

THE RELOCATION OF GEOLOGIC LOCALES IN ASTORIA, OREGON*

By Betty Rae Dodds

The growth of the City of Astoria during the past 100 years has had a serious effect on the study of the geological type section of the Miocene upon which Astoria is built and which it therefore partially conceals.

The first visit to Astoria by a geologist was in 1841 when James Dana, who accompanied the Charles Wilkes Expedition which was formed to estimate the capacities of the Oregon Country, collected the first Miocene fossils found on the west coast of North America from the "beach near Astoria" (Dana, 1849). J. K. Townsend obtained fossils from the same area in 1842. The published description of the rocks and the associated fossils in these collections caused Astoria to become a type section for the marine Miocene of the West Coast. Throughout the intervening 120 years, geologists have correlated Tertiary stratigraphic sections from other locations on the Pacific Coast with the section exposed at Astoria.

The circumstance that a populous town has developed exactly upon the site of a geological type section has advantages, but these are interwoven with frustrating difficulties. The frequent exposure of fresh rock in road cuts and in the excavations required for building has offered periodic opportunities for the study of previously covered sections. However, the rapid masking of described exposures and the frequent removal of seemingly stable reference points has caused confusion. Present day investigators find it difficult to locate themselves according to past authors. When they finally believe themselves properly situated, they may in fact be many blocks from their desired position. During the history of the city, the street names and numbers have been changed, shuffled, and removed. The two Spruce Streets of the 1880's, one running north-south and the other east-west, disappeared in 1899. Before 1899, Astor Street was the present Exchange Street. The present Astor Street lies four blocks north. Obviously, it is necessary to know whether or not an Astor Street collecting locale, for instance, was described before or after 1899. Such dating is vital.

It is the purpose of this paper, through a brief review of the history of Astoria, to construct a framework of the physical history of the city, to place each published geologist in his correct historical setting within the city, and to reestablish his

— Mrs. Dodds is a native Astorian, a graduate of the University of Oregon, and wife of Kenneth Dodds, geologist, whose thesis area was the Svensen quadrangle just east of Astoria. His attempt to find the old fossil sites in Astoria, some of which were geologically famous long before that point of land became a town, was the inspiration for Mrs. Dodd's interesting and valuable piece of research.

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locales so as to be presently useful.

The practical history of Astoria begins with the 1805-06 Lewis and Clark Expedition, which wintered not far from the present location of the town. It was largely its accounting which convinced John Jacob Astor that a fur-trading fort on the Astoria peninsula would be a worthwhile venture. This was accomplished in 1811 with the building of Fort Astor. The men who lived in the fort were such a long distance from ordered civilization that, when the English appeared during the War of 1812 and suggested that they surrender, they complied immediately. So, in 1813, American Fort Astor became English Fort George. However, the fact that the American flag had flown first over this western-most establishment became an important and winning argument in the ensuing battle over territorial rights between the United States and England. By 1818, Fort George was the establishment of Astoria but there were neither Englishmen nor Americans on the site. It had been completely abandoned.

In 1825-26, a young man named John McLaughlin was sent by the Hudson's Bay Co. to establish a fur-trading post and fort on the Astoria peninsula. After a brief reconnaissance, he concluded that Astoria was too far from the center of the territory, and he moved up-river where he built Fort Vancouver. He left one man in Astoria to gather the furs as they were brought to him by the Indians and to send these furs to Vancouver. Astoria, after the initial excitement of Lewis and Clark, the English and Americans, and finally, Dr. McLaughlin, returned to its original calm. It was during this low period that one boat of the Charles Wilkes Expedition ran aground on the sandbar off Astoria.

James Dwight Dana was the geologist who accompanied the expedition to the Pacific Northwest. The name of James Dana is well known and greatly respected by geologists, not only for his personal skill in the field but for his system of mineralogy. He was a young man when he stepped from an Indian canoe which came to rescue the beached members of the Wilkes Expedition. It was 1841. At that time Astoria was described as:

"... a miserable squatter's place, invested by the rival American and English factions with the pompous name of Fort George and Town of Astoria, the fort being represented by a bald spot, from which all vestige of buildings had long since disappeared, and the town by a cabin and a shed." (Lockley, 1928, p. 226).

The white population numbered one. He was the Hudson's Bay lookout and trader who lived in the company cabin on the site of the old fort near the present St. Mary's Hospital. This area, at what is now 15th and Exchange, was in 1841 on a slight promontory with a sea cliff to the north and small bays on either side (see figure 1). The "cabin and a shed" were also on this high ground and it was from here that James Dana walked the beaches east towards Tongue Point and west towards Smith Point, to study the exposed rocks.

They were difficult hikes. There were rock-strewn beaches up-river towards Tongue Point, some of them exposed only at low tide. The deep forest in many places extended to the water's edge and the tangled underbrush discouraged its penetration. Down river were a series of small bays with rock and sand beaches

and a high, forest-covered sea cliff, which plunged into deep water at its base and which had to be sailed around to reach the narrow beach which ended eventually at Smith Point. From here, one can see the ocean and the waves breaking on the treacherous sandbars at the mouth of the Columbia. In spite of the remoteness of the country and the difficulties involved in traversing it, Dana collected some representative fossils and thoroughly described the rock exposures he examined along the river. He was able to preserve the Astoria collection during the rest of the long journey, and later published the description of the exposures in which he found them (Dana, 1849). So began Astoria's geological interest.

In 1844 James Shively took up residence on his Donation Land Claim on the ground surrounding the Hudson's Bay property. Within a year, there arrived Colonel John McClure, who settled down river to the west, and Colonel John Adair, who made his claim up river to the east of Shively. Each of these proud and independent gentlemen platted a portion of his land for a future town. Each was planned and filed separately. The streets were not arranged to join what would be the same street in the next claim, nor were the names co-ordinated to be consistent from one claim to the other. Neither was street-name duplication avoided; there were two Spruce Streets, two Cedar Streets.

