissance Geology----Dogami Report by Allen 1939	
.....		DISTANCE TO SHIPPING POINT		
PRESENT LEGAL OWNER (S) .....			Address .....	
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OPERATOR .....			.....	
Name of claims		Area Pat. Unpat.	Name of claims Area Pat. Unpat.	
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<u>EQUIPMENT ON PROPERTY</u>				
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REPORTS

Snake River Limestone---Reconnaissance exam in connection with reported phosphate content----by N. S. Wagner, December, 1946

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SHIPMENT AND ASSAY RECORDS

MAPS

# State Department of Geology and Mineral Industries

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Portland, Oregon

## MEMORANDUM REPORT

### SNAKE RIVER LIMESTONES ----- Reconnaissance Examination in Connection with Reported Phosphate Content.

Report by: N. S. Wagner  
Date Exam: December, 1946

Homestead District  
Baker and Wallowa Counties

#### Foreword:

Reports exist to the effect that some of the limestone formations in the vicinity of Homestead, Oregon are phosphate bearing. Since some of these limestones have been classified as being Permian in age, with a fauna of the same character as the Phosphoria formation in southeastern Idaho, various of these limestones were sampled for the purpose of obtaining analytical data on their phosphate content. Only negligible phosphorous contents were found in the samples taken. Fossil evidence was found, however, which does complement the meagre paleontological data existent for these formations. The analytical results and the fossil data are here presented in this memorandum report.

#### Location:

The limestones in this area occur both as a massive formation many hundred feet thick, and as very small lenses contained in a greenstone series.

The index map accompanying this report shows the relative location of these limestones. The base for this map is the map of the Snake River Canyon, by the U. S. Engineers. The general geology thereon is taken also from the same source. The area covered by the map of the Homestead Area, by Allen, is indicated by the dashed insert, but only the limestone lenses within the greenstones series which were inspected and sampled during this examination are shown. Additional limestone lenses are mapped within the bounds of the Allen area, and others reportedly occur in the greenstone series at large.

#### Discussion of Examination Procedure:

Since the existent classification of formations in this area is for the most part on a tentative basis due to the reconnaissance nature of the geologic examinations given the area, and due also to the lack of abundant or conclusive criteria on which to base an age classification, and since the prime object of this examination was to obtain analytical data on the general phosphate contents of these limestones, all known limestone types were visited and sampled regardless of assigned age. The nature of the samples taken also varied with the conditions. More attention was often paid to the manifestly impure, shaley horizons than to the more massive and apparently better grade limestones. A few samples composed of many small chips gathered at frequent intervals over an appreciable section distance were taken when the nature of the exposure was such that it was impracticable to attempt more



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refined sampling of individual horizons during the time available. This was done on the presumption that if horizons with a truly noteworthy phosphatic content did exist in the section at large, such would be indicated in the analytical results by a higher than usual phosphate value, in which case a more detailed resampling of the section would be warranted accordingly.

The massive limestone formation extends well into Oregon in a southwesterly direction from Big Bar, Idaho. Accessibility on the Oregon side of the river, however, is poor. As sampling here would involve a needless expenditure of time and effort in packing samples out several miles over a foot trail to the car, this formation was examined on the Idaho side of the river where it can be readily reached from points along the road to the Red Ledge Mine. This road traverses the full section parallel to that exposed by the river on the Oregon side and is removed therefrom in distance only by the width of the canyon.

## Geology:

The limestone lenses examined in the greenstone series are designated on the map entitled "Location of Limestone Occurrences Sampled in the Homestead Area." These limestones are all thin and of but short lateral extent. Allen lists Spirofers, a few Productids, one Tetracoral, and what may be Pentacrinus as fauna collected, and quotes R. L. Lupper in assigning the limestones and associated volcanics (tuffs) as being of Permian (Phosphoria) age as based on fossils contained in the limestone beds. Subsequently, W. R. Wagner in discussing the Seven Devils Volcanics (Pamphlet 74, Idaho Bureau of Mines & Geology) mentions that "F. B. Laney\* has found fossiliferous tuffs in the series in the Lower Snake River Canyon near Homestead, Oregon, which according to Girty, have a Permian fauna of the same character as the phosphoria in southeastern Idaho." Although the exact location of Laney's tuffs is not given, the writer did observe the presence of fossil fragments in the tuff formation as mapped by Allen so that it would seem likely that both men are referring to the same general formation. The above mentioned fossil evidence observed by the writer consisted of only poorly preserved incomplete, fragments and no samples were taken. Better preserved, complete fossils were found and collected at location 2. These were commonly weathered out of the rock and found amongst the talus on side of the gulch below the outcrop. Occasional large blocks were also found which were composed almost exclusively of these shells. These fossils were tentatively identified by Dr. Ewart Baldwin as the brachiopod Bictyoclostus ----- a form that Shimer and Shrock show as ranging from Mississippian to Permian. Baldwin considers these as being more probably the Permian variety.

