

STATE OF OREGON  
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES  
Head Office: 1069 State Office Bldg., Portland 1, Oregon  
Telephone: Capitol 6-2161, Ext. 488

2033 First Street  
Baker

Field Offices

239 S.E. "H" Street  
Grants Pass

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STRATIGRAPHIC IMPLICATIONS OF SOME CENOZOIC FORAMINIFERA  
FROM WESTERN OREGON\*

By  
R. E. Stewart\*\*  
*R. E. Stewart*  
OLIGOCENE

"Blakeley (?) zone" (upper Oligocene?): Reference has been made to an exposure of beds containing foraminifera of possible Blakeley age east of Astoria, Oregon (15, p. 74). The strata and fauna referred to are best developed in southwestern Washington and appear to be upper Oligocene in age and correlative with the Twin River beds farther north in Clallam County, Washington, and the type Blakeley formation of Bainbridge Island near Seattle.

EPOCH	FORMATION OR UNIT
Pleistocene	Elk River
Pliocene M or U L	Port Orford Empire
Miocene U M L	Astoria Nye
Oligocene U M L	Yaquina and "Blakeley (?)" U. Toledo (part) (?) U. Bastendorf and U. Toledo (part)
Eocene U	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> { U. Coaledo M. Coaledo L. Coaledo </div> <div> Remainder of Bastendorf and L. Toledo (Moody sh.)  (✓) Pulaski = Arago of Weaver et al.)  U. McIntosh of Washington </div> </div>
Eocene M	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> { Tyee Umpqua </div> <div> Yamhill-Sacchi Beach (= L. McIntosh)  ? =  of </div> </div>

Rau (14, pp. 426-427) gives a thorough discussion of Blakeley (?) strata in the Willapa River Valley, Pacific County, Washington. He points out that the transitional nature of its foraminiferal fauna between that of the Astoria formation and the Lincoln formation and the stratigraphic position of the type Blakeley in relation to the Lincoln formation in other regions suggest a correlation of these transitional beds with the type Blakeley, but so few typical Blakeley foraminifera have been found that the true relationship cannot be established definitely at this time. He, therefore, calls this stratigraphic interval the Blakeley (?) zone.

Figure 1. Generalized Stratigraphic Column on Some Western Oregon Marine Tertiary Formations. (Redrawn from Ore.-Bin, January 1956.)

Kleinpell (5, pp. 77, 111, 161, 163, fig. 14) has correlated foraminiferal faunules from the Blakeley formation of Washington with his California Zemorian Stage of lower Miocene age.

\* Continued from The Ore.-Bin, vol. 18, no. 1, January 1956.

\*\* Geologist, State of Oregon Department of Geology and Mineral Industries.

Rau (14, p. 424) has charted the following species, all of which are figured in his paper, as restricted to this Blakeley (?) zone in his Willapa River section: Anomalina sp., Bulimina sp., Dentalina sp., Elphidium minutum (Reuss), Robulus cf. calcar (Linne), Sigmoilina tenuis (Czjzek).

The following species, according to Rau's range chart, have lower limits of their ranges in the Willapa Valley Blakeley (?) zone: Bolivina floridana Cushman, B. marginata adelaidana Cushman and Kleinpell, Bulimina cf. ovata d'Orbigny, Buliminella subfusiformis Cushman, Cassidulina pulchella d'Orbigny, Cibicides aff. perlucida Nuttall, Eponides mansfieldi oregonensis Cushman, Stewart and Stewart, Globigerina bulloides d'Orbigny, Nonion costiferum (Cushman), Nonionella miocenica Cushman, Planulina astoriensis Cushman, Stewart and Stewart, Pseudoparrella parva (Cushman and Laiming), Robulus nikobarensis (Schwager), Uvigerinella californica ornata Cushman, U. obesa impolita Cushman and Laiming, Valvulinera araucana (d'Orbigny), V. menloensis Rau.

According to the same chart the following species have their upper range limits in the Blakeley (?) zone: Cassidulina galvinensis Cushman and Frizzell, Cibicides elmaensis Rau, Eponides umbonatus Reuss, Gaudryina alazanensis Cushman, Guttulina frankei Cushman and Ozawa, Gyroldina orbicularis planata Cushman, Karrerella washingtonensis Rau, Nodosaria grandis Reuss, Nonion ? cf. planatum Cushman and Thomas, Plectofrondicularia packardi multilineata Cushman and Simonson, Pseudoglandulina inflata (Bornemann), Pyrgo lupheri Rau, Quinqueloculina weaveri Rau, Sigmomorphina pseudoschenki Cushman and Ozawa, Spiroloculina texana Cushman and Ellisor, Uvigerina gallowayi Cushman.