There is a special breed of man who will take a plot of land in the wilderness and confidently proceed to plan a city designed to grow upon his property. Mr. Shively and Colonels Adair and McClure were of this breed. Independently, each had his own idea of a claim-sized town in this remote spot - a dream of considerable proportion. Each was far-sighted, but not one of the three could foresee that the plans would be incorporated into one another and extended. The peculiar appearance of parts of the city map is due, not to landsliding as has been suspected, but to the laying of the streets as originally platted using whatever jogs or omissions were necessary to join the streets in approximate regularity. Because Shively had platted his blocks larger than either McClure or Adair, there is no room for Harrison Avenue between 13th and 23rd Streets (see maps, pages 122 and 123). Shively and McClure regarded one another with some contempt. However, they did agree on one point, which was that there would be an uninhabited wild area between their claims. This area corresponds to what should be 13th Street in the present city, and the elusive, irregular character of 13th Street has caused the city planners a number of headaches. The jumble of street names persisted until 1899 and until that time it was important to have explicit directions. The terms "Shively's Astoria," "McClure's Astoria," and "Adair's Astoria" were commonly used to denote addresses and buildings. These terms persisted into the 1920's and they are still used infrequently.

By the year 1850 the population had grown, as it had in much of the West, and the inhabitants of Astoria were separated into two small communities. One group lived on Adair's claim, called either Upper Town or, derisively, "Adairsville" by the other group which lived on McClure's claim, called Lower Town. There was great rivalry between the two settlements. Upper Town fought for and won the first Customs House, while Lower Town managed to gain the Post Office. Each of these government offices was the first of its kind to be established west of the Rocky Mountains.

The city was incorporated in 1856 and the limits set. The city included all

of Shively's claim and the eastern part of McClure's claim. A fossil collected by John Evans, United States Geological Survey geologist, and described by B. F. Shumard (1858), was said to have come from "the shores of the Columbia a short distance above Astoria, Oregon." The date of Dr. Evans' visit was 1851 and the described location was probably up-river from the present 19th Street.

Until about 1860 the population remained small. Lower Town was separated from Upper Town not only by the bay which necessitated the use of a rowboat to go from one area to the other, but by the aforementioned rivalry which prevented any accord. Each group had wonderful paper plans involving tree-shaded avenues and beautiful public buildings for its own part of the peninsula. The people seemed blind to the fact that Upper Town consisted of a few rough plank buildings at the edge of the water, and Lower Town of an army barracks and some small houses (see figure 2). At the same time, neither group was yet able to foresee that the peninsula was to become one town incorporating both areas. However, by 1870 the population had grown a great deal. There were many landowners to take advantage of the sale of waterfront property. The sale occurred in 1872 when the State of Oregon, which until this time owned all the land between high and low water marks, offered to sell it to the landowners who owned the waterfront property. Immediately, wharves and buildings on pilings were erected, and this spurred a prosperity which in turn encouraged a rapid growth of population. Because of a lack of level land, most of the business district began to be built on pilings over the water.

In 1876 the Astoria city limits were expanded to include all of the Shively and McClure claims, extending from the summit of the hill to the Columbia River, in addition to the corresponding area on the south side of the hill facing Young's Bay. The metropolitan district continued its growth on the river side of the hill. In 1878 the first road was built connecting the Upper and Lower Astorias.

Thomas Condon, Oregon's first State Geologist, came to Astoria during these early years. His collection of fossils is preserved at the University of Oregon in Eugene and they are labeled, unfortunately for our purposes, "In loose concretions near the water level at Astoria, Oregon." The water level in 1878 was at the original waterfront, but it was greatly altered even then by the constructions which had taken place on the shore and over the water (see figure 3). The city limits extended from the present 2nd to 32nd Streets and the original beach and river cliffs beyond these boundaries were certainly exposed. The Smith Point area at the westernmost end of the peninsula was unaltered, as were the "Astoria beds" in whatever area they may finally be located. We have no direct indications as to the specific water level areas in which Dr. Condon found fossils, but they were very likely east of 32nd Street, west of 2nd Street, and very probably in the bay area between 19th and 23rd Streets.

In 1883 Astoria suffered a large downtown fire, but this was a prosperous era and the town was quickly rebuilt. The use of waterfront fills dates from this time. However, without modern equipment, only a few central beach areas were covered with sand filling and the whole downtown area was rebuilt as it had been before - on pilings above the water (see figure 4). In 1890 when W. H. Dall, geologist with the United States Geological Survey, came to Astoria, the so-called "Astoria beds" were inaccessible. These beds had provided a few samples of a lovely,

distinctive, Eocene-Oligocene cephalopod which every geologist-visitor to Astoria since 1878 has wanted to find. Dall believed the *Aturia* beds to be at the water level in the vicinity of the filled-in area that is now Gyro field, between 19th and 23rd Streets, but he was unable to find them. He was able to investigate the strata on Smith Point, which for many years now has been covered.

A burst of civic confidence in 1891 resulted in the extension of the city limits to include a great area. The city was bounded by the Columbia River, John Day River, Young's Bay and River, and a line connecting the John Day and Young's Rivers (far outside the area of the map). These boundaries were in force when U.S.G.S. Geologist Joseph Silas Diller arrived in Astoria in 1894. He, his aid, and a cook had mules fitted out in Forest Grove and made the arduous trip over the Coast Range by the old Military Trail. In the report of his reconnaissance of the geology of Northwestern Oregon (1896), he includes Plate IX opposite page 470 which is described as "From a photograph taken near the High School building in Astoria." During its history, Astoria has built three high schools. A present reference to the high school refers to the school built in 1957 on West Marine Drive near Young's Bay, while the "old high school" is located at 16th and Jerome and at present houses the Community College. In the 1920's, this was "the high school" while "the old high school" was the McClure School, located in the block bounded by the present 7th and 8th Streets and by Grand and Franklin Avenues. At present the block is a playground. The exposure in the photograph was not located, but was very likely one block south (up the hill) on Harrison Avenue, where there is a fairly high bluff.

In 1899 the city limits were changed again. They have remained stable since that time. That was also the year which saw a partial solution of the confusion caused by the unrelated street names in the three original town plats. The streets in the main part of town were alphabetically named from east to west - A for Astor Street at the Columbia River to N for Niagara at the summit of the hill. The north-south streets were numbered from 1st Street, immediately west of McClure's claim, to 40th Street, some 15 blocks within the eastern city limits. Notably, the numbering system omitted 13th Street, which is at the point where the claims of McClure and Shively meet. The lot-numbering system provided for 50 numbers to a block, that is: block One had numbers 1 to 49, block Two, 50 to 99, and so forth. Therefore, across town, there were two blocks with numbers in the five hundreds, two blocks with numbers in the six hundreds, etc. However, it must be remembered that there was no 13th Street, so from 11th to 12th Streets was the 500 to 549 block and from 12th to 14th Streets was regarded as a single block with numbers 550 to 599. The reason for listing all of these numbers becomes obvious when one is attempting to find a locale described as "opposite 1774 Franklin Street," especially because this numbering system ended in 1955, and so 1774 Franklin is now 3658 Franklin. Today "opposite 1774 Franklin" is 19 blocks away from the true, intended location!

