

**STATE OF OREGON**  
**DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES**  
**PORTLAND, OREGON**

# **THE ORE.-BIN**

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**PORTLAND, OREGON**

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ATOMS AND THINGS

Understanding of internal combustion engines was acquired by hundreds of thousands of people by intimate association with Henry Ford's Model T. Knowledge of radio circuits and vagaries of the ether became rather commonplace with the universal use of radio sets. Flying is becoming so ordinary that most schoolboys know their aeronautics better than their spelling. So what! Well, these are just thoughts in contemplation of how greatly scientific discoveries influence our existence and of how surely and simply scientific phenomena, at first understood by only a few Einsteins, may be brought into our daily lives and become common knowledge.

The stage being set, meet U 235, for this mysterious looking symbol (not a German submarine) is likely to be the cause of making physicists out of future generations and be the incentive for the boys and girls to get intimately acquainted with atomic nuclei, protons, neutrons, isotopes, atom smashing, gamma rays and other of that ilk, now known or partly known to only a few of the members of the inner circle of top-flight scientists. Perhaps in the not very distant future U 235, or some of its robotian relatives, will be heating and lighting the house (or bomb shelter), cooking the food, driving the automobile and airplane, propelling ocean liners, and rocketing space ships out from Mother Earth to disturb the tranquillity of our neighbors of the solar system. (Who doesn't enjoy the role of oracle!)

But to get down to cases and atoms. In the early horse and buggy days, it was scientific gospel that the atom was an indivisible particle - the smallest particle of an element that could exist. That theory is literally shot to pieces. Now, an atom is believed to be a sort of blur held together by electrical forces. There is a central atomic nucleus made up essentially of particles called protons and neutrons. The proton has a positive charge; the neutron has none. About the nucleus is a gyrating bunch of negatively charged electrons, each spinning on its own axis and arranged in concentric layers about the nucleus. In a staple atom, there are as many electrons as there are protons in the nucleus in order to have the electrical charges balance. The number and arrangement of the electrons determine the chemical properties of the atom. But it is with the nucleus that we are concerned now. The various elements have various combinations of protons and neutrons and the total of the number of these particles in an atomic nucleus equals its atomic weight. Thus, hydrogen, the lightest element, has a single proton and an atomic weight of 1. Uranium, until very recently, thought to be the heaviest element, has 92 protons and 146 neutrons to give an atomic weight of 238. Thus, we have U 238 as a symbol of the normal uranium atom. The number of protons in a nucleus determines the charge, or atomic number of an element, and there exists an element for each number from 1 (hydrogen) up to 92 (Uranium). (Recently, discoveries of heavier elements have been reported).

Physicists (and among them, a number of Nobel prize winners) have discovered that by bombarding an atomic nucleus with high speed particles, such as obtained by using very high voltage apparatus, neutrons may be added or subtracted, thus changing the atomic weight. Such changed atoms are called isotopes. What concerns us most, however, is that, in this process of atom-smashing, energy is released in enormous quantities. The isotope of particular interest at the present time is U 235, which has 3 less neutrons than U 238. While atomic nuclei may be smashed with release of energy, the energy required is usually greater than that

obtained as a result of the smashing. But the isotope U 235 is, at present at least, unique in that it may be readily smashed with the resulting release of a stupendous amount of energy. Various estimates of the quantity of this energy have been made, all showing, by comparison with our present sources of energy, the tremendous amount of released power potentially available. These figures are something of the order of comparing the force of a boy's air-rifle with that of a battleship's 16-inch gun. The picture is disturbing to the imagination, but we may as well take it calmly. U 235 hasn't been tamed as yet.

There are various hurdles to take before this atomic energy can be utilized. The present problem is how to isolate a sufficient quantity of U 235 so that it may be tested. Various methods have been tried without much success so far, but it seems rather inevitable that the problem will be solved eventually, for it is reported that over 300 scientists are at work on this and related problems. Probably other usable isotopes will also be found and put to work. Then a few ounces of U 235 or a brother isotope would be capable of driving your car or plane to New York and back and still have some power left over.

The question of control of such concentrated power naturally arises. As far as this writer is concerned, he'd prefer a nice safe dynamite factory in which to work rather than a laboratory containing a couple of grams of U 235! At this distance, investigating isolated U 235 appears to be something along the lines of jiggling a can of nitroglycerine.

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#### PROGRESS OF FIELD WORK

The state geologic survey of the Butte Falls quadrangle shows excellent progress. The base camp is at Trail. Under the general supervision of Dr. W. D. Wilkinson, two parties headed by Wayne Lowell and Wallace Lowry are at work. In excess of five townships so far have been covered.

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U.S.G.S. field parties under Francis G. Wells have completed field work in the Grants Pass quadrangle, and have started work in the Kerby quadrangle. Some preliminary test drilling supervised by Dr. Wells has been done on a back beach black sand deposit north of Bandon.

