

of very light oil. Another in Township 23 west of Elbow River has yielded heavier oil.

In the country to the east of this broken area and the syncline indicated in Figs. 3 and 4, the beds are so slightly flexed that they seem at any one point to be almost horizontal. They are as a rule less consolidated than the beds near the mountains, and the rivers are deeply trenched. This river erosion is accompanied in nearly every case by a series of land slips, extending back for some distance from the banks. This already has been interpreted as faulting by several "experts" and an intricate structure showing anticlines and faults has been pictured providing many "oil companies" with attractive prospectuses. There is a wide anticline, however, in Southern Alberta, between the outer foothills and the Cypress Hills at the eastern boundary of the province, which extends from Northern Montana well into Alberta. This had already been the subject of investigation for a possible natural gas reservoir; and the wells at Bow Island which supply Lethbridge and Calgary are located on it. Attention has again been called to it by the discovery of slight signs of oil in springs on the slopes of the Sweet Grass Hills in Montana, and several drilling rigs have been placed in the valley of Milk River and even at the Boundary line, on the flanks of the above-named hills. The borings in this vicinity will probably penetrate the sandstones of the lower part of the Belly River series, and also the Benton, before reaching the Dakota, from which there seems to be some chance that gas at least will be obtained. The thickness of the Cretaceous measures is here smaller than in the foothills, and very deep wells will not be necessary to test the ground.

A flat anticlinal structure is also indicated by the outcrop of the Belly River rocks in the eastern part of Alberta. This anticline runs in a northwest direction and is crossed by several stream valleys, notably that of the Battle River. The Grand Trunk Pacific Railway crosses the Battle River near the axis of the anticline. A well, sunk for gas near the railway but to the west of the centre of the anticline, struck a small gas reservoir at a depth of 2,340 ft.

Development.—Oil seepages have been known for many years in the mountains along the International boundary east of the Flathead Valley. Several companies bored wells at the outer edge of the mountains, and about six years ago there was some excitement over the discovery of oil in a well near the Waterton lakes. The difficulty of getting machinery to this region and the probability of the area being limited prevented extensive prospecting. The finding of oil last year in an easily accessible area of less broken country at the outer edge of the foothills at once attracted the attention of the speculative element of the population; and many companies were formed and oil leases applied for. The discovery well is situated on an anticline of Benton shales, flanked on both sides by sandstone ridges cut through by the valleys of three streams. Since the sandstone at the crown of the anticline has been removed by denudation, the direction of the anticlinal axis is marked by a series of transverse valleys eroded in the shales. These depressions afford favorable locations for derricks; and 11 wells are now being bored. In the country to the west of this anticline many other drillings are being made so that in the portion of Alberta shown in Figs. 1 and 2 there were during 1914 about 36 separate points of attack, mainly in the foothill belt. Two wells have reached depths of more than 3,000 ft. with-

out success. Seven, including the discovery well, are over 2,000 ft. deep. Fourteen are over 1,000 ft. deep and thirteen others have reached smaller depths.

Three companies are boring in the Milk River Valley and four in the foothills north of Bow River. In a few cases it may be considered that the ground has been found to be barren of productive reservoirs; but in the majority of cases the mechanical difficulties have been so great, owing to the depth to the prospective oil-sands, that no positive result has been reached. In some cases the wells have been badly located from the viewpoint of structure.

In the discovery well, light, gasoline oil and a heavy gas flow were found at 1,550 ft. in sandy beds in the lower Benton. At 2,700 ft. another flow of gas and oil was found in the Dakota or in sands of about that horizon. This oil was also light in specific gravity (about 55 deg. Baume) and was accompanied by a heavy flow of gas which has been shown by experiment to produce a light gasoline on condensation.

It is claimed that showings of oil have been got in several wells in the vicinity.

A discovery of oil 40 deg. Baume in the well of the Moose Mountain Oil Co. was announced on Nov. 24, 1914. The well has since been shot and a yield of 25 bbl. per day is claimed. The oil is dark brown and shows a greenish color by reflected light. It was struck at a depth of 1,690 ft. in the top beds of the Dakota.

In March, 1915, two wells near the discovery well reported oil. The Heron-Elder well, on the western limb of the anticline, reached the top of the Dakota at 2,746 ft. Oil came into the well at 2,774 ft. and rose about 2,000 ft. The oil is dark in color and probably heavier than that from the discovery well. About a mile south and near the crest of the anticline the Western Pacific well reached the top of the Dakota at 2,150 ft. and report gives about 300 ft. of oil in the well accompanied by a strong gas pressure.

LASSEN IS AN ACTIVE VOLCANO.

The latest reported outbreak of Lassen Peak, California, marks a distinct point in the progressive change in the character of the eruption and places Lassen in the category of sure enough, more or less dangerous, volcanoes. Heretofore the eruptions have carried only boulders and light ashes as black smoke without illumination. The present eruption is reported as involving genuine lava whose cloud-reflected glow reminds one of Stromboli, the active volcanic lighthouse of the Mediterranean. J. S. Diller of the United States Geological Survey has just received a telegram from J. R. Milford, Superintendent of the Northern California Power Co., at Redding, California, dated May 20, stating that:

"Lassen Peak in violent eruption 9.30 to 11.30 last night. Fire observed coming from crater. Incandescent ejecta roll down the mountain side. I observed spectacle from Volta (10 miles from Lassen Peak). Many in Sacramento Valley saw same. At Manzanita Lake (3 miles from the crater) to-day storm clouds prevented complete observation. Activity immensely increased."

The present eruption means, according to Mr. Diller, that the explosions are getting down into real hot stuff and that the activity is more completely volcanic. Heretofore the ejected fragments blown out by the steam explosions were rarely ever red hot. Vulcan is evidently on the job and giving a most attractive exhibit for the Panama-Pacific Exposition.