

May 25, 1943

## BERYLLIUM FIND IS QUESTIONED BY MINING MEN HERE

### Grants Pass Prospector's Announcement Of Vast Supply Meets Skepticism.

The report Friday of the discovery of what was termed the world's largest known deposit of vital beryllium ore was met by considerable skepticism among mining men in Medford and Grants Pass, and a United Press dispatch quoting a spokesman for the Oregon State Department of Geology and Mineral Industries that beryllium had never yet been found by them in samples taken from southern Oregon ore deposits did little to foster the hope that such a huge supply actually had been uncovered.

The giant deposit, according to P. M. Millspaugh, director of the strategic minerals survey of the County Supervisors Association of California, was discovered 20 miles north of Gold Hill by Charles Lull, 82, a "grizzled prospector of Grants Pass." The United Press carried Millspaugh's announcement, made in Sacramento.

#### State Man in Dark

Ray Treasher, field representative for the State Department of Geology and Mineral Industries, with headquarters in Grants Pass, said he didn't know anything about the deposit and that from the meagre description received he was unable to specifically locate the deposit. He identified Lull as having operated a mineral assaying laboratory in Grants Pass for many years, in addition to doing some prospecting. Treasher said no samples from the deposit had yet been taken to the Grants Pass office.

In conjunction with the announcement from Sacramento of the discovery of the deposit, the United Press later carried a statement from the Oregon State Department of Geology and Mineral Industries, Portland, that "so far they had not examined any samples and were

unable to confirm the discovery." The dispatch also quoted a spokesman for the department that "so far they had no knowledge of the deposit and that of many samples taken from southern Oregon ore deposits, they had not yet found beryllium."

#### Recall Former Report

It was recalled here that late in 1941 and early in 1942 reports were circulated that beryllium had been discovered in the Butte Falls vicinity. Medford business men became interested and on their behalf the First National bank of Portland requested state geologists to analyze the ore. In February of 1942 Treasher and a state geologist from Portland analyzed samples and failed to find any beryllium. Eugene Thorndike, manager of the Medford branch of the First National bank of Portland, said several reports of beryllium deposit discoveries had been heard the past two or three years but that they had never proven out.

Harry Skyrman, Medford attorney with mining interests, said that to his knowledge no beryllium had ever been discovered in southern Oregon, despite the many rumors and reports of its existence.

Beryllium is considered by the government to be one of the most critical war minerals. It is the fourth lightest metal known and when alloyed with aluminum and magnesium is said to produce the strongest and lightest metal ever conceived.

May 23, 1943

## Greatest Beryllium Deposit Discovered Near Gold Hill

Sacramento, April 23—(U.P.)—Discovery of the world's greatest known deposit of vital beryllium ore by an 82-year-old prospector in southern Oregon, was revealed for the first time today by P. M. Millspaugh, director of the strategic minerals survey of the County Supervisors Association of California.

The huge deposit was uncovered in the mountains 20 miles north of Gold Hill, Oregon, by Charles Lull, grizzled prospector of Grants Pass, Millspaugh said.

Upon receiving first report of the discovery, Millspaugh said, he went to view the deposit himself. "I was astounded," he said. "It looked like a huge mountain of shimmering emeralds. It was the greatest thing I ever saw."

Prospector Lull, who is sole claim holder of the property had been working a small and unproductive pocket of the ore nearby for some months, Millspaugh said, and hadn't recognized the huge deposit for what it was because it was stained off-color by foreign minerals.

It is considered by the government to be one of the most critical minerals necessary to the war.



# So-Called Beryllium Ores of Oregon

DURING the past five or six years innumerable samples of a green, or blueish-green, volcanic tuff, much of it altered to a more or less clay-like consistency, have come to the writer's laboratory from Jackson County, Oregon. This material is said to carry from 6 per cent to 32 per cent of beryllium oxide, but in spite of the fact that a mountain of the ore was said to exist, and in spite of the demand for a single large source of beryllium ore, no production has ever occurred. Since such extravagant claims are common in connection with beryllium, an element which seems to exercise a peculiarly invigorating effect on the human imagination, no special attention was paid to the claims.

Very recently, however, a release to the press and radio stated that the discovery of a large deposit of rich beryllium ore in Oregon would supply all of the country's requirement of beryllium for the next hundred years. Unfortunately, this release seemed to come from a semi-official source in another state, so the report gained wide credence, and there was evidence that a directly deterrent effect was exercised on some who had fair prospects of developing beryl in a reasonable, small way—a method of production which is being earnestly encouraged by those in our government whose province it is to increase our domestic supply of much-needed beryllium ore.

After this last release it seemed advisable, as an unattached scientist deeply interested in beryllium, to visit the Oregon field, and to learn whether the lately heralded discovery was the same as the source of the tuff which had been coming in since the year 1938. The owners granted the privilege of visiting the property and taking samples for analysis, and assured me that the new discovery was the same property. The only "new" part seems to be that this semi-official visitor from a neighboring state, accompanied by one who previously had had mining experience, had been at Grants Pass, Oregon, and had heard for the first time of the deposit from a local source. Without further investigation the story was released to press and radio.

