THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

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ISSUED BY
SCIENCE SERVICE
B and 21st Streets
WASHINGTON, D. C.

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SUBSCRIPTION: $5 A YEAR, POSTPAID

Vol. V. No. 191 Saturday, December 6, 1924

GRAVITY BALANCE MAY BE DIVINING ROD FOR OIL

Oil, liquid wealth, located beneath the ground without the risk and cost of drilling.

This has been the promise of a long list of fakirs who have victimized oil man who have been credulous in their eagerness to realize on the rosy promises to locate oil pools with absolute certainty, tell the depth to the oil, whether the wells would be pumpers or gushers and the amount of oil they would produce. "Doodlebugs" is the contemptuous name that has been won by the mysterious contraptions used by these fakirs.

Yet now comes a scientific instrument that promises to be a sort of divining rod for oil. It is the Eotvos Torsion Balance, now being tested by certain progressive oil companies in California as an aid in locating new oil fields.

This instrument was developed over thirty years ago by the great Hungarian physicist Eotvos who found he needed some super-sensetive means of measuring the force of gravity so as to detect its minute variations from place to place. However, it was a great many years later that the first suggestion was made that the balance could be put to practical use and it is only within the past few months that oil companies have become interested in its possibilities.

Essentially the menchanism consists of a light aluminum bar suspended from a fixed point by a fine platinum wire about a yard long. On one end of the bar is fastened a little platinum weight while an equal weight attached to the opposite end hangs down two or three feet below the bar. The weighted bar tends to rotate under the influence of the force of gravity until it comes to a certain position of equilibrium. This position of rest is either read off on the scale provided or in the case of newer models registered photographically. The whole instrument is then turned in another direction, the new position of rest recorded and the process repeated until enough data have been secured to calculate the exact value of the force of gravity at that station. Similar observations are made at other stations judiciously spaced over the area being investigated.

The torsion balance gives no direct indications of the presence of oil-bearing rocks underground. It gives only an accuratepicture of the variations of the force of gravity in the locality. It is then up to the oil geologist to use this gravity data to help in working out the location of structures in the underlying rocks which are favorable for oil accumulation. Most of the important oil fields have been found to occurs where the underlying strata have been arched upward. Where such conditions exist the older and generally heavier rocks approach nearer the surface and bring about a slight local increase in the force of gravity. It is in this roundabout manner that gravity measurements aid in the search for oil.

In actual practice a lot of troublesome corrections have to be made;for the force of gravity is influenced by distance from the equator, elevation above sea level and especially by the proximity of hills and mountains. The Torsion Balance is so sensitive that even the presence of the observer is registered by a derlection of the beam. It bears much the same relation in sensitivity to the delicate balance used in chemical analysis as that instrument does to the railroad scales used for weighing freight carsl Extraordinary precautions have to be taken to prevent disturbances other than those due to gravity. The swinging parts, consisting of wire, beam and weights, are enclosed in a double-walled metal case. Even then, the sun's rays might set up tiny air currents inside which would cause temporary deflections of the beam and so the observations are customarily made at night with the instrument housed in a tent with insulating walls.

Experiments are still in progress and commercial considerations make the oil companies reticent in disclosing the successes and failures of the new method for predicting oil.

SKY PINWHEELS ARE STELLAR UNIVERSES 6,000,000,000,000,000,000 MILES AWAY

The spiral nebulae in the sky are universes consisting of uncountable hosts of stars, at distances so inconceivably great from our own starry system that it these light, traveling at the rate of 186,000 miles a second, over a million years to reach the earth. The astronomer who has completed this dizzying discovery is Dr. Edwin Hubble, of the Mt. Wilson Observatory in California, according to an announcement made by the Carnegie Institution of Washington.

Nebulae are the hazy areas of light common in the Milky Way, which may be seen also as isolated patches elsewhere in the sky. Some of these nebulae have a curious spiral outline, appearing in the telescope like vast Fourth-of-July pinwheels.

The question of the nature of the spiral nebulae is one of the most interesting problems of astronomy and has led to a marked divergance of opinion on the part of those who have studied them. Some astronomers have believed that they are at enormous distances from the earth and constitute independent stellar systems or "island universes", while others consider them as objects within our own stellar universe at distances comparable with those of our fainter stars. The number of spiral nebulae is very great, amounting to hundreds of thousands, and their apparent sizesrange from small objects almost star-like in character, to the great nebula in Andromeda which extends across an angle of some three degrees in the heavens, about six times the diameter of the full moon.

"The spiral nebulae are much too distant to admit of the use of the simple method of triangulation employed successfully in the case of the nearer stars," Dr. Hubble explains. "There are, however, powerful methods available which depend upon the possibility of determining directly the true or intrinsic brightness of stars from the characteristics of the light which they send to us. If the intrinsic brightness of a star is known, it is a very simple computation to derive its distance by comparison with its apparent brightness in the sky.

One of these methods and that employed by Dr. Hubble in his investigation of the two brightest spiral nebulae, depends upon the fact that certain stars which vary in light in a definite way are known to show a direct relationship between the period of their light variation and their true or intrinsic brightness. The method has been used successfully by Dr. Harlow Shapley of the Harvard College Observatory