MARINE CONSTRUCTION, REPAIR AND MOORAGE

PHONE 921-J-1

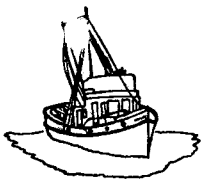
# Wade & Chamberlin Marine Service

LOCATED NEAR YAQUINA, OREGON

STAR ROUTE EAST

NEWPORT, OREGON

10/20/53



Mr. H. M. Dole
Department of Geology and Mineral Industries
1069 State Office Building
Portland 1, Ore.

Dear Mr. Dole:

I would like to again express my appreciation for the time and effort you have taken in preparing the comprehensive report relative to the geology of the mouth of the Yaquina River. It is with particular personal satisfaction that I have become acquainted with the efficiency and interest shown by our State Geological Department in its effort to satisfy requests of this type.

I have obtained a tracing of the contours of the ocean bottom immediately adjacent to the mouth of the Yaquina River prepared this year by the U. S. Coast and Geodetic Survey. It shows quite prominently the trend of the main reef extending north and south and offshore of the mouth of the Yaquina. I will have it printed soon and will send you a copy, feeling that it may add something to your data on this area.

Thanking you again,

Sincerely,

Tom R. Chamberlin

October 19, 1953

Mr. T. R. Chamberlin
Star Route East
Newport, Oregon

Dear Mr. Chamberlin:

Here is the Plate IV that accompanied Heacock's thesis. This may be of help to you.

H. M. Dole
Geologist

HMD:lk
Encl.

October 8, 1953

Mr. T. R. Chamberlin
Star Route East
Newport, Oregon

Dear Mr. Chamberlin:

Mr. Libbey has turned your request for information on the geology in the vicinity of Yaquina Bay over to me for answering. I have never done geological field work in the Newport area but the literature dealing with that area is quite abundant and the following has been taken from the most recent works. Under separate cover I am sending you a copy of the U. S. Geological Survey's Oil & Gas Investigations Preliminary Map 88.

O.M. 88 shows the geology of the Newport-Waldport area and gives a broad picture of Yaquina Bay's geological setting. You will note from this map that the sediments around Newport dip westward and are progressively older from the mouth of Yaquina Bay eastward. Of special interest is the cross section which fortunately is located very close to the area in which you are interested. From the structure indicated on the map and the cross section one can conclude that any excavations in and near the mouth of the bay will be in sediments similar to those exposed on land, i.e., no formations would be expected that are not found on land.

In two unpublished Masters' theses written by Oregon State College students, the area in the immediate vicinity of Yaquina Bay is described in more detail than is shown on O.M. 88. One of these theses, written in 1952, is by R. L. Heacock and he describes the Nye formation in this manner:

"Nye Formation, "Oligo-Miocene"

"The upper 2325 feet of the Nye formation, 1500 feet of which are exposed, are covered by this report. The lower 2055 feet of the formation are being studied concurrently by Mr. Howard Kinzey. (Never published,HMD)

"The principal lithology of the upper portion of the Nye formation is mudstone. In previous literature the formation has been called a shale but the massive jointed nature of these sediments and the absence of the definitive fissility of shale as well as the very fine grained texture of the rock are indicative of a mudstone. When a sample of this mudstone is disaggregated and screened all the mineral grains pass through a 115 mesh screen (0.124 mm. openings). Abundant brown fish scales are a characteristic element of the formation.

"The color of a fresh dry sample of this mudstone was found to be dark greenish gray (color code number 5 GY4/1) when compared to the "Rock-Color Chart" (21). The rock when weathered is greenish gray (5 GY6/1).

"Weathering of the mudstone produces a hackly or at times conchoidally fractured debris in the talus slope.

"Slump blocks up to several hundred square feet in area are rather common in the Nye formation. This phenomenon reflects the incompetence typical of such fine grained clastic sediments.

"When freshly fractured a pronounced petroleum odor emanates from the mudstone, but no characteristic petroleum fluorescence was observed under ultra-violet radiation.