THE difficulties in the exact analysis of beryllium ores are recognized by experienced chemists, and it is interesting to note that none of the high percentages of beryllium oxide in these Oregon samples had been reported by chemists whose training and experience would have specially fitted them for this type of analysis. It was stated locally that the beryllium in this ore would not yield to ordinary methods of analysis, but that a special method had been devised in a local assay office which would show it. In this special method I could discover nothing new. It was the formerly used method of Parsons and Barnes, with not too strict adherence to certain refinements advocated by these authors.

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A careful investigation by analytical method of the most approved type has failed to show significant amounts of beryllium in the so-called beryllium ores of Jackson County, Oregon. The investigation is an authoritative answer to the controversy as to the beryllium deposits in that area.

A matter also worthy of note is the opinion locally held that the spectrographic test for beryllium is not effective. This was used to explain the fact that all samples of the Jackson County tuff submitted to experienced spectrographers had failed to show any beryllium content. It was learned in Grants Pass that the basis of this disbelief in the reliability of the spectrographic method was based upon an observation by Bunsen in the early days of the visual spectroscopy. He stated that the line of wave-length 4573, earlier noted by Kirchoff and Thalén as spark line, did not show if the beryllium chloride was excited by the arc instead of by the spark. It is common knowledge that a number of lines of each element show in the spark spectrum and not in the arc spectrum, and vice versa. So this reference was a simple statement that the line 4573 was a spark line and not an arc line. Such a statement could be interpreted as a criticism of the spectrographic detection of beryllium, in which we rely on lines in the ultra-violet such as 2348.61 and the doublet 3130.42—3131.07, only by those who do not differentiate between the early days of the visual spectroscopy and the technique of the modern spectrograph, with photographic reproduction of the lines in the ultra-violet region. However difficult may be the exact determination of the percentage of beryllium in an ore, it is a happy fact that beryllium is one of the easiest elements to identify qualitatively by means of the spectrograph.

In order to approach the question from another angle it was decided to offer as argument not what was **not** in the Jackson County ore, but rather what **was** in it. A composite sample of material was taken from five cuts on the property, representing the green and the blueish-green tuff in both its harder and its more clay-like consistencies. This sample included only material which resembled most closely samples which had been submitted to me by an authorized representative of the owners. If analysis could account for 100 per cent of the content of the ore, the question of whether in addition to this there was also from 6 per cent to 32 per cent of beryllium oxide would answer itself, and one would be freed from any prejudice against the spectrographic method.

THE analysis was carried out, with every attention to the accuracy of details, testing of reagents, etc., by the accepted

methods for geological rock analysis, as given in Hillebrand and Lundell's "Applied Inorganic Analysis." Aluminum was determined directly in a separate portion, by precipitation as hydrated chloride in ethereal solution, being finally weighed as the oxyquinolate. All weighed precipitates were tested spectrographically for the presence of beryllium, to make certain that any beryllium present was not being counted as another element.

The analysis showed the following percentages:

Silica (SiO <sub>2</sub> ) .....	61.84
Titanium oxide (TiO <sub>2</sub> ) .....	0.81
Aluminum oxide (Al <sub>2</sub> O <sub>3</sub> ) ..	13.52
Ferric oxide (Fe <sub>2</sub> O <sub>3</sub> ) .....	3.44
Ferrous oxide (FeO) .....	1.09
Manganese oxide (MnO) ..	0.11
Calcium oxide (CaO) .....	3.71
Magnesium oxide (MgO)....	1.23
Strontium oxide (SrO) ....	0.12
Potassium oxide (K <sub>2</sub> O) ....	2.23
Sodium oxide (Na <sub>2</sub> O) .....	1.82
Water below 110°C. (H <sub>2</sub> O—)	3.65
Water above 110°C. (H <sub>2</sub> O+)	6.32
Phosphorus pentoxide (P <sub>2</sub> O <sub>5</sub> )	0.14
Chlorine (Cl) .....	0.03
Sulphur (S) .....	0.01
Vanadium trioxide (V <sub>2</sub> O <sub>3</sub> )	0.002
	100.07

Clearly, there is no room for from 6 to 32 per cent of beryllium oxide in this ore.

The question of phenacite, the rich orthosilicate of beryllium, in the deposit had been raised by a statement, earlier made, that some very pure, transparent crystals carried a "high percentage of beryllium." Such a crystal, submitted earlier to me by an authorized representative of the owners, was analyzed for silica by treatment of the powdered sample with sulphuric and hydrofluoric acids, volatilizing the silica as silicon tetrafluoride, igniting and weighing any residue, which would contain any beryllium oxide.

This analysis showed:

Silica (SiO <sub>2</sub> ) .....	99.76%
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Manifestly the crystal was pure quartz.

In addition to the purely chemical analyses so far described, the spectrographic test for beryllium was used on six other types of material from the property. In none was beryllium found. It might be explained that routine spectrographic methods, which will show beryllium in percentages as low as a few hundredths of a per cent, were used, and special refinements, which would show a beryllium content of the order of 0.001 per cent, were purposely avoided, since such contents of beryllium are not uncommon in a number of ordinary igneous rocks, and these amounts are entirely outside the range of practical significance.

In summarizing, it may be said that careful investigation by analytical method of the most approved type has failed to show the presence of beryllium in practically significant amounts in the so-called beryllium ores of Jackson County, Oregon.