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FOSSIL LOCALITIES OF LINCOLN COUNTY BEACHES, OREGON

By
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Geologic Picture

There are many fossils to be found in the old marine sediments which form cliffs behind the beaches of Lincoln County, Oregon. Particularly fossiliferous is the Astoria formation which crops out almost continuously along the coast from the town of Lincoln Beach south to Yaquina Bay. Its areal distribution is shown as the shaded portion on the accompanying map, and in this long narrow strip, fossils may be found in unweathered road cuts as well as along the beach cliffs.

The Astoria formation is composed chiefly of blue-gray sandstones and shales that were deposited during Miocene time, about 20 million years ago, when the shore line of the sea was somewhat east of its present position. The name "Astoria formation" is tentatively applied to these Miocene sediments in Lincoln County because of their similarity to the type Astoria formation at Astoria in Clatsop County, Oregon.

Shells of mollusks (see accompanying sketches) are concentrated in great numbers in certain layers of the Astoria sediments. Scattered through the formation are many large ball-like concretions which, when split open, expose masses of fossil shells. Occasionally concretions are found that contain the fossil bones of whales and sea lions.

Overlying the Astoria formation in many places along the coast are thick deposits of brown and yellow dune sands of Pleistocene or Recent origin. These non-fossiliferous sands are readily distinguished from the older sandstone by their distinctive color and general lack of consolidation.

Another fossil-bearing marine formation, older than the Astoria, crops out at Otter Rock State Park and along the east shore of Yaquina Bay. This is the buff-colored, iron-stained, Yaquina sandstone of Oligocene age. Fossils in the Yaquina sandstone are fairly abundant, but are not so well preserved as those in the Astoria formation.

Fossil Localities

Five of the best places to find fossils along the Lincoln County beaches are described below and their locations shown on the map (see next page).

1. Fogarty Creek

U.S. Highway 101 crosses Fogarty Creek 1.0 mile south of the Lincoln Beach post office. There is a parking space on the west side of the highway, immediately south of Fogarty Creek bridge, and a trail leads directly out to the beach. Fossils and concretions containing fossils can be found in the Astoria formation which forms the cliffs along the beach both north and south of the creek.

2. Depoe Bay

The fossiliferous Astoria formation crops out in the high cliff at the north end of the small inner bay, east of the highway bridge. The locality is easily reached by way of a road which follows around the north end of this bay to the Coast Guard Station at water level. The base of the cliff can be reached at low tide.

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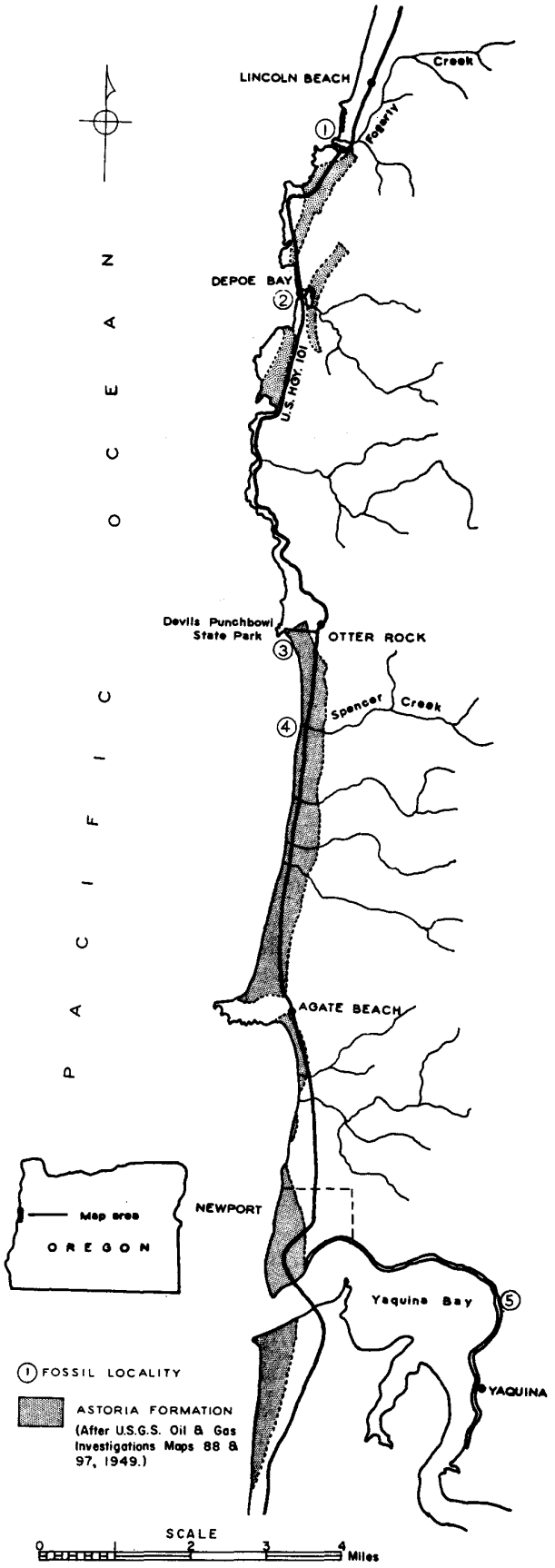
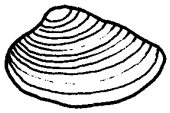
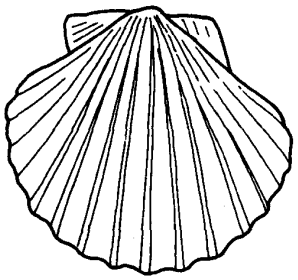
FOSSIL LOCALITIES AND TYPICAL FOSSILS OF LINCOLN COUNTY BEACHES, OREGON



