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...in other words, "BUG MEN"[1]

By

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The visitor to our Exploration Department was deeply interested, but some of the things he heard were hard to believe. He could appreciate, and could adjust himself to accept, a great number of applications of physics and chemistry to petroleum geology. Such things as detecting accumulations of oil, gas, and salt-water in the unseen formations of a drilling well by testing the drilling fluid with fluorescent light, a "hot wire," and a galvanometer, seemed reasonable when our Chief Geologist explained them.

Others, such as recording on a film the varying natural electrical properties of the formations penetrated in a well, and translating this record into a log of the types of rock and their fluid content, were amazing, but certainly in tune with this age of wonders.

He listened with fascination as the Chief explained how sound waves, echoing from layers of rock miles below the surface, were commonplace tools of modern "rock hounds," or geologists, and how delicate recordings of the slight variations of the earth's gravitational pull, which occur from place to place, lead to the discovery of oil.

Finally, as he was about to leave, he heard something that strained his credulity. The phone rang. The Chief talked briefly, then excused himself, saying, "Would you mind if I dictated a short wire?" A girl stepped in. "Send this wire to the Taft Bug Laboratory, please: Dixon Community Well No. 1 reports formation change at 3785 feet. Samples to 3710 feet sent by express today. Please wire results."

He turned to the visitor. "It's one of our important wildcat wells, and operations depend on what the bug men find."

"Bug men!" exclaimed the visitor. "Who - and what - are they?"

The Chief chuckled. "That's what we call our micropaleontologists. Our laboratory for the Northern Producing District is at Taft; our Southern District laboratory is in Los Angeles."

"Well, bug men is a lot easier to pronounce, anyway," said the visitor. "If I remember rightly, paleontologists are the fellows who dig up old bones and reconstruct dinosaurs and saber-tooth tigers. I suppose your micropaleontologists, or bug men, dig up old bugs and infest their asylums with them. You have given me a lot of interesting and extraordinary information about your profession, but please don't tell me that you consult bug experts before deciding what to do next in an important wildcat well."

"That's what we do," answered the Chief, "and they <u>are</u> experts. But I'll have to explain a bit. The 'bugs' our micropaleontologists work with are tiny, single-cell animals, mostly smaller than the head of a pin. They are related to amoeba, but differ in that they have shell-like hard parts which show remarkable diversification. These little organisms are called Foraminifera and are quite widespread in the oceans. You would have to look at some with a microscope to appreciate the intricate form and delicate ornamentation of these little animals."

"But what have they to do with oil wells?" the visitor interrupted.

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[1]Courtesy of <u>The Standard Oiler</u>, November 1946.

[2]When the article was written Mr. Barbat was in charge of the Standard Oil Company laboratory at Taft, California. He has since been made Chief Geologist of the company.

"Quite a lot. You see, their remains become a part of the sediment that accumulates on the sea bottom. After this material gets pressed into rock and folded into various types of geologic structures suitable for the entrapment of oil and gas, it becomes the job of the Petroleum Geologist to seek these structures and test them for possible production. The most reliable way of testing, as you can guess, is to drill into them with a prospect hole, and study the core-samples thus secured. The little fossils found in the samples tell us many things we need to know.

"The microfossils differ from area to area, and they differ with the temperature, salinity, and depth of the sea-water in which they formerly lived - just as the existing animals vary in our present seas. But more important to us, they differ with the passage of time. Successive layers of sedimentary rock tell a story of extinction of certain types of animals, of development and change of others. Migrations into and away from a given area of former sea-bottom, or any change in the animal population which may be caused by changing conditions within the sea, tend to cause the fossils in succeeding layers of sedimentary rock to be different from those preserved in preceding layers.

"Now about the examination in the Bug Laboratory: A formation sample sent to our micropaleontologists is broken down by mechanical and chemical means into something like the mud it once was. This is washed through fine-meshed screens, which pass the mud but catch the microfossils along with a lot of other objects about the same size - teeth or parts of bone of fish, sea-shell fragments, sand grains, or maybe some incompletely disintegrated rock.

"After drying, the catch is spread on a black dish, placed under a microscope, and the microfossils are picked out with the tip of a moistened brush. They are placed in covered slides for study and identification.