Martinottiella communis (d'Orbigny), not mentioned by Rau, is quite characteristic of the Blakeley (?) zone, although its range extends upward into the lowermost Astoria formation and appears to go downward into the top of the Lincoln formation.

Yaquina formation (upper Oligocene ?): The Yaquina formation at its type locality east of Newport is sandstone. It contains a megafauna, but, to the best of the writer's knowledge, no foraminifera. About 15 miles to the south, however, in a highway cut approximately half a mile southwest of Waldport, foraminiferal shales occur in association with sandstones which Vokes, Norbistrath, and Snively (22 b) have mapped as Yaquina sandstone of upper Oligocene ("Blakeley" equivalent) age. Among the megafossils reported from this Waldport locality is Durham's (7b, p. 111, fig. 7) upper Oligocene (lower Blakeley) gastropod marker, Echinophoria rex (Tegland). The foraminiferal assemblage is essentially the same as one recorded by Heacock (16, pp. 13-43) from the upper 2325 feet of the Nye formation at Newport, and has several species in common with the Astoria formation. A partial list of the foraminifera from the Waldport locality is as follows: Anomolina glabrata Cushman, Bolivina advena Cushman, B. marginata Cushman, var. adelaidana Cushman and Kleinpell, Bulimina cf. ovata d'Orbigny, B. cf. pyrala d'Orbigny, Buliminella bassendorffensis Cushman and Parker, B. subfusiformis Cushman, Cassidulina laevigata d'Orbigny, var. carinata Cushman, C. margareta Karrer, Cibicides floridanus (Cushman), Chilostomella cf. oolina Schwager, Cyclammina sp., Dentalina cf. isidroensis Cushman and Renz, Glandulina cf. laevigata (d'Orbigny) var. ovata Cushman and Applin, Globigerina cf. bulloides d'Orbigny, Globobulimina cf. pacifica Cushman, var. oregonensis Cushman, Stewart and Stewart, Gyroldina scalata Garrett, G. soldanii d'Orbigny, Lagena (Oolina) striatula (Egger), L. aff. strumosa Reuss, L. substrata Williamson, Nodogenerina advena Cushman and Laiming, N. (Nodosaria) lapidula (Schwager), Nodosaria parexilis Cushman and K. C. Stewart, Nonion costiferum (Cushman), Nonionella miocenica Cushman, Plectofrondicularia miocenica Cushman, P. cf. vauhani Cushman, Pseudoglandulina (Glandulina) inflata (Bornemann), Quinqueloculina sp., Robulus inornatus (d'Orbigny), R. cf. mayi Cushman and Parker, R. cf. nikobarensis

(Schwager), Textularia sp., Uvigerina subperegrina Cushman and Kleinpell, Virgulina cf. californiensis Cushman. The identifications for this list are based primarily upon comparison with available published figures. It is believed that comparison with type specimens will eliminate the need for using "cf." in most cases.

The mapping of the Yaquina-Waldport area by Vokes, Norbistrath, and Snively (22b) is tentatively followed in assuming an upper Oligocene age for the Yaquina sandstone, although some discrepancy between their field and megafaunal evidence and the implications of the microfauna is indicated by the apparent Miocene affinities of the foraminiferal assemblage listed in the preceding paragraph.

Toledo formation (middle (?) and lower Oligocene and upper Eocene): Below the Yaquina formation in the Newport-Toledo area is the Toledo formation, whose lower member, the Moody shale, contains upper Eocene foraminifera (11, pp. 125-145). The portion of the Toledo formation which lies between the Yaquina formation and the Moody shale is here tentatively considered to be middle and lower Oligocene in age pending further study of the upper Toledo foraminifera.

Bastendorf formation (lower Oligocene and upper Eocene): At Bastendorf Beach between Tunnel Point and Yokam Point about 4 miles northeast of Cape Arago in Coos County, the Bastendorf formation has a thickness of approximately 3000 feet. The upper 2000 $\pm$  feet are well exposed in high sea cliffs, but the lower portion has been eroded almost to beach level and is not exposed.