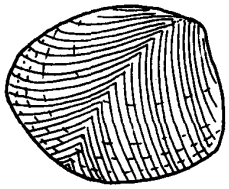
PELECYPODS



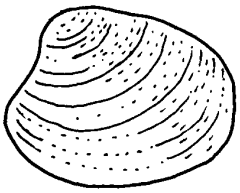
MACROCALLISTA



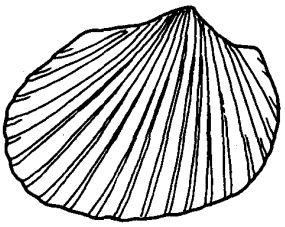
PECTEN



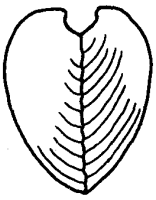
ACILA



MARCIA

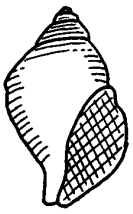


ANADARA

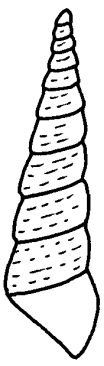


ANADARA (side view)

GASTROPODS



BRUCLARKIA



TURRITELLA

NATICA

3. Otter Rock.

Fossils can be found in the sea cliffs below Devils Punch Bowl State Park, which is 0.4 mile west of the highway at Otter Rock. A good foot trail leads down to the beach from the southeast corner of the park. Buff-colored Yaquina sandstone, which forms the high cliffs of the point, yields a few fossils. The blue-gray Astoria formation, containing only a few fossils at this particular locality, crops out at the foot of the trail and is continuous, and locally very fossiliferous, as far as Yaquina Head, 5 miles to the south.

4. Spencer Creek.

Many well-preserved fossils and concretions containing fossils can be found where the Astoria formation crops out in the cliffs behind the beach near the mouth of Spencer Creek. Highway 101 crosses Spencer Creek 1.2 miles south of Otter Rock. There is a parking area at the north end of the bridge, and a trail leads down to the beach. The Astoria sandstone forms the sea cliffs, and in places the floor of the beach, as far as Yaquina Head, 4 miles to the south. Throughout this distance the formation is very fossiliferous.

5. Yaquina Bay.

Cliffs at the east end of Yaquina Bay expose Yaquina sandstone in which fossils are abundant though fragile. The locality is reached by starting from the corner of Front and Bay streets in the old part of Newport on Yaquina Bay and following a narrow, surfaced road, which runs along the north and east shore of the bay, for a distance of 3.0 miles. Fossils are numerous in chunks of weathered rock beside the road at the base of the sandstone cliff.

Names of the Fossils

When a paleontologist discovers a new fossil, he gives it three names, two of which are Greek or Latin, and the third is his own name. For instance, a certain mollusk, which is very abundant along the Lincoln County beaches, has been named "Anadara devincta Conrad." The first name, Anadara, is the genus, denoting a group of fossils all members of which look something alike. Next comes the species name, devincta, which differentiates the fossil from all others of that genus. And last is the name of the paleontologist himself -- in this case, Conrad. After a description of the species has been published, the name is adopted internationally.

The amateur fossil hunter will find that it is very difficult to tell one species from another, but that it is fairly easy to identify the genus of a well-preserved specimen by carefully comparing it to pictures and descriptions in the literature.