"From knowledge and experience, the bug men decide what changes in the fossil content of each sample are caused by the passage of time. They have learned to recognize certain varieties as characteristic of certain rock layers; these they call 'markers.' Markers are like the numbers on a calendar - they give us reference points to measure the passage of geologic time.

"This applies to the samples I sent that wire about," continued the Chief. "The report we get should give the geologic age of the new formation the drill has entered."

"But why should you be concerned with how old it is?" demanded the visitor.

"Oh, we're not interested in the age as such, certainly not measured in years or millions of years as the case may be. But determining the age of this formation tells us in effect every other place that it has been encountered. It tells us where this rock-layer crops out on the surface, and at what depth it occurs in all the other wells that have penetrated it. From this knowledge we can map the formation and show its surface and underground convolutions."

"I see what you mean," agreed the visitor. "It locates the geologic structure and shows where it is folded up and where folded down - and you say the structure controls the accumulation of oil. However, I don't understand why you need a report from your bug men to determine the course of action in this well."

"If this new formation the drill has entered is close to the oil-sand we are looking for," the Chief explained, "we will reduce the diameter of the drill hole and keep a close watch for showings of oil or gas. This will put us in a position to make an economical test of the sand if the showings warrant. If the formation is not close, the age reported will probably give us a fairly accurate estimate of the additional feet we must drill to reach our objective.

"Then too, if by some odd chance the formation proves to be older than the sand we hope to get oil production from, there is no need to drill deeper. Some sort of geologic

complexity not previously known will be indicated, because the sand which should be there is missing, and we will abandon this well without delay and perhaps try another location. If a detailed study of the core-samples from this well, combined with geologic data from other sources, discloses the reason for the missing sand, it may point to a location where we can drill with more assurance."

The visitor asked, a little banteringly, "Do your bug men, then, give you all the right answers and take all the guesswork out of oil prospecting?"

The Chief shook his head. "It would be easy for me to say yes, but unfortunately that is not always true. They do a remarkably good job of interpreting the life histories of organisms that lived aeons ago, but the complexities involved sometimes lead to incorrect conclusions. But even the mechanical tools geologists use do that too. However, experience has shown that we can rely a great deal on what the micropaleontologists tell us. We are fortunate indeed that these specialists have developed their skill to such a high level. We still have to 'ask the drill' in prospecting for oil in an unproved area, but the findings of the bug men remove some of the gamble."

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CHROMITE NEWS ITEMS

Paul H. Floyd, Jean W. Pressler, and Roy S. Jackson have bought the Hayes mill that was located at the McCaleb ranch and are building a mill at the mouth of Sixmile Creek on the Illinois River road 8.7 miles west of Selma, Josephine County. The name of the organization is the Sixmile Chromite Company. Floyd and Pressler were formerly employed by the Metallurgical Division of the Northwest Electro-development Laboratory of the U.S. Bureau of Mines, Albany, Oregon.

The mill when completed will have 2 jigs, 4 tables, and other equipment. It is estimated that its capacity will be approximately 70 tons a day. The company has leased several chromite claims and will negotiate to custom mill ore from other properties.

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Fred Langley and Claude Dean, Grants Pass, Oregon, have been operating the Big Bear property since June 1952. It is in sec. 35, T. 36 S., R. 8 W., about 6 miles up Slate Creek from the Redwoods Highway.

A crosscut, 75 feet lower in elevation than the original workings at the Big Bear mine, has been driven about 200 feet. More than 200 tons of chromite have been mined from the original adit and stope, and a chromite lens with a maximum width of about 7 feet is exposed in the floor of these workings. The owners hope to intersect this lens at 270-285 feet in this new crosscut.

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Doyle Compton and James Gallaher of Grants Pass are hand sorting chromite from the old dumps of the Oregon Chrome mine on the Illinois River 16 miles west of Selma, Josephine County. This work was begun in late March. Six tons of chromite was shipped after 10 days work.

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ALASKA CHROME

The Defense Materials Procurement Agency has announced that the government has contracted to buy 13,000 long tons of chromite from the Red Mountain deposit on the Kenai Peninsula of Alaska from the Kenai Chrome Company. The government has agreed to advance $110,000 for exploration and equipment, including a loading dock, and up to $200,000 for working capital. Advances are to be repaid with interest. The standard of payment will be $97 per ton f.o.b. port of entry in the State of Washington, for ore containing 48 percent Cr_2O_3 and 3 to 1 chrome-iron ratio. Both penalties for lower grade and premiums for better grade are provided for.