The general street plan as sketched above was in effect when Chester Washburne studied the Astoria area several times between 1900 and 1905, and again in 1910. The locales listed by Washburne (1914) are still valid where they are indicated by Street and Avenue, such as "5314, Tenth and Harrison Streets," or "5322, Irving Avenue and 34th Streets." But, because of the change effected in 1955 of

numbering each block by hundreds and this time including a 13th Street, many of the locales need to be relocated. Too, some of the reference points used in the work have disappeared and an attempt must be made to replace these references with present-day landmarks.

The accompanying list of Astoria locales includes those in Washburne's paper and gives, wherever possible, an indication of the present availability of exposures.

Washburne, in the body of his Astoria description, uses a brick kiln as a reference point for a number of locations. For instance, "three blocks east of the brick kiln" and "two blocks east of the last location." Unfortunately, the brick kiln and all vestiges of it have completely disappeared, no doubt because, as Mr. Washburne remarked, the quality of the bricks was so terrible. Through discussions with an elderly woman of the area, the writer has tentatively placed the brick kiln between Birch and Ash Streets near 45th Street in the eastern part of town. It must be mentioned too, that the main road from 45th Street to the town gates was along Birch Street through a section of town known locally as Alderbrook, and was not one block south on the present U.S. Highway 30. Therefore, the exposures which Washburne saw were ones existing some 50 years ago at the base of the cliff on which U.S. Highway 30 is built, and not exposures along the present main highway. Some of the present cuts offer very good exposures. Another reference point used by Washburne and by subsequent authors is the Hammond Lumber Mill, which was a mammoth building erected on pilings over the water at 53rd Street near the city limits. It burned long ago, but one may still see the remains of it at low tide when hundreds of pilings are exposed.

In the years 1900 to 1910 the Smith Point waterlevel exposure was covered with basalt talus and Washburne could not find any good fossils such as Dall had found in 1890. Nor could he find the Aturia zone, but he believed such beds would be found between 30th and 40th Streets, whereas Dall would have expected them between 19th and 23rd.

Arnold and Hannibal (1913) list four locales in Astoria. These four are also included on the accompanying list, together with comments upon the availability of present exposure.

H. V. Howe worked the Astoria area during the summer of 1921 and published parts of this work in 1926. He often uses street names and numbers as references, such as "Bond and Hume" or "19th and Grand" and these remain true indicators of location. Some of his other reference points, such as the Hammond Mill, are no longer adequate. One of his locales "outside the city limits, and about one and one-half blocks south of the Hammond Lumber Mill" refers to an exposure outside the eastern city limits along the former U.S. Highway 30, which now leads into the Tongue Point area. It is not known why he correlates these beds with the ones pictured by Diller (1896) on Plate IX. The High School in 1894 was far from the eastern city limits and it is definitely the High School to which Diller links his plate. It is easily possible to find the areas in Howe's work. It is far more difficult to find an exposure in these places. He discusses the original beach at Smith Point, now no longer available; he meticulously describes a band of green sand at 14th and Irving, now covered by a large concrete bulkhead; land slumping has disguised the described slopes at both 5th and Commercial Streets and 5th and Duane.



Figure 1. Astoria in the 1840's. Tongue Point is in the middle left. The large house is the Hudson's Bay building on the site of the present St. Mary's Hospital. Notice particularly the bay in the right foreground. (Courtesy, Oregon Historical Society)



Figure 2. Astoria in 1856. The building marked 4 is the Hudson's Bay Commissary, as on Figure 1. House No. 7 is Shively's home. The other buildings are shops, army buildings, private homes, and a church. (Courtesy, Oregon Historical Society)

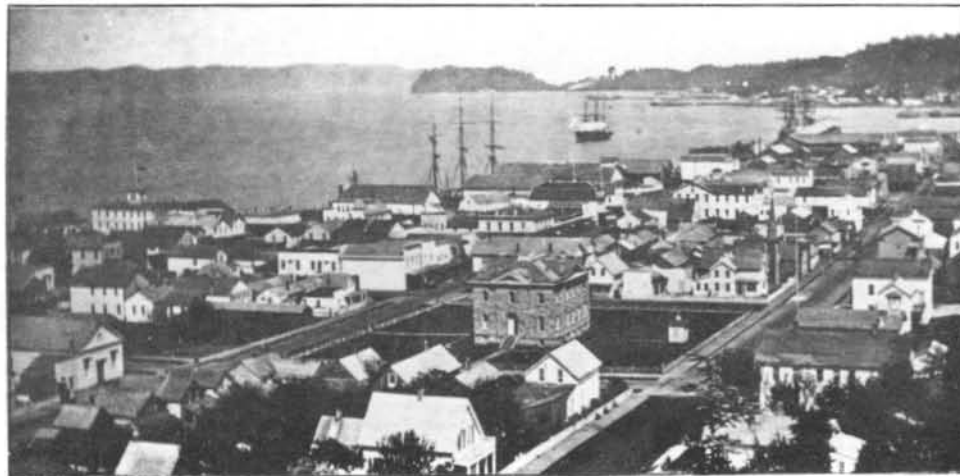


Figure 3. Astoria about 1881. Before the fire of 1883. The gray stone building in the foreground is the Post Office. The streets are wooden planks built on pilings. At upper right is the bay as in figures 1 and 2, and is still open water. (Courtesy, Oregon Historical Society)



Figure 4. Astoria as rebuilt after the fire of 1883. The gray stone building in the foreground is the Post Office. The bay area as on figures 1, 2, and 3 is bridged over. The arrow marks the site of the Hudson's Bay - St. Mary's Hospital block. Shively's house is to the right and uphill from here. The blocks of buildings are built on pilings over the water between the Post Office and St. Mary's, which are on solid land. (Photo by Snodgrass, courtesy, Oregon Historical Society)

On a December morning of 1922, a raging fire broke out in downtown Astoria. The flames licked around the pilings, roared along the wooden streets, and toppled frame buildings into the hissing water. Amid cries of dismay and screams of terror, the famous hotels, shops, and landmarks of "Old Astoria" twisted into blackened ruins. When the flames died and the embers cooled, it was found that nearly 40 acres of the business district was completely destroyed (see figure 5). It was then that the extensive filling began which has completely buried the original shoreline. The watery areas between 8th and 23rd Streets and from the present waterfront as far back as Franklin Avenue, as in the Gyro field-19th to 23rd Streets section, were buried under many feet of dredgings. This was an extensive reclamation project which provided a great level area for the construction of the modern business district (see figure 6). At the same time, the filling has forever ruined the chances of the geological investigation of the original waterfront as James Dana described it in 1841.