Fossils which are found in greatest abundance along the Lincoln County beaches are the mollusks. Mollusks are a large family of animals having protective shells, the most common types being pelecypods and gastropods. These two important groups are easily differentiated: pelecypods have two shells and resemble clams; gastropods have one coiled shell and resemble snails. At least 60 species of fossil mollusks (pelecypods and gastropods in approximately equal numbers) have been found in the Astoria formation in Lincoln County and more than half that number in the Yaquina formation. All of these species have been described and most of them illustrated in the literature (see bibliography).

The names listed on page 24 represent only a few of the many species of pelecypods and gastropods characteristic of the Astoria and Yaquina formations. Some of these fossils are shown in the sketches opposite this page.

Astoria formation

Pelecypods:

Acila conradi Meek

Anadara devincta Conrad

Marcia angustifrons (Conrad)

Pecten propatulus Conrad

Gastropods:

Bruclarkia oregonensis (Conrad)

Ficus modestus Conrad

Natica oregonensis (Conrad)

Turritella oregonensis Conrad

Yaquina formation

Pelecypods:

Acila shumardi Dall

Nemocardium lincolnensis Weaver

Macrocallista pittsburgensis Dall

Thracia condoni Dall

Gastropods:

Bruclarkia columbiana (Anderson and Martin)

Fusinus lincolnensis Weaver

Calyptraea mammillaris Broderip

For many years fossil hunters, both amateur and professional, have been finding fossil bones of marine mammals in the outcrops of the Astoria formation along the Lincoln County beaches. Most of the bones have been identified as belonging to pinnipeds (seals and walruses), cetaceans (whales), and sirenians (sea cows). The majority of the finds have been separate parts of skeletons, such as skulls, jaw bones, and vertebrae. More rarely is an entire skeleton discovered. The best preserved specimens are generally found in the hard sandstone concretions. Among the mammals identified from the Astoria formation are the following:

Pinnipeds (seals and walruses)

Desmatophoca oregonensis Condon

Cetaceans (whales)

Cophocetus oregonensis Packard and Kellogg

Sirenians (sea cows)

Desmostylus cymatias Hannibal

Desmostylus hesperus Marsh (extinct species)

Remains of other vertebrate dwellers in the Miocene sea, which have been found in the Astoria formation, include a very large turtle skull, fish vertebrae, and shark teeth.

Maps of the Area

The following topographic and geologic maps of the area may be obtained from Distribution Section, Geological Survey, Denver Federal Center, Denver, Colorado, at prices indicated.

Topographic:

1. Cape Foulweather quadrangle, U.S. Geol. Survey, 1944. Price 20 cents.
2. Yaquina quadrangle, U.S. Geol. Survey, 1946. Price 20 cents.

Geologic:

1. The coastal area between Cape Kiwanda and Cape Foulweather, Oregon: U.S. Geol. Survey Oil and Gas Invest. Prelim. Map 97, 1949. Price 50 cents.
2. Geology of the Newport-Waldport area, Lincoln County, Oregon: U.S. Geol. Survey Oil and Gas Invest. Prelim. Map 88, 1949. Price 75 cents.

Bibliography

Many of the books listed below may be purchased from their publishers through local bookstores, and others may be consulted at public libraries. All may be seen at the Department's library in Portland.

General references on fossils

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Handbook of paleontology for beginners and amateurs: New York State Museum, Albany, New York, 1950.

Keen, A. M., and Frizzell, D. L.
Illustrated key to west North American pelecypod genera: Stanford Univ. Press, 1953.

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Etherington, Thomas J.
Stratigraphy and fauna of the Astoria Miocene of southwest Washington: Calif. Univ. Dept. Geol. Sci. Bull., vol. 20, no. 5, 1931. (Contains illustrations of Miocene fossils.)

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A new turtle from the marine Miocene of Oregon: Oreg. State Coll. Mon., Studies in Geol. No. 2, 1940.

A pinniped humerus from the Astoria Miocene of Oregon: Oreg. State Coll. Mon., Studies in Geol. No. 7, 1947.

Packard, Earl L., and Kellogg, Remington
A new Cetothere from the Miocene Astoria formation of Newport, Oregon: Carnegie Inst. Wash. Pub. 447, 1934.

Schenck, Hubert G.
Marine Oligocene of Oregon: Calif. Univ. Dept. Geol. Sci. Bull., vol. 16, no. 12, 1927.

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Nuculid bivalves of the genus Acila: Geol. Soc. Am. Spec. Paper 4, 1936.

Snavely, P. D., Jr., and Vokes, H. E.
The coastal area between Cape Kiwanda and Cape Foulweather, Oregon: U.S. Geol. Survey Oil and Gas Invest. Prelim. Map 97, with text, 1949.

