head Valley. The rocks of the district were certainly not oil-producing, and so gave no indications as to the probable locality of the seepage, and the oil was only located, after some time, by the odour. The spring was found in the brush, about a quarter of a mile from the trail, at the base of the mountain to the north of the valley and near a small lake and marsh, which lie at an elevation of some 200 feet above the stream and 4.400 feet above the sea. The ground to the north of this lake is marshy and full of springs of water which go to form the lake. About 100 yards from the base of the mountain, on a knoll higher than its immediate surroundings, there is issuing a good-sized spring of water, and besides this spring were found several pools covered with thick, dark-green oil. The oil, being lighter than the water, accumulated nearest the highest point, the water flowing off below. The oil had accumulated here in several pools which covered an area of some 50 feet diameter, but, as far as could be determined, actually rose only within a radius of 6 or 8 feet, the remaining pools being formed by overflows. As the oil spreads itself out over the face of the water, all these pools have the appearance of being entirely oil, but an attempt to skim it off soon revealed the fact that it could not be collected by this means, but only by laying a cloth on the top of the pool and allowing it to soak up the surface oil and water, the cloth then being wrung out into a tin, from which the water was syphoned off from the supernatant oil. Samples of the oil were thus obtained and brought down for analysis. In appearance it is lighter than the crude oil of Pennsylvania, probably containing less tarry matter and being richer in the more volatile constituents. The table on page 200 shows the results of an examination made of these oils by the Provincial Assayer.

It will be noted that both samples 3 and 4 are of exceptionally low specific gravity, and that sample 4 consists almost entirely of the lighter constituents of petroleum.

The oil rises through black marsh earth covered with charcoal, etc., resulting from the frequent ignition of the oil-soaked vegetable matter on the surface, and it is difficult to tell how much of its colour it owes to this source. This "spring" can only be described as an oil seepage; there is no flow and the quantity of oil therefrom is very small, probably not more than a couple of gallons a day.

The flow of oil here reported is exactly as it was observed in the last week in August, 1003. Conversations had subsequently with prospectors of undoubted reliability, would indicate that the amount of oil issuing varies with the season and with different seasons, probably being influenced by the flow of water in the springs, the water seeming to bring the oil up with it. As far as could be noted, there are no warm springs in the district, all being very cold and very clear, having no mineral taste or smell.

The oil rises with the water, as already said, on a knoll. It is not a question of seepage out of any surface material, but of a spring coming up from the formation underlying the surface deposit and carry-

ing oil. The immediate locality is surrounded on the surface by gravel wash, and if lateral flow existed it would be to the lowest level, which is the creek bed.

The place at which the oil is found is at the top of an anticlinal in the formation, that is to say, at the highest point in the bedding of the rocks, the axis of the anticlinal crossing the creek in a N. W. direction. From this point the beds dip up the creek to the N. E., and also down the creek, to the S. W. The beds can be traced dipping to the N. E. for about three miles, at first at a very flat angle, but gradually increasing until the dip reaches about  $35^{\circ}$ . At this point a fault occurs with, to the east, a different dip to the rocks, while further up the creek this is followed by other faults; hence it may be said that three miles above the "spring" is the limit in that direction of this possible field of accumulation.

To the S. W., that is, towards the valley of the Flathead, the beds dip at a very flat angle, probably not exceeding to<sup>o</sup>, and apparently flattening out as they are lost to sight under the gravel and surface wash of the Flathead depression. In this depression no sign of solid formation can be seen, with the exception, possibly, of two or three places in the bed of the river (and these being covered with water could not be examined), where there seens to be a bed of yellowish clay shale lying flat, and which appears to be "in place" as a primary deposit.

On Kish-e-neh-na Creek, at a point where oil is reported, a similar anticlinal fold occurs, but with the axis running nearly N. E. and S. W., or with the course of the creek, the beds dipping off at an angle to the N. W. and S. E. into the adjacent mountains.

In neither of these anticlinals is there any evidence of a break, and it is quite possible that below the faults referred to overlying beds are unbroken and continuous to the S. W, over the whole area of the l·lathead depression, for a distance of 10 or 12 miles north of the Boundary.

Directly across the valley of Sage Creek from the "Big Spring" in the direction of the axis of the anticlinal and about half a mile distant, a second seepage of oil occurs in the bed of the creek, just at the base of the mountain to the east of the valley. Here, on the east side of the creek bed, is seen in place, and lving nearly flat, a bed of hard, dark, flinty shale from which issues a spring of clear water, rising in a small basin, some two feet in diameter, formed in the gravel. With this water there is given off constantly a gas, perfectly colourless, having a strong smell of the more volatile constituents of petroleum, and this gas, when collected in a vessel, burns with a vellowish flame, or, when mixed with air, explodes. The water in this little pool is quite clear and the gas can be seen to issue from the shales, but no oil can be seen here issuing as such. On the surface of the pool, however, a whitish scum collects and a piece of paper touched to the surface of the pool absorbs the scum, which does not discolour the paper any more than would water. The paper so saturated is easily inflammable. The occurrence seems to be rather a condensation by the cold water at this point of the