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Geologic mapping of the Canyon City quadrangle is being continued by U.S.G.S. parties under the direction of Thomas P. Thayer.

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Field work by R. C. Treasher in Multnomah County has been completed and Mr. Treasher has returned to his station at Grants Pass.

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The following copy of letter is of especial interest at this time in showing new developments in production of domestic manganese:

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF MINES  
Washington

June 8, 1940

Hon. Homer D. Angell,  
House of Representatives,  
Washington, D. C.

My dear Mr. Angell:

With reference to your letter of June 3, inquiring about the minimum grade of ore to be used at the pilot plant now being constructed in Tennessee for the production of electrolytic manganese, and the cost of operation:

The plant in Knoxville, Tennessee, was constructed in 1939, not as a Bureau of Mines plant, but as one independently owned and operated by the Electro Manganese Corporation, whose home offices are located in Minneapolis, Minnesota. U.S. Patent 2,119,560, which covers the electrolytic process for the manufacture of manganese metal, was granted to Stephen M. Shelton and was assigned by him to the Government of the United States as represented by the Secretary of the Interior. The Electro Manganese Corporation operates under a license to use this patent which was granted by the Secretary of the Interior.

The electrolytic method may utilize low-grade ores. It has been estimated that it can be successfully operated on ores containing as low as 10% manganese. Due to costs in handling materials the method will, of course, be less expensive with ores of higher manganese content. The Bureau of Mines does not have figures on operating costs at the Knoxville plant. However, the cost is estimated to be higher than that of producing ferromanganese from ferro-grade ores. A cost approaching that of ferromanganese can be obtained only in a large, well-integrated plant. The capacity of the plant at Knoxville is approximately one ton of metal a day. Costs in a plant of this size may exceed 20 cents a pound.

Cordially yours,

R. R. SAYERS  
Acting Director.

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THE FLASK OF QUICKSILVER

The standard unit of measure used in the sale of quicksilver since early time was a "flask" equivalent to 76 pounds 1 ounce avoirdupois weight. This cumbersome figure was not popular with United States producers, so they, for many years (until 1927) calculated on a basis of the more convenient 75-pound flask; recently they have figured quicksilver on the 76-pound flask basis. H.H. Miller (The Mining

Journal, June 15, 1940) delved into the history of this weight at some length, and the following is a brief resume of its derivation.

Spain has been the world's foremost producer. The Romans were the first to mine quicksilver in Spain at the famous Almaden mine. Transportation was by slave-back; and the standard load was 100 librae (Roman pounds). The first use of quicksilver was as a medicine (calomel), so Spain adopted the libra as the standard apothecary pound. This is equivalent to 0.7607 of the modern avoirdupois pound. The standard slave-load of 100 librae is therefore equivalent to 76.07 avoirdupois pounds, which is slightly more than 76 pounds 1 ounce (76.067 lbs.). Since Spain uses the metric system, the weight of a Spanish flask is 34.5 kilograms, very close to the weight of the United States flask.

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A contract to supply 128 ore pots to the Aluminum Company of America has been given to the Steel Pipe and Tank Co. of Portland according to Commerce, published by the Portland Chamber of Commerce.

The contract totals 1000 tons of steel plate and caused the Steel Pipe and Tank Co. to make a considerable plant expansion.

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#### OREGON'S SAN FRANCISCO EXPOSITION MINERAL EXHIBIT

In June, a member of the State Department of Geology and Mineral Industries spent several days on Treasure Island arranging the mineral exhibit in the Oregon Room in the Hall of Western States. The central theme is quicksilver, with a model of quicksilver purification method surrounded by several large specimens of cinnabar. The model was designed by S. H. Williston, in charge of operations at Horseheaven Mines, and the apparatus was built by Marion Morris, of the Horseheaven staff. On either side of the central stand is a large display case. In one case are specimens of agates, opals, petrified wood and non-metallic minerals (including limestone, diatomite, pumice, coal, and marble and granite); while in the other case ores of metals which occur in Oregon, such as manganese, tungsten, chromium, molybdenum, quicksilver, antimony, copper, nickel, iron, lead, cobalt, and gold, are represented. Lights inside the cases illuminate the displays effectively.

On the wall above the cases are four colored transparent photographs illuminated from the rear. These translites are 20 by 30 inches and show the Alpine Coal Mine (Coos County), Cornucopia Gold Mines, Horseheaven Quicksilver Mine, and the Oregon Consuelo Dredge (Cracker Creek, Baker County). Several plaques give pertinent data as to Oregon's mineral production.