The foraminifera of the Bastendorf shale appear to be related both upward toward the Oligocene and downward toward the Eocene.

The upper 700 $\pm$  feet of the Bastendorf Beach Bastendorf section and much of the Sunset Tunnel Keasey section contain the fauna used by Laiming to characterize his lower Oligocene zone "R" (Refugian stage).

The dominant affinities of the foraminifera of the exposed middle portion of the Bastendorf Beach section appear to be with the upper Eocene Coaledo fauna.

In other words, the Bastendorf foraminifera indicate lower Oligocene age for the upper 700 $\pm$  feet of the section and uppermost Eocene age for the remaining lower portion.

Upper Bastendorf beds (lower Oligocene): In designating his zone "R," Laiming states (6, p. 194):

"The uppermost zone here described and designated zone 'R' is characterized by the group of foraminifera figured by Cushman and Schenck (3, pls. 42-45) from the Bassendorf shale of Oregon, typical of the Refugian stage of the California Tertiary.

"Most characteristic for this zone are the occurrences of Uvigerina cocoaensis, 'Planulina' haydoni, Plectofrondicularia packardi and Bulimina sculptilis, the first two being confined to this zone."

The following foraminifera were figured from the "Bassendorf shale" in the Cushman and Schenck paper (3, pls. 42-45) cited by Laiming: Anomalina coalingensis Cushman and G.D. Hanna, Bulimina sculptilis Cushman, Cibicides hodgei Cushman and Schenck, Cyclamina

clarki ? (Hanna), Dentalina adolphina d'Orbigny, D. communis (?) d'Orbigny, D. consobrina d'Orbigny, Glandulina laevigata d'Orbigny, Guttulina byramensis (Cushman), G. problema d'Orbigny, Gyroidina soldanii d'Orbigny, var. octocamerata Cushman and G. D. Hanna, Nodosaria pyrula d'Orbigny, Planulina haydoni Cushman and Schenck, Plectofrondicularia packardi Cushman and Schenck, Robulus inornata (d'Orbigny), Uvigerina cocoaensis Cushman.

Detling (9, pp. 350-360) records and figures the following species from her uppermost Bastendorf stations 46 to 49 which appear to represent Laiming's zone "R" (asterisks mark species which on her range chart appear to be restricted to this part of the section): Bulimina cuneata (Cushman), Cassidulina globosa Hantken, Cibicides hodgei Cushman and Schenck, C. pseudo-wuellerstorfi Cole, Dentalina communis d'Orbigny, Eponides condoni Cushman and Schenck, Globigerina triloculinoides Plummer, \*Guttulina byramensis (Cushman), \*G. problema d'Orbigny, Nodogenerina bradyi Cushman, Nodosaria consobrina (d'Orbigny), \*Nonion umbilicatus (Montagu), Planulina haydoni Cushman and Schenck, Plectofrondicularia packardi Cushman and Schenck, Pseudoglandulina turbinata Detling, Robulus inornatus (d'Orbigny), Trochammina ? sp., \*Uvigerina atwilli Cushman and Simonson, U. cocoaensis Cushman, U. sp.

A list of additional species which the writer has observed in samples from this zone "R" portion of the Bastendorf formation includes: Bathysiphon eocenica Cushman and G. D. Hanna, Bulimina schencki Beck, B. sculptilis Cushman, var. laciniata Cushman and Parker, Ellipsodonta cf. cocoaensis (Cushman), Eponides condoni Cushman and Schenck, E. duprei Cushman and Schenck, E. kleinpellii Cushman and Frizzell, Lenticulina cf. crassa (d'Orbigny), Nodosaria grandis Reuss, Plectofrondicularia garzaensis Cushman and Siegfus, Robertina cf. angusta Cushman, Robulus chehalisensis Rau.

Essentially the same zone "R" fauna occurs in the Keasey formation of Columbia and Washington counties as in the upper Bastendorf beds at Bastendorf Beach. Cushman and Schenck (3, pp. 305-324, pls. 42-45) recorded both Keasey and Bastendorf assemblages in the paper cited by Laiming, but there appears to be some question as to whether their Keasey assemblage represents lower Oligocene or upper Eocene age. However, a typical lower Oligocene zone "R" fauna occurs in Keasey sediments which have been exposed in road cuts along Wolf Creek Highway east and west of Sunset Tunnel in northwestern Washington County.