The significant change effected by the city planners in 1955 when the blocks were re-numbered by hundreds, was accompanied by certain street name changes. In the western end of town, Taylor Avenue which circumscribed Smith Point was changed to West Marine Drive. At 1st Street, West Marine becomes Marine Drive and changes finally at 32nd Street into Lief Erickson Drive. The change has eliminated not only Taylor Avenue but portions of Astor, Bond, Commercial Streets, Franklin Avenue, and again Commercial Street in a west to east traverse along the Columbia River.

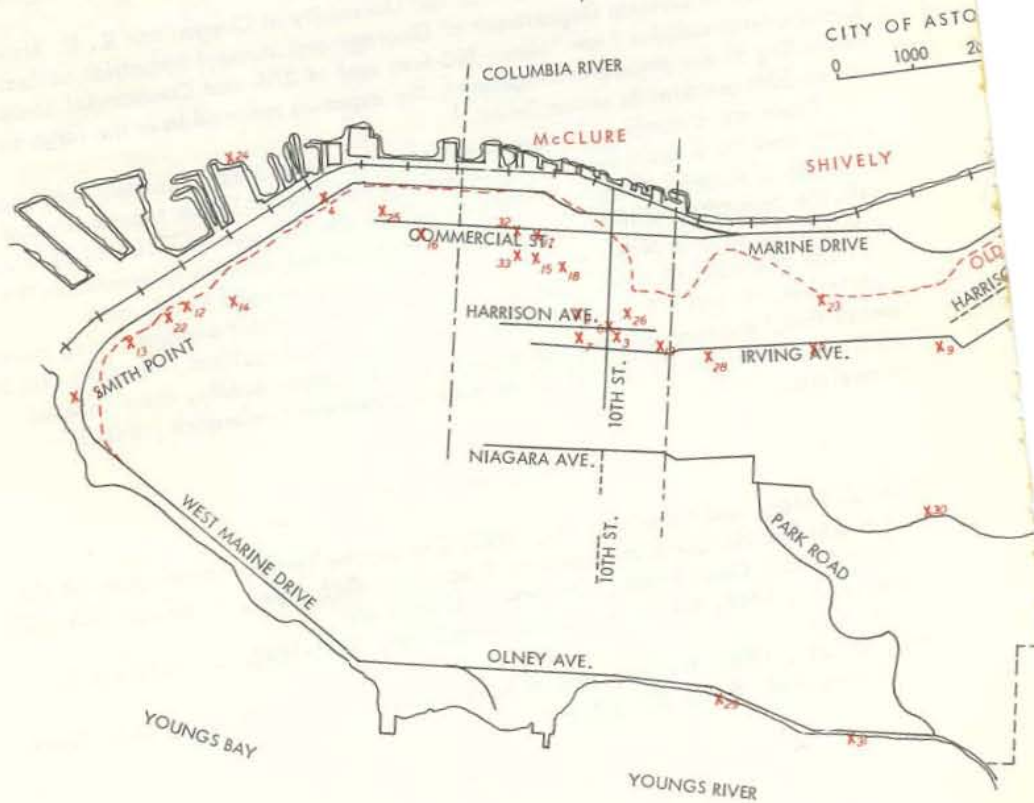
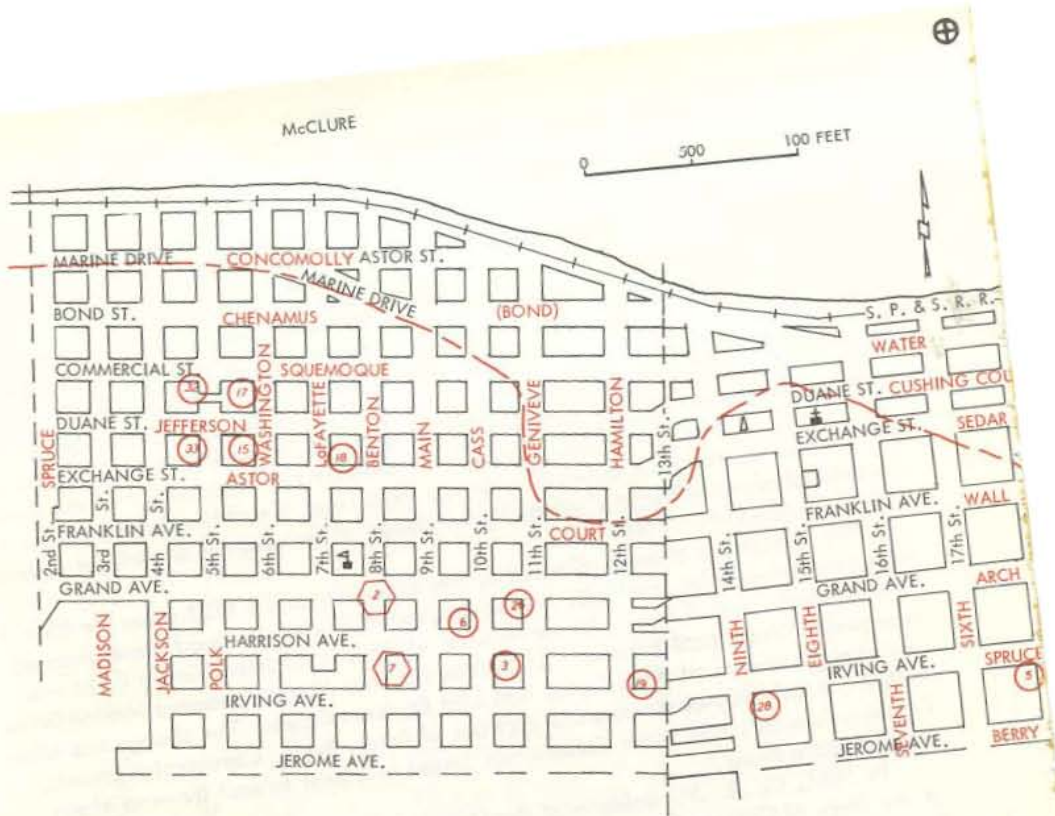
In 1945, Dr. E. M. Baldwin of the University of Oregon and R. E. Stewart of the State of Oregon Department of Geology and Mineral Industries collected foraminiferal samples from "about 100 feet east of 37th and Commercial Streets." According to the present arrangement, the exposure referred to is the large road cut at 38th and Lief Erickson Drive.