Vokes, H. E., Norbisrath, Hans, and Snavely, P. D., Jr.
Geology of the Newport-Waldport area, Lincoln County, Oregon: U.S. Geol. Survey Oil and Gas Invest. Prelim. Map 88, with text, 1949.

Weaver, Charles E.
Tertiary stratigraphy of western Washington and northwestern Oregon: Wash. Univ. Pub. in Geol., vol. 4, 1937.

Paleontology of the marine Tertiary formations of Oregon and Washington, Parts 1, 2, and 3: Wash. Univ. Pub. in Geol., vol. 5, 1942.

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WORLD BAUXITE RESERVES

Engineering and Mining Journal, New York, November 1953, gives a resume of a talk given to the New York Section, A.I.M.E., by Irving Lipkowitz, Assistant to the President, Reynolds Metals Company, on bauxite reserves.

Mr. Lipkowitz stated that total world reserves were estimated at about 2.4 billion tons sufficient to last about 200 years at the 1952 rate of mining. Of this amount, about one-third is in Russia and satellite countries. He estimated that reserves in the United States total approximately 50 million tons. The present world figure is approximately twice the amount estimated at the beginning of World War II. The increase is the result of (1) intensive exploration for commercially high-grade ores, and (2) constant improvement of processes to make lower grades of ore commercially useable. Whereas in 1941 the industry was using bauxite with not more than 7 percent silica, at the present time improved processes have allowed commercial treatment of ores running 15 percent silica. Mr. Lipkowitz estimated that reserves of high aluminum-containing clays in the United States amounted to almost 3 billion tons. In answering questions concerning power potentials, he commented that as hydroelectric facilities require such a tremendous capital outlay which must be amortized over decades, the use of natural gas has been favored in recent years. Lipkowitz asked the hypothetical question: Why should we tie up our future? In a few years atomic energy may be used on a competitive commercial basis and smelting plants may be located close to ore supplies.

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A MARK TWAIN COMMENT ON GEOLOGY*

Since my own day on the Mississippi, cut-offs have been made at Hurricane Island, at Island 100, at Napoleon, Arkansas, at Walnut Bend, and at Council Bend. These shortened the river, in the aggregate, 67 miles. In my own time a cut-off was made at American Bend, which shortened the river 10 miles or more.

Therefore the Mississippi between Cairo and New Orleans was 1215 miles long 176 years ago. It was 1180 after the cut-off of 1722. It was 1040 after the American Bend cut-off. It has lost 67 miles since. Consequently, its length is only 973 miles at present.

Now, if I wanted to be one of those ponderous scientific people, and "let on" to prove what had occurred in the remote past by what had occurred in a given time in the recent past, or what will occur in the far future by what has occurred in late years, what an opportunity is here! Geology never had such a chance, nor such exact data to argue from! Nor "development of species," either! Glacial epochs are great things, but they are vague--vague. Please observe:

In the space of 176 years the Lower Mississippi has shortened itself 242 miles. That is an average of a trifle over one mile and a third per year. Therefore, any calm person, who is not blind or idiotic, can see that in the Old Oölitic Silurian Period, just a million years ago next November, the Lower Mississippi River was upward of 1,300,000 miles long, and

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*Taken from Life on the Mississippi.

stuck out over the Gulf of Mexico like a fishing rod. And by the same token any person can see that 742 years from now the Lower Mississippi will be only a mile and three-quarters long, and Cairo and New Orleans will have joined their streets together, and be plodding comfortably along under a single mayor and a mutual board of aldermen. There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact.

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NEW SOUTHERN OREGON CHROME MILLS REPORTED

Fitzpatrick Mill

A small concentrating mill located at the Umpqua Cottages on U.S. Highway 99 north of Canyonville, Douglas County, has been operating for several months. The mill is owned by G. W. and J. E. Fitzpatrick. Ore from several properties in the area has been treated.

Equipment at the mill consists of a jaw crusher, a ball mill, two cone classifiers, and two small homemade concentrating tables (4 x 10 and 3 x 5 feet). A larger table is being installed. The ball mill is operated by a Briggs and Stratton gasoline engine and the tables are driven by electric motors. This mill is estimated to have a maximum capacity of about 2 tons of concentrates a day.

Meyer Chromite Mill

Nick Meyer, Davenport, and Lester Shippen have recently completed constructing a concentrating mill on the north bank of the Umpqua River beside Gazley Road about 2½ miles northwest of Canyonville. Some ore from the Frozen Creek chromite deposit in sec. 19, T. 28 S., R. 4 W., is stockpiled at the mill. Equipment consists of a jaw crusher, a conveyor which transports ore from the jaw crusher to a ball mill, a cone classifier, and two large concentrating tables.