## EOCENE

### Upper Eocene

As has been pointed out in the preceding discussion of Oligocene formations, both the Toledo and the Bastendorf formations are here considered to be partly Oligocene and partly Eocene in age.

An upper Eocene foraminiferal assemblage from the lower (Moody shale) member of the Toledo formation in Toledo, Lincoln County (11, pt. 6, pp. 125-145), and a very similar assemblage from beds at Helmick Hill in southeastern Polk County (10, pt. 5, pp. 93-111) have been recorded and figured by Cushman, Stewart and Stewart.

Detling (9, pp. 348-361) has recorded, figured, and indicated ranges for upper Eocene foraminifera from the portion of the Bastendorf formation which is exposed below the lower Oligocene zone "R" beds at Bastendorf Beach, and also from the underlying Coaledo formation which is exposed westward and southward along the coast to Point Arago.

Lincoln and Polk counties area

Moody shale (upper Eocene): The upper Eocene foraminiferal assemblage recorded and figured from the Moody shale in Toledo (11, pt. 6, pp. 125-145) is comprised of the following species: Bolivina basisenta Cushman and Stone, B. basisenta Cushman and Stone var. oregonensis Cushman, Stewart and Stewart, Cassidulina globosa Hantken, Cibicides howei Cushman and Todd, C. warreni Cushman, Stewart and Stewart, Dentalina cf. samanicus (W. Berry), Ellipsonodosaria sp. A, E. sp. B, Eponides minimus Cushman, Globobulimina pacifica Cushman var. oregonensis Cushman, Stewart and Stewart, Gyroidina scalata Garrett, Haplophragmoides sp., Lagena cf. costata (Williamson), Marginulina subbullata Hantken, Nodosaria chirana Cushman and Stone, Nonion florinense Cole, Planulina tolmani Cushman and Simonson, Plectofrondicularia searsi Cushman, Stewart and Stewart, P. vokesi Cushman, Stewart and Stewart, Robulus chiranus Cushman and Stone, R. inornatus (d'Orbigny), R. welchi Church, Saracenaria sp., Textularia ? sp., Uvigerina garzaensis Cushman and Siegfus, Valvulineria chirana Cushman and Stone.

The very similar assemblage recorded and figured by Cushman, Stewart and Stewart from upper Eocene beds at Helmick Hill (10, pt. 5, pp. 99-111) is comprised of the following species: Angulogerina hannai Beck, Bathysiphon eocenica Cushman and G. D. Hanna, Bolivina basisenta Cushman and Stone, Bulimina schencki Beck, Cassidulina globosa Hantken, Cibicides warreni Cushman, Stewart and Stewart, Cyclammina cf. acutidorsata (Hantken), Dentalina communis d'Orbigny, Ellipsonodosaria sp., Eponides minimus Cushman, Glandulina laevigata (d'Orbigny) var. ovata Cushman and Applin, Globobulimina pacifica Cushman var. oregonensis Cushman, Stewart and Stewart, Gyroidina cf. planulata Cushman and Renz, Lagena cf. acuticosta Reuss, L. cf. costata (Williamson), Marginulina cf. subbullata Hantken, Nodosaria cf. longiscata d'Orbigny, Nonion applini Howe and Wallace, N. florinense Cole, Nonionella jacksonensis Cushman, Plectofrondicularia oregonensis Cushman, Stewart and Stewart, P. packardi Cushman and Schenck, Robulus chiranus Cushman and Stone, R. inornatus (d'Orbigny), R. welchi Church, Sigmomorphina semitecta Reuss, Virgulina cf. zetina Cole.

Coos County coastal area

In the coastal section westward and southward from Tunnel Point to Cape Arago, upper Eocene sedimentation is represented, in descending stratigraphic order, by the middle and lower portions of the Bastendorf shale and the upper, middle, and lower members of the Coaledo formation.

Middle and lower Bastendorf formation (upper Eocene): The only appreciable thickness of unexposed strata in this upper Eocene coastal section is at the western end of Bastendorf Beach, where the lower 1000<sup>±</sup> feet of the Bastendorf shale has been eroded to beach level and is obscured by the valley fill of Miner Creek. Due to their apparent stratigraphic position between upper Eocene Bastendorf and Coaledo beds these unexposed lower Bastendorf strata are presumed also to be upper Eocene in age.