"Two silty horizons were noted in the upper part of the Nye formation. The lower of these silty layers occurs below the high-tide mark at the west side of McLean Point. This silty stratum is about 20 feet thick. Since no attitude could be measured at this locality the average dip of the formation was used to determine an approximation of thickness. The top of the silty stratum is located 1937 feet stratigraphically below the top of the Nye formation. This bed contains a few scattered limy concretions which are disc shaped and have a major dimension of three feet. A zone of more spheroidal limy concretions up to 1½ feet in diameter was noted approximately 100 feet stratigraphically below the silty bed.

"The upper silty horizon was found 4½ feet below the top of the Nye formation. This bed is 8 feet thick.

"The only other rock type exposed in the upper part of the Nye formation is a 3½ foot bed of rhyolitic tuff. The location of the exposure of this bed is shown on plate IV. The tuff is 530 feet stratigraphically below the top of the formation. Under the petrographic microscope this tuff was visually estimated to be composed of 40% volcanic glass (index of refraction 1.48-1.49), 35% quartz, 15% acid plagioclase, 10% orthoclase, and a trace of mafic minerals. The color of this bed when compared to the "Rock-Color Chart" (21) is very light gray (N 8). This bed is poorly indurated and has no more prominent physiographic expression than the enclosing mudstone.

"The upper part of the Nye formation has a range in dip from 17° to 18° W. and strikes uniformly N. 5° W. The Nye mudstone is overlain unconformably by the "Astoria" formation with a 6° angular discordance in dip and a 5° difference in strike. Pleistocene deposits overlie both the Nye and "Astoria" formations with a marked angular unconformity since the Quaternary deposits are horizontal and were deposited on an erosional surface.

"The age of the upper part of the Nye formation is "Oligo-Miocene" and compares to Kleinpell's lower Saucesian Stage. This age assignment will be discussed more completely in a succeeding section on paleontology."

J. E. Herron was the author of the other Oregon State College thesis. Mr. Herron completed his work in 1953. In this thesis the "Astoria" formation is divided into two units: the Agate Beach formation and the Depoe formation. Only the Agate Beach formation is found at the mouth of Yaquina Bay and it is described as follows:

> "The Agate Beach formation unconformably overlies the Nye and Yaquina formations. It is discussed in greater detail on the following pages. In general, it is greenish gray, fine-grained, tuffaceous, micaceous, silty sandstone, with intercalated layers of tuffaceous, sandy siltstone and occasional layers of tuff, and coarse sandstone. Its outstanding feature is the abundance of pelecypods. Its age is lower Miocene, or upper Saucesian. Its total thickness is more than 1000 feet."

Detail of the Agate Beach formation along the Newport Beach section is given by Herron in his thesis. It is:

Newport Beach Section

> "The base of the Newport Beach section rests unconformably on the Nye formation in the cliff on the north shore of Yaquina Bay, 950 feet west of the north abutment of the Yaquina Bay bridge on the coast highway. The section continues westward and northward along the seacliff to the north boundary of Yaquina Bay State Park, and ends with the highest member exposed in the seacliff.
>
> "Exposures consist of good seacliff outcrops, where the Agate Beach formation is exposed between the terrace deposits and the beach sand. Fresh samples were available except in the lowest part of the section, which is badly weathered.
>
> "Measurements were made with a ten-foot tape and Brunton compass. Occasional use was also made of a fifty-foot tape and pacing. At the north (upper) end the beds strike N 10° E and dip 13° NW. At the south end the strike N 10° W and dip 12° SW.
>
> Unconformably overlain by Recent beach sands and terrace deposits.

| Unit | Agate Beach formation | Feet |
|---|---|---|
| A31. | Siltstone, medium gray N5, fine grained, massive, sandy, slightly indurated with carbonates; Foraminifera rare; some carbonaceous matter. Occasional small pelecypods. | 8.4 |
| A30. | Sandstone, greenish gray 5GY6/1, very fine grained, silty, finely crossbedded, indurated, with interbedded fine layers of medium light gray, tuffaceous siltstone having few Foraminifera. | 4.1 |
| A29. | Sandstone, greenish gray 5GY6/1, fine grained, silty, massive. Occasional small pelecypods. Foraminifera rare. | 2.5 |
| A28. | Sandstone, light gray N7, coarse grained, in a calcareous matrix. Basal shale 0.1 foot thick. | 0.6 |