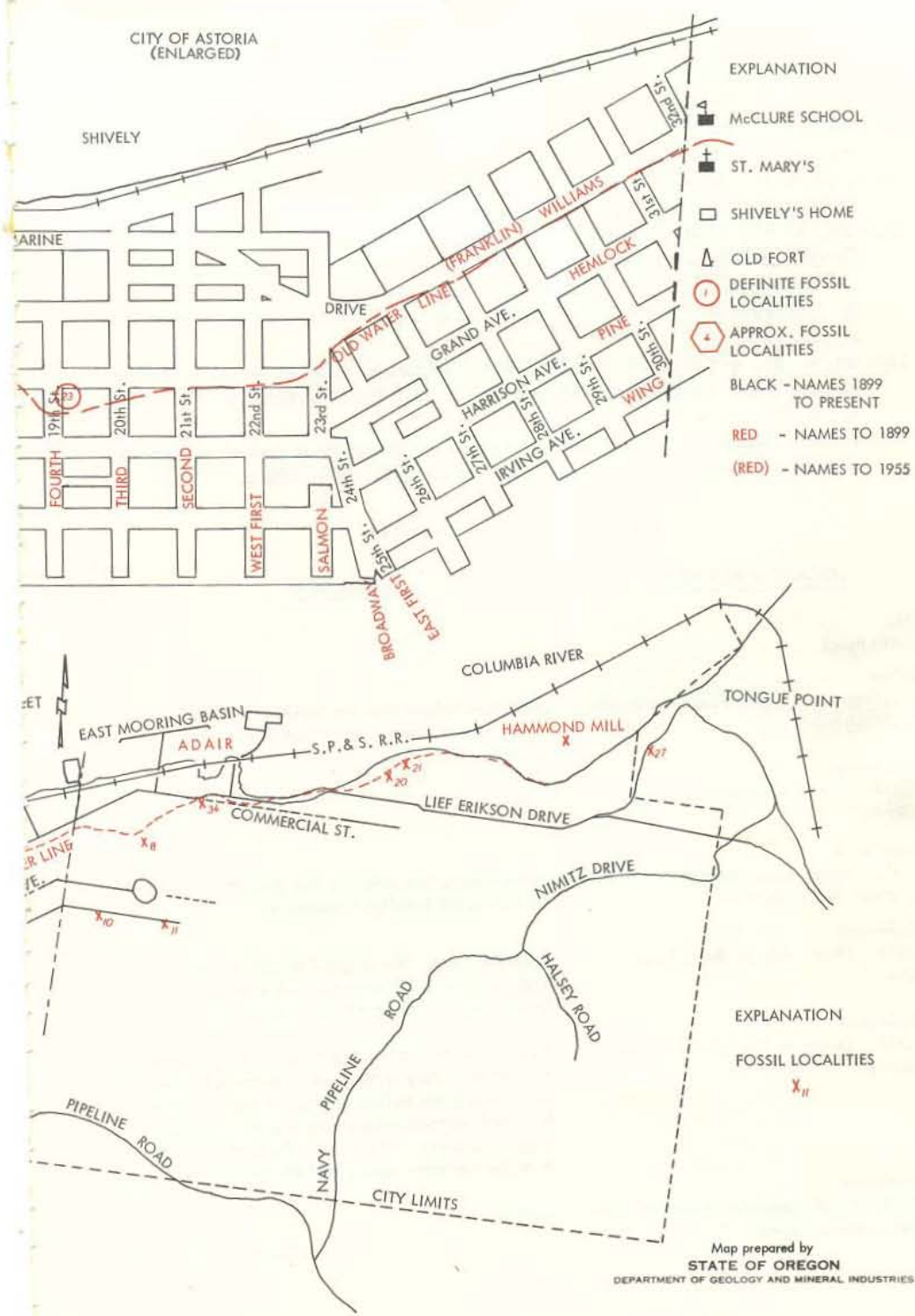
There are a number of other Astoria locales mentioned in already published works, and there are sure to be many more locales found in the type section of the Miocene at Astoria, Oregon. With the aid of the information included here and with the assistance of the maps, it is hoped that those who are interested in the area will be able to find locales which have been published to this time.

The geologist of today must be aware of the significant changes which human habitation, in just a few years, can work on described sections. He must also be aware that, although humans can change the landscape rapidly, their cultural edifices are fragile things and to use them as permanent reference points is precarious.

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Astoria Fossil Locales

<u>LOCALE or REFERENCE</u>	<u>COMMENT</u>	<u>MAP NO.</u>
Dall		1
Smith Point		
Diller		2
"...from a photograph taken near the High School."	The High School was the McClure School, since burned down. The block is now a playground.	
Washburne		3
"5314. Tenth and Harrison Streets, Astoria."	Same	
Washburne		4
"5315. Loose concretions on river bank in lower part of Astoria."	Too general, but refers to the area west of 1st Street called locally, Uniontown.	
Washburne		--
"5316. North side of Smith Point, Astoria."	General area. The original beach is filled in and the bank is extensively overgrown with brush and is bulkheaded below most homes.	
Washburne		5
"5317. Opposite 766 Irving Avenue, Astoria."	Now opposite 1762 Irving Avenue at the corner of 18th St. Very little bank is exposed because of a large stone bulkhead erected here. There is a small outcrop which may require some digging to uncover. It is rich in Foraminifera and is at the southern corner of 18th and Irving.	
Washburne		6
"5318. N.W. corner of 10th and Harrison Avenue, Astoria."	Same.	