Lucky Nine Chrome Company Mill

H. R. Winston, Wayne Young, Daryl Cohl, Raymond Carson, Sealy Carson, Bernard Carson, Dorothy Kartes, Ed Collins, and Hurley Wilson are the incorporators of the Lucky Nine Chrome Company. This company has begun the construction of a concentrating mill about 2 miles west of Canyonville north of the road to Riddle. Ore from deposits in sec. 36, T. 30 S., R. 7 W., and sec. 20, T. 30 S., R. 6 W., will be treated.

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DEPARTMENT STUDIES HARPER RADIOACTIVITY

N. S. Wagner, Department field geologist at Baker, made a reconnaissance of mining claims on Cottonwood Creek south of Harper in northern Malheur County to investigate reports of radioactive minerals in the area. He obtained samples from the discovery claims owned by Messrs. Louis Hall and Lormand Wise and also a neighboring claim owned by Mr. Rathman. The samples were sent to Portland for testing in the Department's "radioassayer." They were all very low-grade in radioactivity, ranging from 0.005 to 0.015 U_3O_8 equivalent. No discrete uranium minerals were identified. Judging from the preliminary examination, radioactivity appears to be related to yellow fluorescence, and from previous experience this yellow fluorescence in eastern Oregon probably results from activation caused by some undetermined uranium salt. The uranium occurs in minute quantities in a fluorescent coating.

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MINERALS ALLOWED IN DMEA ASSISTANCE LIST

According to revised regulations which were published March 23, 1954, in the Federal Register, the following minerals will be the subject of exploration loans under DMEA:

(a) Government share 50 percent -

Bauxite, chromium, copper, fluorspar, graphite (crucible grade), lead, molybdenum, zinc, and cadmium.

(b) Government share 75 percent -

Antimony, asbestos (chrysotile only), beryl, cobalt, columbium, corundum, diamonds (industrial), kyanite (strategic), manganese, mercury, mica (strategic), monazite and rare earths, nickel, platinum-group metals, quartz crystal (piezo-electric), rutile-brookite, talc (block steatite), tantalum, thorium, tin, tungsten, and uranium.

Details concerning exploration loans and application forms may be obtained from the Defense Minerals Exploration Administration, So. 157 Howard Street, Spokane, Washington, as well as other DMEA offices.

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GOLD MARKET REOPENS IN LONDON

According to The Wall Street Journal, the London gold market reopened for trading on March 22, 1954, after a 15-year lapse. On this day, six British financiers clad in their accustomed uniform of black coats and striped trousers began buying and selling gold in the attempt by Great Britain to regain the pound sterling's prewar eminence in world finance. The London gold market has been closed since 1939 and all dealings in the metal have been handled by the Bank of England. Within a few minutes the six traders fixed a price for gold at 248 shillings and sixpence an ounce, about 20 cents under the United States official price of $35. The discount is due to freight charges between the United States and other parts of the world. Scene of the beginning of gold trading was the famous banking house of Rothschild & Sons. Joining in the trading were five banking and brokerage firms: Johnson Matthey & Co., Ltd.; Samuel Montague & Co., Ltd.; Mocatta & Goldsmith; Pixley & Abell; and Sharps & Wilkins.

Despite the fact that so-called free trading was resumed, there are still restrictions. A special government license is required for banks or individuals inside the British sterling area to buy the metal with sterling. Other purchasers are completely confined to residents of the United States or Canada holding sterling earned in authorized trade and to residents of nations outside the sterling and dollar areas who hold sterling bought with dollars or gold. Anybody, whether in or outside the sterling area, can sell gold. Thus there is no measure of convertability of pounds into gold or dollars that has not previously existed. It was announced that a large South African gold producer would start selling more of its output through the new London market.

The E&MJ Metal and Mineral Markets comments that London's move to restore free trading in gold merely gives bullion dealers the commissions they missed for so long. United States authorities are adamant as ever against similar action here.

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PINE CREEK PLACERS, EASTERN BAKER COUNTY

According to the Baker Record Courier, increased activity is planned for Pine Creek Placers in eastern Baker County. Pine Creek drains areas below the famous old Cornucopia gold mine. A 1200-foot cut will be run under contract to a depth of 65 feet to bedrock. Gravel from the cut will be run through sluices in order to test the gold values. If economic amounts of gold are recovered, the course of Pine Creek will be changed by converting the cut into a new channel so that the rest of the creek bed may be worked. Mr. R. M. Conley, formerly of California, is in charge of the work.

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