| Unit | Agate Beach formation (cont.) | Feet |
|---|---|---|
| A27. | Sandstone, greenish gray 5GY6/1 fresh, weathers to moderate yellowish brown 10YR5/1, coarse grained in a fine-grained silty sandstone matrix, massive, somewhat micaceous, slightly tuffaceous. Casts of pelecypods. Molluscan localities 4026 and 4038. | 1.4 |
| A26. | Sandstone, medium light gray N6 fresh, weathers to very light gray N8, fine grained, massive, very tuffaceous, micaceous, some carbon. Molluscan locality 4018*. | 15.7 |
| A25. | Sandstone, medium dark gray N4, fine grained, silty, heavy. Occasional small pelecypods. | 0.6 |
| A24. | Sandstone, medium gray N5, fine grained, silty, micaceous and carbonaceous. Interbedded with this is a medium dark gray N4, tuffaceous siltstone. Foraminifera rare. | 2.6 |
| A23. | Sandstone, greenish gray 5GY5/1, fine grained, silty, micaceous, carbonaceous. Foraminifera rare. Occasional pelecypods. Molluscan locality 4039*. | 3.5 |
| A22. | Sandstone, light gray N7.5, medium grained, micaceous. Has middle layer of sandstone, light gray N7.5, composed of mica and quarts, fragments mostly angular and platy. Occasional small pelecypods throughout. | 2.4 |
| A21. | Siltstone, dark greenish gray 5GY5/0.5, sandy, massive, tuffaceous, micaceous. Occasional small pelecypods; abundant Foraminifera. Foraminiferal locality 4133. | 5.2 |
| A20. | Siltstone, medium light gray N5.5, sandy, massive, tuffaceous, micaceous. | 4.7 |
| A19. | Sandstone, greenish gray 5GY5/0.5, fine grained, massive, micaceous. | 16.1 |
| A18. | Sandstone, dark greenish gray 5GY4/1, coarse grained, massive slightly indurated with carbonates but very poorly consolidated. | 1.0 |
| A17. | Tuff, pale greenish yellow 10Y8/2, sandy, massive, very finely crossbedded. Some wood fragments. | 5.3 |
| A16. | Concealed by terrace deposits. | 13.9 |
| A15. | Sandstone, greenish gray 5GY5/1, very fine grained, silty, very finely laminated, micaceous. | 6.0 |
| A14. | Mudstone, medium light gray N6, massive, with leaf impressions. Molluscan locality 4025*. | 2.6 |

| Unit | Agate Beach formation (cont.) | Feet |
|---|---|---|
| A13. | Sandstone, greenish gray 5GY5/0.5, fine grained, silty, massive, somewhat micaceous. Rare Foraminifera and ostracods. Foraminiferal locality 4132. | 13.4 |
| A12. | Eroded and concealed by sand. | 34.6 |
| A11. | Sandstone, medium light gray, weathers to light olive gray 5Y6/1, medium grained, silty, heavy, well indurated, micaceous. Occasional small pelecypods. Some carbonaceous fragments. | 1.5 |
| A10. | Claystone, medium gray N5.5, tuffaceous, massive, slightly micaceous. | 1.1 |
| A9. | Sandstone, medium gray N5, fine grained, silty, massive, somewhat micaceous. Common small pelecypods and carbon fragments. Molluscan localities 4017, 4020, 4021, 4024, 4029, 4037. | 6.7 |
| A8. | Siltstone, dark greenish gray 5GY4/1, sandy, massive, tuffaceous. | 2.9 |
| A7. | Sandstone, medium light gray N5.5, fine grained, silty, massive, somewhat micaceous. | 1.3 |
| A6. | Siltstone, greenish gray, massive, tuffaceous. | 0.9 |
| A5. | Sandstone, greenish gray 5GY5/1, fine grained, silty, massive, micaceous. | 18.5 |
| A4. | Siltstone, medium light gray, weathers to greenish gray 5GY6/1 and to moderate yellowish brown 10YR5/4, sandy, massive, tuffaceous. Rare small gastropods. | 2.7 |
| A3. | Sandstone, light olive gray 5Y6/1, fine grained, silty, massive, with large calcareous concretions. | 10.8 |
| A2. | Siltstone, medium light gray N6, sandy, massive, tuffaceous, with carbon particles. | 2.4 |
| A1. | Sandstone, light olive gray, fine grained, silty, massive. | 3.6 |

Total exposed thickness of Agate Beach formation - 197 feet

Unconformably overlies the Nye mudstone."