Continued on page 126



Figure 5. Astoria looking west, after the fire of 1922. To the extreme upper left is the old St. Mary's building. In front of the building notice the broken wooden street and the burned piles on which it was built. In the middle distance is the Court House, which appears in figure 6. (Photo by Frank Woodfield, courtesy, Oregon Historical Society)



Figure 6. Astoria in 1947. The arrow marks the modern St. Mary's building on the site of the original Hudson's Bay property. The two buildings in the foreground are the Court House with the cupola (now removed) and the Post Office, on the site of the gray stone building as in figures 3 and 4. Notice that the former bay in front of St. Mary's has a number of larger buildings situated upon fill, among which is the John Jacob Astor Hotel. The whole visible area, except those in the distance having docks built on pilings, is constructed on fill. (Photo by the Oregon Journal, courtesy, Oregon Historical Society)

Washburne "5319. One block () of old high school on Harrison at the N.W. corner of 8th Street, Astoria."	The McClure School, formerly in the block bounded by 7th and 8th Streets, and Grand and Franklin Avenue. There is no exposure on the N.W. corner of 8th and Harrison, but there is a large weathered bank at the southeast corner.	7
Washburne "5320. Opposite 1774 Franklin Street, Astoria."	Now opposite 3658 Franklin Avenue, one block east of the John Jacob Astor School, which is between 35th and 36th Streets. The whole hill is badly weathered.	8
Washburne "Irving Avenue, in hill above sawmill, Astoria."	The sawmill is replaced by the Astoria Plywood mill and the station referred to is probably an exposure at 23rd and Irving Avenue, on the south side of the street.	9
Washburne "5322. Irving Avenue and 34th Street, Astoria."	Same. No visible exposure.	10
Washburne "5323. Irving Avenue near 37th Street, Astoria."	Same. Poor exposure.	11
Washburne "5339. Smith Point, Astoria, bank 50 feet above Columbia River, SW $\frac{1}{4}$ sec. 7, T. 5 N., R. 9 W."	Unlocated, but might have been near Port Way Street, which is the entrance to the Port Docks.	12
Washburne "5340. Smith Point on road to Young's River; SW $\frac{1}{4}$ sec. 7, T. 8 N., R. 9 W."	Possibly near Hamburg Avenue.	13
Washburne "5378. Opposite 383 Alameda Avenue, Astoria; SW $\frac{1}{4}$ sec. 7, T. 8 N., R. 9 W."	Same. No visible exposure.	14
Washburne "5379. Sixth and Duane Streets, Astoria, in rear of Southwest corner house; altitude, 40 feet."	Same. Walk up a little private road.	15
Washburne "5390. Commercial Street, Astoria, road cut 2,650 feet west of Sixth Street in dark gray shale."	Probably the best available exposure in this area is higher on the hill at 1st and Duane. The 1st and Commercial area slid some 400 feet downhill in 1951.	16
Washburne "5403. Commercial Street, at the southwest corner of Sixth Street, Astoria; Miocene."	Same. No exposure.	17
Washburne "5404. Southwest corner of Seventh and Exchange Streets, Astoria."	Same. Badly weathered.	18

Washburne		19
"5405. Irving Avenue west of Thirteenth Street, Astoria; Oligocene?"	Same but badly weathered, overgrown, and bulkheaded.	
Washburne		20
Brick kiln	Probably between Birch and Ash Streets near 45th Street.	
Arnold and Hannibal		21
"loc. 46: ashy shales with limestone nodules, beach at foot of 46th Street, Astoria, Oregon."	Same location, eastern part of town. Not checked.	
Arnold and Hannibal		22
"loc. 47: ashy shales with limestone nodules beach between foot of Hull Street and Smith Point."	Between Hull Street and Smith Point, fill material has covered the original beach since 1940.	
Arnold and Hannibal		--
"loc. 273: ashy shale, bluff back of town between 1st and 13th Street."	A wide area to include in one locale. It must be assumed that the authors had no exact information on the areas from which their fossils came.	
Arnold and Hannibal		23
"loc. 45: basal sandstone, beach at foot of 19th Street."	The foot of 19th Street is completely buried under fill.	
Howe		24
"Smith's Point to the west of the old settlement of Astoria, especially in the vicinity of the present port docks."	Same. All fill.	
Howe		25
"...Hume Avenue and Bond Street."	Same.	
Howe		23
"...foot of Nineteenth Street."	Same. All fill.	
Howe		26
"...Eleventh and Grand."	Same.	
Howe		27
"...deep cut on the Columbia highway, immediately outside the city limits, and about one and one half blocks south of the Hammond lumber mill."	On the FORMER Columbia highway. Now this road leads into Tongue Point.	
Howe		28
"...Irving and Fourteenth in the center of the city."	Same, but bulkheaded.	
Howe		3
"...Tenth and Harrison."	Same.	
Howe		29
"...along both the Olney and water-works roads."	Along the Olney road. Along the Waterworks road.	30