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REVISIONS IN CHROME BUYING PROGRAM

According to the Grants Pass Courier of April 14, 1953, O. C. Bradeen, Regional Director, General Services Administration, Seattle, announced two changes in the government's program for buying chromite at Grants Pass, Oregon. Formerly a shipper was limited to deliveries of 5000 tons in one year. Hereafter there will be no restrictions on the tonnage that can be delivered in one year. The second change has to do with termination of the program, and it appears that buying of ore by the government will be in effect until the close of business June 30, 1955, or until 200,000 tons of ore or concentrates have been received. Formerly there was a provision that the government could terminate the program by giving one year's notice.

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CHROMITE STATISTICS

Chromite Report No. 35, by the U.S. Bureau of Mines, states that domestic production in 1951 amounted to 7,056 tons. Domestic production for 1952 totaled 21,216 short tons. All 1952 domestic shipments with the exception of one California producer, were received at the government's purchase depot at Grants Pass.

Total domestic consumption of chromite in 1952 amounted to 1,185,460 short tons of which 676,624 was metallurgical grade and 387,085 refractory grade. Industrial stocks at the end of 1952 amounted to 364,013 tons metallurgical grade, 269,933 refractory grade, and 120,353 chemical grade, making a total of 754,299 tons.

Imports in 1952 amounted to 1,700,209 short tons, of which 54 percent was metallurgical grade, 35 percent refractory grade, and 11 percent chemical grade. Turkey supplied 49 percent of the metallurgical grade and Southern Rhodesia 19 percent. The balance came from Union of South Africa, 10 percent; New Caledonia, 6 percent; the Philippines, 4 percent; and Cuba, 4 percent. The remaining 8 percent was distributed among small shippers from several countries.

Chromite Report No. 36, covering January 1953 only, states that a total of 815 short tons of chromite was received at the Grants Pass depot during the month.

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INCREASED GOLD PRICE REQUESTED

The Eastern Oregon Mining and Mineral Association, B. F. Kulis, president, and Orville Fleetwood, secretary, petitioned the Oregon legislature requesting that the legislature memorialize the President and Congress to raise the domestic price of gold from $35 to $75 per ounce. The resolutions of the Association were sent to Representative Robert Steward and Senator Rex Ellis for introduction. The resolutions were sent also to United States Senator Cordon and United States Representative Sam Coon.

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STRONTIUM DEPOSIT PRODUCING

A deposit of combined celestite and strontianite on Fidalgo Island in Puget Sound has been put into production by the owners, Dr. William E. Caldwell of Oregon State College and George Waterman of the Manufacturers Mineral Company, Seattle. One hundred tons of the ground ore will first be sold to Hooker Electrochemical Company, Tacoma, Washington, where it will be used to remove a small amount of iron in the process of making caustic soda. The ore is ground to about 250 mesh by the Manufacturers Mineral Company

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SPECIAL BULLETIN FOR SALE

A few copies of Department Bulletin 41, "Ground-Water Studies in Umatilla and Morrow Counties," 1946, by Norman S. Wagner, are still available from the Department at a price of $1.25 each. Included are logs of 209 water wells in the two counties.

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BAKER CITY COINS

In examining a catalog advertising an auction by a coin dealer in New York, the writer was interested to see a picture of gold coins made in Baker, Oregon, in 1907. Inquiry among coin dealers and collectors both in Portland and Baker failed to get any definite information about these coins. A letter to the coin dealer in New York resulted in a reference to an article in the Numismatist of April 1933, which gave a brief history of the coins. The article is reproduced below. Incidentally the coins were valued at $3000 each and realized $900 each at the auction. It is certain that the Baker City individualism has not changed and would crop out in any similar situation today.

Gold Coins of Home Manufacture Circulate in Baker City

Baker City, in eastern Oregon, is nothing if not original. When currency became somewhat scarce in other parts of the country, the whole thing was treated as a huge joke by the business men of that part of the State. The banks went right along paying out "real money" to their depositors as if a scarcity of circulating medium was the least of their troubles, and looking over the gold-bearing hills of the surrounding landscape, ejaculated, "Ah, ha," if not, "Oh, ho." At least that is the way the average Bakerite puts the case, now that the rest of the State has caught its breath and things financial are again normal.

