

GAS IS WHERE YOU FIND IT

By Dr. Charles S. Evans

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DRILLING for gas or oil is somewhat like looking for lost golf balls!

You might find a golf ball any place, on the street, under your chesterfield, or in the grimy hands of a small boy.

However, the best place to look is on or near a golf course, and, since more people slice than hook, and most golfers are right-handed, the rough to the right of the fairway, 100 yards from the tee, is the best place.

Similarly, the best place to look for gas or oil is in an area where seeps or springs of oil or gas have been observed; where scattered drilling has disclosed some oil or gas, or where there are good thicknesses of rock underground of types that have held reservoirs of gas or oil elsewhere.

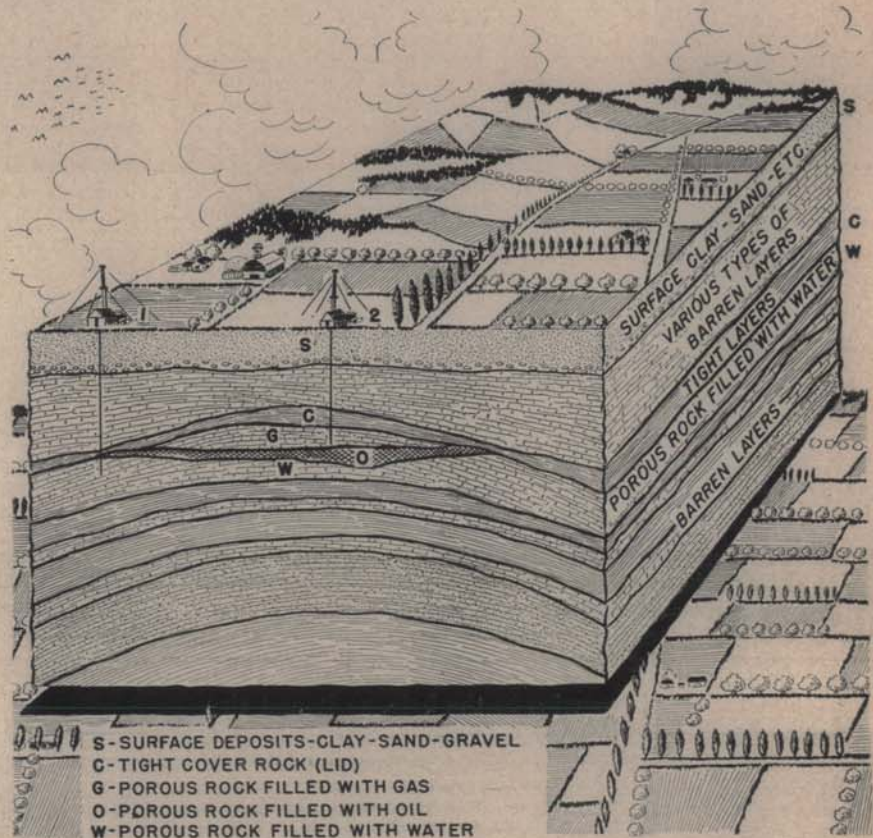
When an oil or gas operator speaks of a reservoir of oil or gas, many people immediately picture a vast cavern underground that is filled with these fluids. This is not so. The reservoir is of rock, top to bottom, but it is a reservoir because this particular rock contains billions of tiny inter-connecting holes or pores. To picture it better, actually, or in your mind's eye, fill a pail with dry sand. Then pour in water. The water fills all the small spaces between the grains of sand. In other words, the sand is porous. The volume of water you can put into the pail of sand compared to the total volume of the pail is a measure of the porosity of the sand. Its porosity should be about 25 per cent.

The rock of the reservoirs in this area is not sandy nor is it in loose grains like sand. It is limestone or dolomite and if exposed to the surface could be quarried for building stone or for crushed rock for roads, but it is porous.

Porous rock underground occurs at different depths in different layers over much of southwestern Ontario, but reservoirs of gas or oil occur only here and there.

In drilling, three different fluids are found, water, gas and oil. In Essex, Kent, Lambton, Middlesex and Elgin, the area with which we are concerned, water, salt water at that, is found in nearly every well drilled. It always occurs just below or a short distance below the gas or oil in the porous rock reservoirs. Water always tries to work downward, oil where there is no water tries to do the same. If oil and water are in the same container oil rises to the top of the water. Natural gas being lighter than water or oil or air always tends to rise. Because of this a reservoir of gas must have a gas-tight cover or lid so that the gas will not escape to the surface in quantity and be lost.

A reservoir with an upside down basin for a lid is best suited to hold the most gas.



PRESCRIPTION—Measure off a square mile of farm land, cut deeply with a knife for 2,000 feet. Lift out gently and you have a piece of cake any geologist would come miles to see. In this cross-section the various strata below the surface are easily seen.

This is shown in the diagram in which a block of land one mile square, 2,000 feet thick, is, as it were, cut out and lifted up for examination.