The 1300<sup>±</sup> feet of exposed middle Bastendorf strata are represented by Detling's stations 30 to 45 (9, fig. 1). From this stratigraphic interval she has recorded the following species of foraminifera (asterisk indicates a species which, on her range chart, is restricted to the Eocene portion of the Bastendorf formation): Bolivina cf. jacksonensis Cushman and Applin, Bulimina cuneata (Cushman), B. sp. B, Cibicides hodgei Cushman and Schenck, Cyclammina pacifica Beck, C. sp., Globigerina triloculinoides Plummer, Nodogenerina bradyi Cushman, Nodosaria

consobrina (d'Orbigny), N. cf. pyrula d'Orbigny, Nonion inflatum (Cushman and Ellis), Plectofrondicularia packardii Cushman and Schenck, P. packardii multilineata Cushman and Simonson, P. sp. A, P. sp. B, Pseudoglandulina turbinata Detling, Pseudopolymorphina ? sp., Robulus inornatus (d'Orbigny), \*Spiroloculina wilcoxensis Cushman and Garrett, Trochammina ? sp., Uvigerina garzaensis Cushman and Siegfus, Valvulineria tumeyensis Cushman and Simonson.

Among other species which the writer has observed in this middle Bastendorf association are: Bathysiphon cf. eocenica Cushman and G. D. Hanna, Bolivina cf. basisenta Cushman and Stone, Bulimina sculptilis Cushman, var. laciniata Cushman and Parker, Cassidulina globosa Hantken, Dentalina cf. communis d'Orbigny, Epistomina eocenica Cushman and M. A. Hanna, Globigerina cf. bulloides d'Orbigny, Gyroidina condoni (Cushman and Schenck), var. rotundiformis Cushman and Simonson, Plectofrondicularia garzaensis Cushman and Siegfus, Pseudoglandulina cf. inflata (Bornemann), Valvulineria cf. thomasi Cushman and Simonson.

Upper member of Coaledo formation (upper Eocene): The upper member of the Coaledo formation in its coastal exposure at Yokam Point west of Bastendorf Beach is predominantly coarse to fine-grained tuffaceous sandstone, with minor occurrences of sandy shale, carbonaceous sandstone and shale, and coal. Deposition appears to have been at relatively shallow depths in littoral and estuarine marine, brackish and fresh water. Foraminifera have been reported from only three restricted horizons in more than 1300 feet of these upper Coaledo sediments, and they are small and appear to have lived under very unfavorable environmental conditions.

Detling (9, pp. 348-361) records, figures, and indicates ranges for the following species of upper Coaledo foraminifera from her stations 28 and 29: Cibicides aff. baileyi Beck, \*C. fenestratus Detling, Cyclammina pacifica Beck, Nonion inflatum (Cushman and Ellis), Pseudopolymorphina ? sp., Quinqueloculina sp., Robulus inornatus (d'Orbigny), \*Saracenaria hantkeni (Cushman), \*Triloculina gibboei Beck, Uvigerina cocoaensis Cushman, \*Virgulina cf. hobsoni Beck.

The following species were recorded and figured by Cushman, Stewart and Stewart (10, pt. 3) from what appears to be the same upper Coaledo locality as Detling's station 29: Ammobaculites cf. hockleyensis Cushman and Applin, Angulogerina cf. hannai Beck, Bolivina basisenta Cushman and Stone, B. cf. kleinpelli Beck, Cibicides cf. cooperensis Cushman, Dentalina (?) sp., Eponides cf. minimus Cushman, Globobulimina pacifica Cushman, var. oregonensis Cushman, Stewart and Stewart, Gyroidina cf. planulata Cushman and Renz, G. sp., Nonion applini Howe and Wallace, N. cf. inexcavatum (Cushman and Applin), N. sp., Nonionella jacksonensis Cushman, Plectofrondicularia cf. searsi Cushman, Stewart and Stewart, Quinqueloculina cf. minuta Beck, Robulus inornatus (d'Orbigny).

Middle member of the Coaledo formation (upper Eocene): The middle member of the Coaledo formation, as exposed westward along the coast from the promontory of Yokam Point to that of Gregory Point (Arago Lighthouse), is predominantly tuffaceous shale with a few sandy lenses.