A week or two after the "squeeze" was in full blast two or three Baker City citizens conceived the idea of issuing "gold Currency" on their own hook, and evolved a plan of manufacturing 2-ounce slugs, or buttons, of native gold, which, of course, could not bear the stamp of the Government, but could be worth their weight just the same. Fred Mellis, a mine owner, and James Howard, ex-president of the bank of Sumpter, are said to be responsible for a design used on these slugs, a number of which were hammered out of pure gold and which weighed somewhere near two ounces. The effect of having these slugs passed around Baker City had a good effect on the people, for the natural inference was produced that as long as the mines of eastern Oregon could produce the precious metal in $20 chunks there was no need of getting alarmed over a scarcity of circulating medium.

W. G. Ayer, the "sheep king" of Baker County, who is a visitor in Portland, has one of these buttons, which he bought at its weighing-in value and a trifle over, desiring to hold it as a souvenir commemorative of the faith the people of his section of the State entertain of their ability to meet emergencies.

The obverse has the words stamped into it with a stencil die, "Baker City, Or., 2 Ounces," and the reverse the words, "In Gold We Trust." A picture of this unique "coin" is presented herewith of actual size.

From the Numismatist.

From the coin catalog.

Supplementary information on the Baker coins received and reproduced below does not check in some details with the article in the Numismatist, but it does mention the two types of slugs as represented by the pictures. One type appeared in the Numismatist article; the other was illustrated in the coin catalog.

> "In this year there was a terrific depression in the U.S. and this Baker Bank had a few hundred ounces of gold dust which the bank president proposed to coin into money for circulation in Baker City. So he ordered a jeweler to make some sample coins, and two varieties were made. These two are distinctively very different. They were made to the weight of $40.00 each, BUT with NO denomination on them, ONLY the weight, 2 oz., as the banker probably thought if there is a dollar denomination on them, they might NOT be permitted to pass by the government. But the federal authorities nipped the scheme in the bud and ordered the banker under serious threat and coercion of imprisonment to abstain from his idea."

F.W.L.

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BINGHAM REAPPOINTED TO STATE BOARD

Governor Paul L. Patterson announced on March 20, 1953, that his reappointment of Mason L. Bingham as a member of the Governing Board of the Department of Geology and Mineral Industries was confirmed by the State Senate on that date. Mr. Bingham's 4-year term began March 21, 1953, and ends March 16, 1957.

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METALS FROM OIL WELLS

According to the American Geological Institute News Letter of April 1953, certain types of crude oils found in California contain appreciable amounts of nickel and vanadium, and it may be that mining of metals from oil wells may some day be economically feasible. The Atomic Energy Commission has suggested to some oil companies and geophysical contractors that they combine exploration for oil with seeking evidence of uranium and thorium. Such a combination in prospecting would require little extra effort by the drillers.

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HAVE WE LEARNED THESE LESSONS?

Lessons of a Decade was the attractive title of a paper read at the Annual Meeting of the Pacific Coast Section of the American Association of Petroleum Geologists, in Los Angeles, California, October 31, 1952, by Ira H. Cram, Continental Oil Company, Houston, Texas. Among danger spots to our future, Mr. Cram said, in part:

> ". . .I cannot refrain from . . . dwelling upon geologic prejudice which manifests itself mainly in being too sure where deposits of hydrocarbons can't exist. The geologist ridden with such prejudice develops too few ideas regarding the location of the next oil or gas fields and geologic ideas are the backbone of discovery which in turn is the backbone of the petroleum industry. The geologic idea is the 'gleam in the father's eye' which precedes interesting consequences and productive results. The future requires superlative geological, geophysical, and managerial talent -- the most skillful, the most daring, the most ingenious, the most imaginative. We geologists must battle the insidious forces of prejudice to the end that more and more intelligent ideas are born and sold to management resulting in the drilling of more and more wildcat wells. Such a drilling campaign is almost as necessary as death is inevitable. I do not question that the outcome will be favorable.

(From American Geological Institute News Letter, March 1953.)

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