Herron shows a composite section of the above as follows: (The rough left border is a graphic measure of the individual units' response to erosion. Perhaps this could be interpreted as a measure of their digability.)

His geologic map of the Newport area is:

We have on file in our office a blue print of the Yaquina Bay Bridge by the Oregon State Highway Commission. From this drawing the following logs are given for the borings made in connection with this project. It is not known whether this is all the information the Oregon State Highway Commission has on this area or not. Perhaps you may wish to check with them.

North end of bridge - sta. 198 + .04

(1) Sta. 200 + 31.5

| | | Elev. | |
|---|---|---|---|
| Surface | | 87.0 | feet |
| Compact sand | 87.0 - 75.0 | | |
| Compact sand and gravel | 75.0 - 65.0 | | |

Sta. 200 + 31.5 (cont.)

| | | | |
|---|---|---|---|
| Compact sand | 65.0 | - | 54.5 feet |
| Shale | 54.5 | - | 34.0 |
| Sand strata | 34.0 | - | 33.0 |
| Shale | 33.0 | - | -10.0 |

(2) Sta. 204 + .08

| | | | |
|---|---|---|---|
| Surface | | | -19.2 |
| Sand, blue clay and soft yellow clay | -19.2 | - | -27.0 |
| Shale | -27.0 | - | -60.0 |

(3) Sta. 209 + 90

| | | | |
|---|---|---|---|
| Surface | | | -19.9 |
| Hard clay | -19.9 | - | -22.2 |
| Sand, fine gravel and fossil shells | -22.2 | - | -42.8 |
| Compacted sand and fossil shells | -42.8 | - | -54.6 |
| Soft muck sand | -54.6 | - | -77.1 |

(4) Sta. 213 + 80

| | | | |
|---|---|---|---|
| Surface | | | -3.0 |
| Sand | - 3.0 | - | -9.0 |
| Sand and gravel | - 9.0 | - | -19.0 |
| Sand and fossil shells | -19.0 | - | -62.6 |

(5) Sta. 222 + 65

| | | | |
|---|---|---|---|
| Surface | | | 0.0 |
| Sand and fossil shells | 0.0 | - | -67.0 |

South end of bridge - Sta. 230 + 64.59

Other than the log at Sta. 200 + 31.5 all the other logs are pertinent to the Nye formation - in which these bore holes were undoubtedly in - under the bay. It may be that the Oregon State Highway Commission has some record of the ease with which these holes were dug.

Dr. E. M. Baldwin, professor of geology at the University of Oregon, has written an article entitled "Pleistocene history of the Newport, Oregon, region" (Geol. Soc. of the Oregon. Country, vol. 16, no. 10, 1950, pp. 77-81). In this article he suggests that the present Yaquina River mouth is being driven northward from a former position. Dredging at the mouth of Yaquina Bay, then, would probably not be in old valley fill but in the sediments of the Agate Beach and Nye formations.

Geologic information on the Coos Bay region is to be found in our Bulletin 27, "Geology and coal resources of the Coos Bay quadrangle, Oregon," by J. E. Allen and

E. M. Baldwin. The following is extracted from the geologic map which accompanies this bulletin:

It will be noted from this that although Tertiary sediments are found at both Yaquina Bay and Coos Bay not much correlation can be made in the individual formations. Also, the presence of the large area of Quaternary sand to the north of Coos Bay does not have any counterpart at Yaquina Bay. The structure of the two areas, also, is quite different.

The age of the Yaquina Bay sediments ranges from upper Oligocene through lower Miocene (Nye formation and Agate Beach formation). The age of the Coos Bay sediments is upper Eocene for the Coaledo and Bastendorf formations, Oligocene for the Tunnel Point sandstone, Pliocene for the Empire formation (found at mouth of Coos Bay) and Recent for the alluvium. (See chart enclosed for comparative ages of the formations). Although age of formation is not as important as type of formation, in regard to their ability to be excavated, this does indicate that under similar geologic conditions the Empire formation should probably be more easily excavated than either the Agate Beach or Nye formations. It must be emphasized, however, that so many other variables enter into the physical characteristics of a rock that difference in age is seldom an important factor, unless the time span is fairly long. The exception to this is the material deposited in the Recent time interval. Material of this age should be moved without

much trouble and if the Recent material was the filling of Coos Bay it is not surprising that the bay was deepened simply by suction dredge.