The massive limestone formation is enlarged on the map entitled "Location of Limestone Occurrences Sampled in Big Bar Area", the map detailing as the title indicates, the specific area sampled.

This limestone is shown on the U. S. Engineers map as Triassic, but the writer does not have the text of the data giving the criteria upon which this classification was made. Wagner (W.R.) however, describes a limestone member in his Lucile series,

\* Personal Communication, reported to A. L. Anderson, Pamphlet Np, 34, p. 13, 1930, Idaho Bureau of Mines & Geology.

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which from his description, and the description of associated formations, would appear to be the equivalent of this Big Bar exposure. (Reference: pamphlet 74 Idaho Bureau of Mines & Geology). This Lucile Limestone is exposed in an area northeast of the Big Bar limestone.

The Lucile limestone is tentatively classed as Upper Triassic on the basis of fossil fragments identified by J. B. Reedsides, Jr., of the U. S. Geological Survey whom Wagner (W.R.) quotes as follows:

"The two specimens have been examined by a number of paleontologists, and the consensus is that they represent fragments of echinoderms and that at least the one specimen that shows tubular bodies is part of a stout echinoid spine (radiole). I have compared the structure of this specimen with that of spines of cidaroid echinoids from the Upper Triassic at a locality on the Lapwai Indian Reservation, Idaho, and they seem to me quite similar in size and make-up. So far as I am informed, no spines of this thick, heavy type occur in the Paleozoic, and their presence would imply a Triassic age for the containing beds."

At locality 2 on the Big Bar deposit the writer found many fossil specimens which have been classified by R. S. Stewart as echinoid spines of rather large size. Although no spines like those referred to by Wagner (W.R.) and Reedsides were available for comparison, it is thought probable that those collected by the writer are of the same type. These fossils were found abundantly existent in one thin layer in what was otherwise an apparently quite unfossiliferous exposure. The layers in this exposure were often thin (2-4") with somewhat shaly partings. Especially close attention was paid to this exposure in the hopes of finding fossils, but the spines were all that was found.

In all deposits examined - that is, in both the Homestead and Big Bar areas - a practice was made of taking samples of horizons that showed even fragmentary evidence of megascopic fossils. This was done in hope that microscopic fossils might be found therein. cursory examination of these samples by Stewart showed nothing that could be positively identified as a foram, and the nature of most of the rock in these samples is such that it probably can not be broken down and separated successfully for further study. However, given sufficient time to explore the exposures in the field, it is quite possible that local shaly partings containing the microscopic breed of fossil life could be found. Considering the metamorphosed nature of the formations and the paucity of megascopic fossil remains, a study of the possible microscopic fossil content of these formations might prove well worth attempting.

## Samples and Analytical Results:

### Homestead Area: Location No. 1.

This is a limestone occurrence found during this examination and not shown on the original Allen map. The limestone here occurs in thin (1-3") beds, often alternating between sandy and shaly calcareous partings which are likewise thin. Outcrops are poor and inconspicuous and limited to a very small area over which soil and talus is thin to absent. Float is to be found along the general strike for a distance of a couple hundred feet. Two samples were taken here as follows:

GB 300	Cut channel across upper fraction of section-----	10'
GB 301	Cut channel across lower fraction of section-----	7'



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## Location No. 2

A clean-cut trend of limestone exists here, but no formation conclusively in place was observed. The sample taken consists of chips of limestone and fossiliferous calcareous float gathered from along the full length of the occurrence and from an appreciable distance below the upper margin of the material as exposed on the hillside, but not from the extreme lower reaches of the talus.

GB 302 as above.

## Location No. 3

Massive, hard, limestone outcrops prominently here. This stone weathers to a chocolate brown color which is abundantly developed on almost all exposures, and which varies in richness of color to almost black locally. In one streak near the base, and on the eastern end of the exposure, lobster-red colored fossil shell fragments protruded from the rock as much as  $\frac{1}{4}$ ". These appeared to be of a different species than the Dictyoclostus already referred to from location No. 2 but they were incomplete and it was utterly impossible to extract them from the rock. Cut channel samples were obtained only with great difficulty and are as follows:

GB 303 Cut channel across lower 12' of section on the east end of outcrop.  
GB 304 " " " upper 7' " " " " " " " " "  
GB 305 " " " 12 to 15' of section on western end of outcrop.