Mr. Maurice Brady, assistant at the Baker State Assay Laboratory, is at the exhibit for the duration of the Exposition. Mr. Brady has had considerable experience in giving information on Oregon minerals and will be of assistance in explaining the exhibit. Publications of the State Department of Geology and Mineral Industries are on display and may be bought or consulted by those interested in Oregon's minerals.

During the first two weeks of the exhibit 378 persons stopped to ask specific questions and to buy publications.

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FREIGHT RATES TO BE SLASHED

Change to Affect Mine Concentrates and Ores

According to the Baker Democrat-Herald (June 20, 1940), a new schedule of freight rates on ores and concentrates from Baker to Utah and Tacoma smelters, which went into effect June 27th, has been announced by the Union Pacific Railway company through Lynn V. Vermillion, Baker agent.

The schedule, worked out by the railroad company, provides a general reduction of rates, which is expected to stimulate ore shipments. Conferences recently were held between traffic representatives of the railroad, Baker county ore shippers, and the Baker County Chamber of Commerce.

The Union Pacific has shipped 70 cars of ore and concentrates from Baker already this year.

The rates are based on minimum weights of 100,000 pounds per carload. Application has been made to the Interstate Commerce Commission for through rates from Sumpter, in connection with the Sumpter Valley Railway Company, based on \$1.10 per ton over Baker rates, to include transfer at Baker.

The rate schedule follows:

<u>TO TACOMA:</u>			:	<u>TO UTAH SMELTERS:</u>		
Aug.19,1939	Value not to exceed	June 27, 1940	:	Aug.19,1939	Value not to exceed	June 27, 1940
\$4.40	\$15.00	\$3.00	:	\$4.95	\$15.00	\$3.25
4.40	20.00	3.00	:	4.95	20.00	3.25
4.40	30.00	4.00	:	4.95	30.00	4.25
5.50	40.00	4.50	:	6.05	40.00	4.75
6.05	50.00	5.00	:	6.60	50.00	5.25
6.60	60.00	5.50	:	7.15	60.00	5.75
7.15	70.00	6.00	:	7.70	70.00	6.25
7.70	80.00	6.50	:	8.25	80.00	6.75
8.25	90.00	7.00	:	8.80	90.00	7.25
8.80	100.00	7.75	:	9.35	100.00	8.00
	to		:		to	
Value	500.00	7.75	:	Value	500.00	8.00

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LOCATING COAL LAND

By the Leasing Act of February 25, 1920, deposits of coal, phosphate, sodium, oil, oil shale, and gas in lands valuable for such minerals were made subject to disposition only under prospecting permits and leases issued by the Secretary of the Interior. Exceptions are valid claims existent at date of said act and thereafter maintained in compliance with the mining laws under which they were appropriated. Regulations under this act are contained in circulars of the General Land Office. Applications for permits to prospect coal land in the state should be made either of the Regional U.S. Land Offices in Oregon at Roseburg and The Dalles.

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I. C. 7118

An interesting paper has recently been issued by the U. S. Bureau of Mines, as Information Circular 7118. The title is "More Jobs for Minerals"; the author is Paul M. Tyler. Many less commonly understood facts about minerals are given; and there is much food for thought presented in this very enlightening 19-page discussion of the relation and importance of minerals to our modern existence.

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27-1 Lode gold property in southwestern Oregon composed of one unpatented claim. Property developed by 500 feet of tunnel. Owner states ore assays \$100 per ton on a 12-inch vein. Owner will sell.

R. E. Paddock and T.W.Billings, Marial, Ore.

27-2 Lode property in central Oregon near Ashwood, consists of 3 patented claims. Property was operated in 1905 and again in 1935; reported possibilities of cinnabar deposit; owner will lease. Owner states he has detailed information.

Ben F. Laughlin, Yamhill, Oregon

27-3 Placer property consisting of one claim in Greenhorn district of eastern Oregon. Owner states gravel runs \$1.00 per yard. Owner desires partner or to make sale.

Harry O. Smith, Route 1, Box 61-B,  
Oregon City, Oregon.

27-4 Lode gold property: Rainbow Mine (formerly known as Siskron Mine) composed of 5 claims on Sucker Creek, Waldo district, Josephine County. Main workings consist of several hundred feet of drifts, crosscuts, and winzes. Amalgamation-flotation mill said to be in good condition. Abundant timber and water. Production has been estimated at \$46,500. Reported assays give an average of \$18.50 per ton over an average width of 14 inches.

H.W.Finch, 1516 Euclid Ave., Berkeley, Calif.

FOR SALE: One Ainsworth Brunton Pocket Transit with head, \$20.00. Although the instrument has seen considerable service, it is in good condition.

Edward Law, Route 1, Central Point, Oregon

FOR SALE: 1/6 h.p. G.E., D.C.motor, volts 110-120, r.p.m. 1725.

State Department Geology & Mineral Industries  
702 Woodlark Bldg., Portland, Oregon.

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