Detling (9, pp. 348-361) records, figures, and indicates ranges for the following foraminifera from her middle Coaledo stations 6 to 27: Bulimina cuneata Cushman, \*B. sp. A, B. sp. B, Cassidulina globosa Hantken, Cibicides aff. baileyi Beck, C. pseudowuellerstorfi CoLe, Cyclammina pacifica Beck, Dentalina communis (d'Orbigny), Discorbis ornatissima Cushman, Eponides condoni Cushman and Schenck, \*E. sp., Globigerina triculinoidea Plummer, Gyroidina cf. soldanii d'Orbigny, Nodogenerina bradyi Cushman, Nodosaria consobrina (d'Orbigny), N. cf. pyrula

d'Orbigny, Nonion inflatum (Cushman and Ellisor), \*Plectofrondicularia jenkinsi Church, P. packardi Cushman and Schenck, P. packardi Cushman and Schenck, var. multilineata Cushman and Simonson, Pseudopolymorphina ? sp., \*Quinqueloculina minuta, Beck, Q. sp., \*Robulus coaledoensis Detling, R. inornatus (d'Orbigny), \*R. welchi Church, Trochammina ? sp., Uvigerina garzaensis Cushman and Siegfus, Valvulineria tumeyensis Cushman and Simonson.

Lower member of Coaledo formation (upper Eocene): The foraminiferal fauna of the lower member of the Coaledo formation is essentially the same as that of the upper part of the McIntosh formation of southwestern Washington. In the Coaledo section exposed along the Oregon coast southward from Gregory Point (Arago Lighthouse) to Cape Arago and Five-mile creek, this fauna extends upward about 375 or 400 feet into the middle Coaledo as defined by Allen and Baldwin (7a, pp. 21-23, pl. 5).

Detling (9, figs. 1, 2, and text) has recorded, figured, and given ranges for the following species from the lower Coaledo: Bolivina cf. jacksonensis Cushman and Applin, Bulimina sp. B, Cyclammina pacifica Beck, C. sp., Discorbis ornatissima Cushman, \*Gyroidina cf. soldanii d'Orbigny, Nodogenerina bradyi Cushman, Nonion inflatum (Cushman and Ellisor), Plectofrondicularia packardi Cushman and Schenck, P. packardi multilineata Cushman and Simonson.

The following species have been recorded and figured from the lower Coaledo by Cushman, Stewart and Stewart (10, pt. 4): Angulogerina cooperensis Cushman, Cassidulina globosa Hantken, Cibicides natlandi Beck, var. olequaensis Beck, Cyclammina pacifica Beck, Dentalina cf. approximata Reuss, D. dusenburyi Beck, D. communis d'Orbigny, Ellipsonodosaria sp., Eponides ellisorae Garrett, Gaudryina sp. A, Gaudryina sp. B, Glandulina laevigata (d'Orbigny) var. ovata Cushman and Applin, Globobulimina pacifica Cushman var. oregonensis Cushman, Stewart and Stewart, Gyroidina cf. soldanii d'Orbigny, Lenticulina cf. theta Cole, Marginulina cf. subbullata Hantken, Nonion applini Howe and Wallace, Nonion danvillense Howe and Wallace, Planulina cf. haydoni Cushman and Schenck, Plectofrondicularia oregonense Cushman, Stewart and Stewart, P. searsi Cushman, Stewart and Stewart, Quinqueloculina imperialis Hanna and Hanna, Robulus inornatus (d'Orbigny), R. articulatus (Reuss) var. texanus (Cushman and Applin).

This series of articles will be concluded in a forthcoming issue of the Ore.-Bin by a discussion of the foraminifera of the Yamhill formation, the Saachi Beach beds, and the Tyee and Umpqua formations.

Anyone interested in obtaining a copy of the bibliography for these articles may do so by addressing a written request to the State of Oregon Department of Geology and Mineral Industries, 1069 State Office Building, Portland 1, Oregon.

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#### LAND DETERMINATION AREAS IN OREGON

The U.S. Forest Service notified the Department this month that one new area is to be examined for determination of surface rights under Public Law 167. The area, centering around Dooley Mountain, Baker County, is in addition to the ones noted in the May and June 1956 Ore.-Bin. The land to be examined is located in the National Forest in Tps. 11 and 12 S., Rs. 39, 40, and 41 E. The U.S. Bureau of Land Management states that no new areas are to be examined by them this month.