The above, I believe, covers most of your questions and should give you a pretty good idea of the geology of the Yaquina Bay area. However, I wish to point out again, that I have never done geological field work in the Newport region and that the information presented here is based entirely on library research. Also, as you mentioned, there is no substitute for core drilling and, I might add, geologic field mapping. Perhaps it would be wise to employ a geologist who is familiar with these two areas to prepare a short report dealing with the engineering geology of the formations. If you should consider this I would suggest you get in touch with Prof. E. M. Baldwin at the Geology Department of the University of Oregon, Eugene. Dr. Baldwin has had many years of experience in mapping in the Coast Range and along the Oregon and Washington coast.

Sincerely yours,

H. M. Dole
Geologist

HMD:lk
Encl.

# Yaquina Bay Dock & Dredge Co.

PHONE 612 P. O. BOX 245

NEWPORT, OREGON

10/5/53



Mr. S. W. Libby
Oregon State Geological Dept.
State Office Building
Portland, Ore.

Dear Mr. Libby:

I discussed by telephone yesterday with one of your associates in your office our need for certain geological information relative to the tertiary sediments which exist in that area between the jetties in the mouth of Yaquina Bay at Newport, Ore.

I would like to outline a little of the background in order that you may understand the reason we are requesting this information. On February 14, of this year the port districts of Toledo and Newport collectively petitioned the U. S. Army engineers at a special hearing in Newport, Oregon, for the deepening of the present project depth of the harbor of Yaquina from 26 feet to 40 feet on the bar and from 20 feet to 30 feet in the channel and turning basin. As in all U. S. Engineers' projects, sufficient savings must be shown to ammortize the project over a 50-year period. Large savings were shown. However, if the rock which exists at the mouth of the jetties is sufficiently hard that it must be removed by drilling and blasting there is some question, due to the high cost of operation, that sufficient savings have been shown. It has come to our attention, however, that in the case of the deepening of the bar at Coos Bay that the final accepted bid for the removal of the rock was approximately one million dollars short of the original U. S. Army Engineers' estimate. The difference was in the contractor's ability to dig the rock with a standard 20-inch pipe-line dredge--as against the engineers' estimate of removal by drilling and blasting. It has therefore occurred to us that if we can in some way establish the general type of rock that exists in the mouth of Yaquina Bay to be similar in nature to that which exists in the mouth of Coos Bay, we might be able to show sufficient reason to estimate the cost of this project on the basis of the experience gained at Coos Bay.

We have discussed this problem with a retired engineer who is familiar with both Yaquina and Coos Bay, and he indicates that to his knowledge the rock within the jetties in both cases is the same. In an effort to substantiate this viewpoint we thought there might be some literature available through your office which would show--first, some correllation between the two separate rivers in what I assume are tertiary sediments, and, secondly, some field work in the area to the northeast of the Yaquina bar where rock exposures occur on the beach and in the cliffs. The local stratigraphy might be extended and thereby determine through samples the general nature of the rock in the mouth of the jetties.

We realize that in the final analysis core drilling on the bar is the only solution; however, this is a difficult procedure, as well as being expensive. We feel that


# Yaquina Bay Dock & Dredge Co.

PHONE 612 P. O. BOX 245

NEWPORT, OREGON


some research should be undertaken to determine even the feasibility of core sampling.

I might indicate that any information gathered will be used only in connection with the petitioning of the U. S. Engineers for this improvement. If you might have any information which would be pertinent to this question we would certainly appreciate the opportunity either to meet with you at your convenience and discuss the situation, or if it appears in published pamphlet form, we would appreciate receiving that information and gladly pay any expenses thereby incurred.

I have no idea as to the scope of the duties of your office, but if you feel that any local field work might be of value in determining and answering our problem we would be glad to discuss that opportunity with you.

Sincerely,

TC:LC