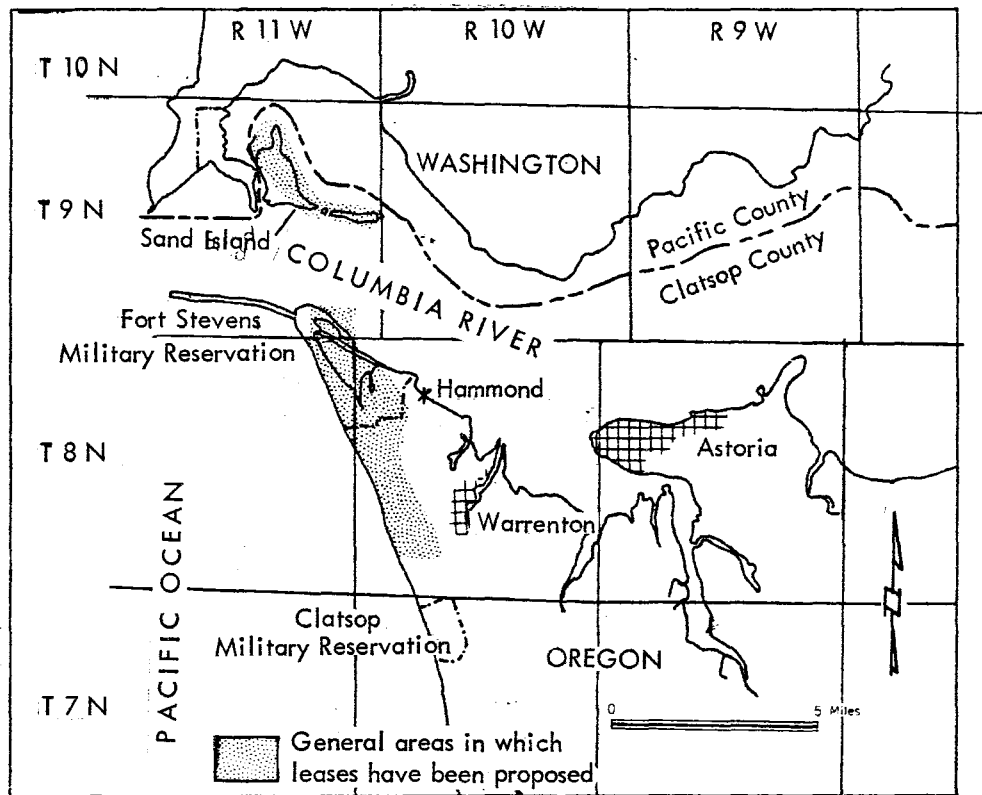
Howe		31
"...in the neighborhood of Williams- port."	Same.	
Howe		32
"...Fifth and Commercial Streets."	Same, but there is no good exposure.	
Howe		33
"...corner of Fifth and Duane Streets."	Same, but no exposure.	
Stewart and Baldwin		34
"...about 100 feet east of 37th and Commercial Streets."	Now at 38th and Lief Erickson Drive.	

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BEACH SANDS ATTRACT BUNKER HILL

The Bunker Hill Co., Kellogg, Idaho, has recently filed applications for mining leases with the Clatsop County Court and the State Land Board covering approximately 3,000 acres of iron-bearing sands in the Clatsop Spit area in Clatsop County. In its application Bunker, one of the largest mining and smelting companies in the country, indicated that extensive exploration would necessarily precede any mining or plant construction. The company also stated that new metallurgical methods might be employed to recover the very low percentages of iron-bearing minerals from the sands.

Bunker Hill became interested recently in the Clatsop Spit sands after Pacific Power & Light Co. brought the deposit to its attention. The black sands of the Oregon beaches and the estuary of the lower Columbia River have been the subject of numerous investigations and reports over the years. In 1941 the department drilled 13 holes near Hammond, about 10 miles northwest of Astoria. A deposit of black sand measuring approximately 500 by 800 feet and at least 3 feet deep was sampled. The deposit contained about 40 percent magnetite, an iron oxide mineral which has the unusual property of being magnetic. Results of the department's work are published in Bulletin 14-D, "Oregon Metal Mines Handbook." In 1944 the U.S. Bureau of Mines also drilled the Hammond property and reported its findings in its Report of Investigations 4011, "Columbia River magnetite sands, Clatsop County, Oregon, and Pacific County, Washington, Hammond and McGowan deposits," 1947, by J.V. Kelly. In addition to the magnetite, the bureau reported the following concentrations of minerals: hornblende 16 percent, ilmenite 19 percent, quartz-feldspar 15 percent, garnet 7 percent, zircon, rutile, biotite, and olivine 3 percent. The department also made a comprehensive study, "Mineralogical and physical composition of the sands of the Oregon coast from Coos Bay to the mouth of the Columbia River," which was published as Bulletin 30 in 1946. The report concerned itself not only with the mineralogical character of the sands but with the natural forces involved in their removal, transportation, and deposition by ocean currents, large rivers, and winds. The effects of these agencies are of great importance to harbor, river, and highway construction, to land owners



INDEX MAP OF CLATSOP SPIT AREA, CLATSOP COUNTY, OREGON.

located on or near beach areas, and to tourist-oriented activities.

The areas which the Bunker Hill Co. is desirous of leasing are shown on the above map. Because of a multiplicity of ownerships, only the outlines of the general areas are indicated. The Clatsop County Court has indicated that it is willing to issue a permit to the company, which would permit prospecting on county lands on a temporary basis pending negotiation of mining leases. No action has been taken by the State Land Board, which not only must refer the proposed lease to other state agencies concerned with the area but must unravel a complicated skein of ownerships of both surface and mineral rights both above and below the ordinary high tide line. Typical of the problems involved is the identification of the various parcels of submerged land which cannot be conveniently or accurately defined by the usual section, township, and range methods commonly used on dry land. A system of coordinates based on the Lambert Azimuthal Projection has been adopted by the board to cover these areas.

The scope of the proposed project can be gauged by the recent announcement in the press that Bunker anticipates that it will erect a \$12,000,000 plant if preliminary testing, which will probably require several years, indicates ore in sufficient quantity and of high enough grade. The company is applying for an initial lease period of 25 years from the state. The dune sands and those lying below water will probably be mined by a connected bucket dredge or similar equipment

capable of handling large volumes of unconsolidated sand. The company has announced that a dike will be erected around the area to be mined and that this will reduce any pollution and disturbance of the estuarine waters to an absolute minimum. Because of the unconsolidated nature of the sands and the dredging method which will be employed, the mined areas will be restored promptly to their original appearance. The action of the ever-present winds and waves will also aid in erasing rapidly any evidences of mining activity.

Whether the recovered minerals would be treated further locally is unknown at the present time. Possible steps which might be taken include the production of either sponge iron or pig iron by one of the relatively new direct-reduction processes which do not require the very heavy capital expenditures necessary for the erection of a standard blast furnace. Briquetting of the concentrated material to make it acceptable to some of the steel mills which cannot handle the loose sand is also a possibility.

The feasibility of beneficiating Oregon coast sands has already been demonstrated. From 1954 to 1956, a plant located just north of Coquille in Coos County beneficiated some rough, black sand concentrates prepared under a World War II contract and produced salable concentrates of chromite, garnet, ilmenite, magnetite, and zircon. The plant used electrostatic and electromagnetic equipment. The original concentration was accomplished with the aid of Humphrey spirals located in a small plant near Bullards north of Bandon. Interest in the black sands actually dates back more than 100 years, however. The early discovery of placer gold in the Coos County beach sands and in the elevated beach terraces several miles distant from the coast resulted in considerable mining activity which lasted for many years.