## Big Bar Area:

The limestone here is exposed in high cliffs often flanked by large talus slopes and cut by tributary streams. The exposure is continuous for a distance of two miles across the formational strike. Variable dips and faults exist and isoclinal folding may occur. Thus the formation was sampled on both contacts and on significantly different looking horizon variations in between.

## Location No. 1

GB 306 Southern contact. Chip sample (6-8" intervals) for a distance of 115' on the level on beds dipping 22° to the north. Mostly massive limestone.

## Location No. 2

GB 307 Chips sample (almost continuous) across about a hundred foot section of thin bedded, poor, cherty limestone.

## Location No. 3

GB 308 Sample of chips beginning at northern contact and extending some 400' along road for an estimated vertical formational section of 100'.

## Location No. 4

GB 309 A distinctive horizon of massive limestone which weathers brown occurs as cliffs here. The sample taken here consisted of fragments (size, about  $\frac{1}{2}$ " ) gathered from high on the talus slope be-

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low the cliffs for a distance of about 300'. A well developed shelf exists above this horizon above the area sampled. This reduces contamination from the overlying formation to a minimum.

## Location No. 5

GB 310 The formation overlying GB 309 is generally thin bedded and contains numerous partings. It is accessible in the canyon of a creek which is incised through it and through part of the underlying formations. Fragments (size, about  $\frac{1}{2}$ " ) were gathered from high on the talus slopes for a distance of about 400'. As is also the case with sample GB 309, the sample taken was large and fragments were gathered without sorting or selection excepting for size. The samples should be reasonably representative of the formations exposed in the cliff above, and in the instance of GB 310 there was no overlying formation to provide any possible contamination.

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The analytical results for these samples are tabulated on the following page.

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## Conclusion:

The fossil data gathered on this survey tends to further substantiate the age classifications already assigned to these respective formations ----- namely Permian for the limestone lenses in the greenstone series in the Homestead area, and Triassic for the massive limestone formation at Big Bar.

Although no appreciable  $P_2O_5$  content was found in any of the samples, it is noteworthy that the  $P_2O_5$  content of the samples from the limestones in the Homestead area is consistently higher than is that from the Triassic limestone. This might be significant in terms of the Lupper and Laney conclusions regarding the similiarity between the faunas of these Permian beds and that of the Phosphoria formation of eastern Idaho. Thus, while no appreciable  $P_2O_5$  content was revealed in any of the Homestead limestones sampled, to indicate the presence of higher grade streaks, the possible age relationship might well be bourne in mind in connection with sampling related formations elsewhere in Oregon.

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ASSAY REPORT

## Homestead District Samples

Samples Submitted by N. S. Wagner, December 19, 1946.

Sample No.	Lab. No.	Ignition Loss	Silica SiO	Oxides R <sub>2</sub> O <sub>3</sub> *	Calcium CaO	Magnesia MgO	Phosphorus P <sub>2</sub> O <sub>5</sub>
P-5563	GB-300	17.20%	53.73%	6.70%	20.45%	2.05%	0.884%
P-5564	GB-301	10.42	64.14	12.16	9.01	2.73	0.439
P-5565	GB-302	15.32	45.58	17.56	17.50	3.44	0.085
P-5566	GB-303	30.28	27.58	6.72	24.03	12.10	0.105
P-5567	GB-304	21.24	42.30	8.44	20.96	7.20	0.083
P-5568	GB-305	38.28	12.88	4.10	34.31	11.27	0.065
P-5569	GB-306	42.62	1.22	1.04	53.69	0.64	0.024
P-5570	GB-307	42.52	1.98	1.16	52.80	0.85	0.059
P-5571	GB-308	42.10	3.10	1.70	52.28	0.68	0.033
P-5572	GB-309	43.16	2.12	1.46	45.38	7.02	0.058
P-5573	GB-310	42.66	1.84	1.56	50.43	2.82	0.024

\* Includes Fe, Al<sub>2</sub>O<sub>3</sub>, Cr, part of the phosphorus, and all other members of the ammonium hydroxide group.

L.L. Hoggland

Assayer