In the block, all the solid rock is buried under soft, surface deposits of clay, sand and gravel below which are some hundreds of feet of layered rock which contains no oil or gas, but may contain some water.

Deeper down is layer "C", a tight, impervious layer lying above a layer of porous dolomite. This porous dolomite contains gas, oil and water. Gas has risen to the top of the arch, oil has risen to the top of the water which fills the rest of this arch and also fills this porous rock in the lower areas surrounding the arch. Well No. 1 drilled at the left of the block passes through the tight cover into porous rock containing water only. Well No. 2 passes through the tight cover into gas-filled porous rock and is a producer.

The layers of rock in this block are not flat, but are bowed upward to form an upside down basin that will catch and hold gas and oil that have risen above the water.

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35 years

Henry McHardy, Port Alma

It is needless to point out that Henry is from Scotland, but for the record we record his birth in Aberdeenshire. Hoo-o-ever, Henry was but 5 years of age when his family moved to this part of Ontario. On November 7, 1913, he joined the company in the Tilbury field and for 35 years has been bossing the job in one of the biggest natural gas fields ever found. In those early days Henry could be seen gauging wells and his horse and cart was a familiar sight. He lived at Merlin until 1921 when he moved to Port Alma. In 1924 the purification plant was built there and his duties increased. As a field man, he soon became an expert in shooting wells. During his career he estimates he has shot 500 wells, not only in Tilbury but in Haldimand, Dover, Aylmer and other fields. In 1939 he was appointed field superintendent, and his duties today keep him eternally busy at the purification plant and compressor station. He still likes field work and says that sometimes he would like to get back at it. Hobbies? "Just sleeping", he says, but all who know him declare he doesn't take much time at his favorite recreation.



HENRY McHARDY

35 years

James Thorburn, Windsor

The little Scot who is office manager in Windsor first settled in Galt when he came to Canada as a young man, and for two years worked for the Galt Water Commission. The advent of the automobile intrigued him, and he moved to Windsor with a burning desire to learn the automobile business and especially to learn to drive one. However, he joined the Windsor Gas Company on March 31, 1913, as a half-time worker in the meter reading department, which consisted of one and half men. He quickly graduated from half-time work to full time work, and later served in various positions as collector, credit manager and office manager, to which post he was appointed in 1931. He has seen the Windsor Gas Company grow from about 8,000 to 25,000 meters. Jimmy recalls many amusing incidents of the early days, one of them as a winter scene. The service line was frozen and Jimmy was pouring down alcohol from a small bottle in order to clear the line. The tenant saw him and said: "That won't be enough gas for all night." Jimmy remarked that probably they thought they were paying \$3 a month for a year after that for all the "gas" that was in that bottle of alcohol.



JAMES THORBURN

35 years

Norris Hazzard, Middlesex

Born in Sombra township, Lambton county, in 1891, Mr. Hazzard was educated at a country school in that township. In April, 1913, he joined the company repairing transmission lines in the Wallaceburg division. A year later he was transferred to Merlin, where he spent seven years on transmission line work. In 1921 he went to Port Alma for six years where he worked on the transmission and field lines and general field work. The next three years he worked in Chatham, and then spent five years at Thamesville, working on transmission and distribution in both of these divisions. He was supervisor of transmission and distribution at Mt. Brydges for 13 years before becoming divisional manager of the Middlesex division in 1935, a position which he still holds and enjoys.



NORRIS HAZZARD

Mr. Hazzard follows all baseball and hockey games with a great deal of interest. He enjoys gardening and fishing "if someone doesn't insist on fishing", but he says "I am off the ponies for life."

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Layers of rock bowed up as shown here are said to be folded, and the best place to find gas or oil is on the top of the arch of such folded layers of rock.

The geologist tries to find these arches of rock, for even though they occur where the layered rock is not porous, yet it is in some similar closed arch that gas is almost always contained.

If the surface deposits did not exist then anyone walking over the exposed layers of rock could see that the layers slant downwards to the left and downwards to the right. This would show an arch of layered rock existed there.

There are areas in Canada where the layered rock is exposed at the surface and maps can be made directly showing the position and extent of these arches of rock. In the five Western counties of Ontario, there are very few exposures of bed rock, and these arches may only be

found by drilling holes and examining samples of bed rock and plotting the information from all the wells on maps.

Two oil fields in this area, Oil Springs and Bothwell, were located by the springs or seeps of oil that occurred there in surface deposits. But all the other oil or gas fields have been discovered either by drilling blindly, or by using information obtained from previous drilling in the area.

The closed arches in the porous layered rock that are filled with gas or oil vary greatly in size. Tilbury field was productive over 18,352 acres, while No. 59 pool in the Dawn field covered only 75 acres.

Because of the large number of deep wells drilled since the first deep gas was discovered in Essex County in 1889, there is not much likelihood of finding a gas field as large as the Tilbury field. But undoubtedly there are yet to be found many fields, from ones of several thousand acres to ones small enough to hide away on a 200 acre farm.