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## CHROME STOCKPILE PURCHASES EXTENDED

Office of Defense Mobilization Director Flemming has announced that the present chrome purchase program will be extended to June 30, 1959. Continuation of the program, originally scheduled to terminate at the end of June 1957, offers some assurance to the chrome miners of Oregon and California that they can continue to mine until such time as a workable long-range federal domestic minerals policy takes over. The need for continuing the program is apparent for it encourages further exploration by the present chrome producers and helps keep the prospectors in the hills. Both of these are necessary if the nation expects to maintain a domestic metallurgical grade chrome mining industry.

In making the announcement, Flemming noted that 101,000 long tons of chrome out of a goal of 200,000 long tons had been stockpiled since the purchase depot was established in August 1951. He stated that the purchase price (based on \$115 per ton of 48-percent  $\text{Cr}_2\text{O}_3$  lump ore with a 3:1 chrome-iron ratio) and location of the purchase depot at Grants Pass would remain the same.

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## MINING NEWS

The Oregon Chrome mine in Josephine County, operated by W. S. Robertson of Grants Pass, is currently shipping about 50 tons of chrome ore per day from the ore body opened up last fall. The ore is being trucked to the GSA buying station at Grants Pass.

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A promising low-grade, large-tonnage mercury prospect is being developed by John and Weyland Roush of Lakeview. The claims, named the Digmire claims, are located up Salt Creek in sec. 12, T. 38 S., R. 20 E., Lake County. The Roush brothers are part-owners of the White King uranium mine, Oregon's first uranium producer.

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The Opalite quicksilver mining district in southwestern Malheur County has again become active. Present work is concentrated in the vicinity of the old Bretz cinnabar mine which produced more than 10,000 flasks of mercury before it was abandoned in the early 1940's. The claims, originally staked by John Ruiz, were taken over last May by the Shawano Development Corporation. Comstock Uranium Company is building a furnace at the mine. Mining is to be done by Shawano Development Corporation and S. S. Arentz, operator. The cinnabar is disseminated through clayey tuffaceous lake sediments beneath an overburden averaging 20 to 30 feet thick.

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A DMEA loan has been granted for prospect exploration of cinnabar showings in Hope Butte in the Bully Creek area of Malheur County. Current plans call for a drilling program to be conducted on the north and northwest sides of the Butte. The property is owned by the Jordan brothers of Vale and has been under prospect exploration by H. K. Riddle, lessee, since last fall.

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The Great Lakes Carbon Company has returned to the Otis Basin area of Harney County and is engaged in exploration of diatomite-bearing terrain in an area to the east of that tested last year. Large-diameter holes are being drilled as a means of exposing the diatomite for examination and sampling.

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### GEOLOGIST ADDED TO STAFF

The Department has added a second geologist to its staff at the Baker field office. The position, authorized by the last session of the Legislature, became necessary due to the great increase in exploration for uranium, oil and gas, and work on the State Geologic Map in eastern Oregon.

The new geologist, Howard C. Brooks, graduated from Idaho State College, Pocatello, Idaho, in 1953 and has just received a Master of Science degree from the Mackay School of Mines, Reno, Nevada. His masters thesis was concerned with a Nevada uranium prospect now under lease and being explored by the Homestake Mining Company. While in Nevada, Mr. Brooks was an assistant in the analytical laboratory of the State of Nevada Bureau of Mines. Previous to attending the Mackay School of Mines, Mr. Brooks was a geologist with Westvaco Chemical Company.

The Baker field office of the Department, located at 2033 First Street, was established shortly after the Department was founded in 1937 and has been in charge of Mr. N.S. Wagner since 1942.

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### DEPARTMENT FIELD ACTIVITIES

Dr. Wallace D. Lowry, Professor of Geology at Virginia Polytechnic Institute and former Department staff member, is geologically mapping the Ironside Mountain quadrangle of east-central Oregon. Dr. Lowry was retained by the Department for the summer to prepare a geologic map of the area for publication and to do reconnaissance work in central Oregon for the State Geologic Map.

Mr. R. E. Corcoran has been mapping in the Mitchell Butte quadrangle of southeastern Oregon. During July and August he will be working in the Northern Cascades and will return to southeastern Oregon in the fall.

Mr. Herbert G. Schlicker is doing State Geologic Map work in the Central Cascades near Eugene.

Mr. Max Schafer is continuing his studies on uranium occurrences in the State. Several properties in central and southeastern Oregon have been visited and geologic mapping is being done near the White King uranium mine northwest of Lakeview.