The economic impact of the proposed Bunker Hill operation will be great. Once actual mining and processing are under way, the activity will be continuous, day in and day out, for a long period of time. It will not be subject to seasonal variations, closed seasons, or any of the normal factors which adversely affect the economy of this part of the state.

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MINING NEWS

Gold

Hydraulic "giant" and sluice operations at the Parkerville placers near the head of the North Fork of Burnt River west of Whitney in Baker County have been maintained at full capacity this spring. While water was plentiful during spring runoff, a giant with a 5-inch nozzle was employed around the clock. Reserves from two storage ponds are now rapidly being depleted and a smaller giant with 3-inch nozzle is being used a few hours a day. Operation of the giant is expected to cease about August 1. The property has been owned and operated on a limited basis since 1932 by Tony Brandenthaler of Baker. This is the first year the placers have been worked on such a scale. At the height of operation, 8 men were employed under the management of Scotty Hay.

Perry Hobson and two employees are operating a washing plant on the North Fork of Burnt River immediately below the mouth of Geiser Creek and about three miles below Parkerville. The washing plant and 3/4-yard dragline have a capacity of 50 to 60 yards of gravel an hour.

Standard Industries, Inc., a construction company from Tulsa, Oklahoma, has leased the Mormon Basin placers which are owned or controlled by Calvin Suksdorf of Baker. Operations were begun about June 20. Equipment includes a 1½-yard dragline and a 150-yards-per-hour washing plant with bowl-type concentrators. At the present time they are working on Emigrant Creek, Malheur County.

Prior to World War II, placer gold was recovered from bedrock and near bedrock horizons on the Steinmetz claim on Pine Creek, Baker County, a few miles above Carson in the Cornucopia district, by means of shafts and short drifts. Shaft depth was in the neighborhood of 50 feet and timbering, pumping, and running sand constituted serious mining problems, but gold values of compensating worth were reportedly encountered and mined. Attempts are now being made by the H & H Mining Co. to test this ground by drilling. The ground is generally comprised of nested granite boulders, with the pay streak reportedly limited to near-bedrock.

Copper

An 18-ton shipment of sorted chalcopyrite-gold ore has been recovered from an exploration tunnel on the Standard mine claims, Dixie Creek, Grant County, and delivered to the American Smelting & Refining Co. smelter at Tacoma, Wash., by Jim Kinsella of John Day. The Standard was a substantial producer of copper ore during the opening decade of 1900, and it is particularly noted for associated cobalt-gold mineralization. Available records show that several shipments of the cobalt were made to Thomas Edison and to consumers in Germany at that time. The source of the present shipment of copper ore is a new tunnel located high on the hill above and beyond the area occupied by the old workings, but in line with the projected course of the old vein system.

Mercury

A new cinnabar prospect was recently discovered in Grant County by veteran prospector L. H. Roba of Canyon City, Oregon. The prospect is located on ranch land owned by L. H. Williams in the Little Canyon Creek watershed. This area is known to contain a number of hot springs and hot water seepages along fault zones cutting Triassic sediments. The Triassic sediments are capped locally by Tertiary lavas. According to reports, enough exploration work has been done to indicate that the discovery merits additional attention, and a project for continued exploratory development is being currently drafted.

Uranium

Five carloads of uranium ore from the Lucky Lass mine near Lakeview, Lake County, have been shipped to Vitro Chemical Products of Salt Lake City for reduction to uranium oxide. About six more carloads are reported in the present stockpile. The ore was taken from the bottom of the pit which was dug on the property last year. The owners are seeking advice from Vitro on future mining methods, according to an article in the Lake County Examiner, June 27.

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GAS LINE EXTENSION GRANTED

Permission to expand natural gas service into southwestern Oregon has been granted the El Paso (Texas) Natural Gas Co. by the Federal Power Commission. El Paso will build 6 miles of 16-inch pipeline and 121.6 miles of 10 3/4-inch line from Eugene to a new terminus near Grants Pass at an estimated cost of almost \$7.7 million. California-Pacific Utilities Co., San Francisco, will then extend its main line from Grants Pass to Ashland at a probable cost of \$5.27 million. On completion of the projects, 16 southwest Oregon communities will receive natural gas for the first time. These would be Ashland, Canyonville, Central Point, Gold Hill, Grants Pass, Jacksonville, Medford, Myrtle Creek, Oakland, Phoenix, Riddle, Rogue River, Roseburg, Sutherlin, Talent, and Winston-Dillard.

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DOMESTIC MINES CLOSED - PLANTS THREATENED

An investigation of imports of manganese and chromium ferroalloys, and of electrolytic manganese and chromium has been ordered by the Office of Emergency Planning. In announcing the planned investigation, Edward A. McDermott, Director of OEP, cited section 232 of the Trade Expansion Act as his authority to investigate imports which may appear to threaten or impair the national security.

Application for the investigation was made by the Manufacturing Chemists Association on behalf of 11 companies. The application contends that imports of manganese and chromium ferroalloys have increased to such an extent that the domestic ferroalloy industry is in serious jeopardy, and that unrestrained growth of lower priced imports will cause a shut-down of domestic plants that will render the United States incapable of supplying its needs in time of national emergency.

McDermott said that he will seek the views of other Federal departments and agencies having an interest in the problem. (American Mining Congress Bulletin, June 19, 1963)

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DOMESTIC AGRICULTURAL GOODS FOR FOREIGN MINERALS

How can the Federal Government ease the United States' continuing balance-of-payments deficit? The Administration believes that a major tool is utilization of the U.S. barter program under which surplus U.S. farm commodities are bartered for defense and foreign aid goods instead of paying cash, thus reducing the outflow of U.S. dollars overseas.

Evidence of the increased use of barter was provided by a recent Department of Agriculture announcement of a barter project designed to furnish Brazil with 200,000 tons of wheat in exchange for Brazilian metallurgical-grade manganese ore, ferromanganese produced in this country from Brazilian manganese ore, and muscovite block mica and beryl ore. (American Mining Congress Bulletin, June 19, 1963)

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