Mr. Len Ramp is completing his studies on the occurrence of chrome in southwestern Oregon. This is the fourth year of this study and a bulletin on his findings is to be issued.

Messrs. N. S. Wagner and Howard Brooks of the Baker field office are doing reconnaissance mapping in eastern Oregon for the State Geologic Map.

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### TRIMBLE COMPLETES FIELD WORK

Mr. Donald E. Trimble, geologist with the U.S. Geological Survey, reports that the project of the Engineering Geology Branch in the Portland industrial area begun in 1948 was completed this June. The project area comprised the Camas, Portland, Hillsboro, Oregon City, and Boring 15-minute quadrangles. All field work was done by Mr. Trimble. It included mapping of both bedrock and surficial units, the results of which will be published as composite maps. Publication plans include a Survey bulletin on the entire project area and a Geologic Quadrangle Map series publication on the Portland quadrangle. Mr. Trimble reports that it is not likely the bulletin will be published for several years but the map series publication on the Portland quadrangle is now in draft form and may be ready for distribution within a year.

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## SURVEY GEOLOGISTS IN OREGON

The U.S. Geological Survey has several field parties in Oregon this summer making geological investigations for the State Geologic Map, a cooperative project with the State of Oregon Department of Geology and Mineral Industries. Dr. Francis G. Wells, who is in charge of the Survey's program on the map, is in southwestern Oregon accompanied by Mr. David Brooks. Dallas Peck is continuing his field work started last summer in the Western Cascades. Professor Aaron Waters of Johns Hopkins University, on temporary duty with the Survey, is completing his work in the Columbia Gorge and will work in the Mt. Hood area. Dr. Roland Brown, assisted by Jack Wolfe, is making paleobotanical collections to assist the field geologists in their mapping. Dr. Ralph Imlay, Survey authority on the Mesozoic formations, will do field work in Curry County and in central Oregon. Present plans for the State Geologic Map are to complete the field mapping in Oregon west of 121° longitude this summer. A black and white preliminary geologic map of western Oregon should be available the middle of 1957.

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## NEW OCCURRENCE OF BAUXITE NEAR PORTLAND

An interesting new occurrence of ferruginous bauxite was examined recently by the Department in the vicinity of Garden Home, a suburb of Portland. Location of the occurrence is NE $\frac{1}{4}$  NW $\frac{1}{4}$  sec. 25, T. 1 S., R. 1 W., where the exposure is in an old railroad cut. The material is the reddish-brown pisolitic variety typical of that found in the deposits in Washington and Columbia counties several miles to the north and northwest. A chemical assay of the bauxite by the Department gave the following results: Al<sub>2</sub>O<sub>3</sub>, 40.13 percent; SiO<sub>2</sub>, 4.12 percent; Fe<sub>2</sub>O<sub>3</sub>, 25.78 percent; TiO<sub>2</sub>, 4.32 percent; loss on ignition, 25.65 percent. The road cut has weathered considerably and no fresh rock is exposed beneath the bauxite. The bauxite zone appears to be at least 3 to 4 feet thick and drilling may show a much greater actual thickness.

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## GEOLOGY OF URANIUM AND THORIUM PUBLISHED BY U.S.G.S.

A comprehensive volume on the geology of uranium and thorium and methods of prospecting for radioactive ores has been published by the U.S. Geological Survey as Professional Paper 300. The volume is an outcome of the joint program carried on since 1944 by the Atomic Energy Commission and the Geological Survey to study atomic energy resources of the United States. This program has been successful in finding reserves of fissionable materials far beyond early expectations and in adding a large volume of valuable data to the sum of geologic knowledge.

Professional Paper 300 is a compilation of 89 reports by 133 scientists. It is entitled "Contributions to the geology of uranium and thorium by the United States Geological Survey and Atomic Energy Commission for the United Nations International Conference on Peaceful Uses of Atomic Energy, Geneva, Switzerland, 1955." There are 739 pages, 235 illustrations, and an extensive subject index. Copies may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. Price is \$6.00.

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## PURCHASE PROGRAM BILL

Senate Bill 3982, to allow for the purchase of 1 $\frac{1}{4}$  million units of tungsten at \$55 per unit, 250,000 tons of fluorspar at \$53 per ton, and 250,000 pounds of columbium-tantalum-bearing ores at previously established prices, is awaiting the President's signature.

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