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PROSPECTING FOR OIL

By HARRY M. WALLEY, '32

It was about mid-morning on a warm summer's day. The countryside was rather wild and hilly. There were signs of civilization, however, in the railroad tracks that lay gleaming in the distance and in the smoke that floated lazily over the hillside, showing that some housewife was busily engaged. Four men, intent on their business, stood talking for awhile; then one of them drove a stake into the ground, whereupon they solemnly shook hands over the stake, climbed in a car, and drove away. That stake, so insignificant in itself, was symbolic of a great change that was soon to come over the surrounding country, for it marked the site of an oil well to be drilled in an unimproved territory and known to oil men as a "wild-cat" well.

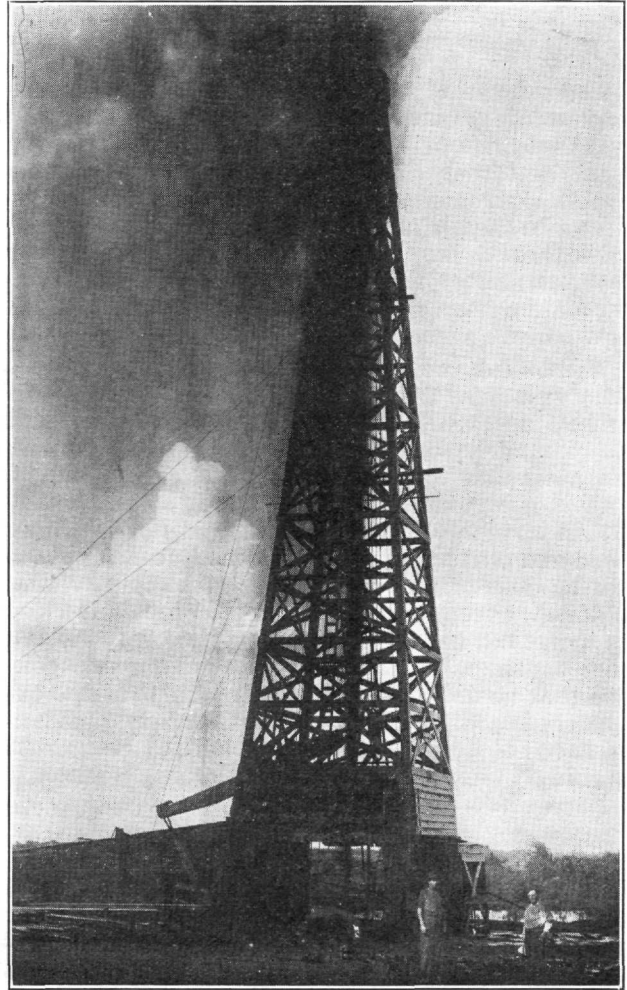
Before that stake was driven the land had been examined by expert geologists, who declared there were good prospects for oil. Attention was also given to the natural obstacles to overcome, in the way of transporting materials to the location, nearness of a railroad, and so forth. The land was then leased from the farmers on a royalty basis, and there had to be so many acres in a block for these men before they would drill. They did not have any intention of proving the territory up for some other corporation. After the leases were obtained and the stake driven, the location was surveyed and blueprints of it filed with the state and county recorders and one in the office of the men doing the drilling.

The next step was getting the materials on the location. Usually in the drilling of a wildcat well, unless it is owned by a large company which does its own drilling entirely, the work is given out to an oil-well contractor on a basis of so many dollars a drilling foot, plus certain necessary expenditures. The whole cost of a well about three thousand feet deep—the depth of the one described herein—is from fifteen to twenty-five thousand dollars.

The derrick material, which can be either wood or steel, was put on the ground first and the derrick built. The drilling tools were brought to the location and rigged up; that is, put in position. That completed the preparations for the drilling. On this particular well steam power was to be used.

The first part of the drilling is called spudding-in. The size of the hole at the start depends on the depth of the well. On this well it was fourteen inches in diameter. Casing of less and less diameter was used as the hole was made deeper. The last casing to go in was about five and a quarter inches in diameter. All the casings run up to the top of the hole and are inside of one another. When a well is first started, a rope is used to drill with. This rope is attached to the bull wheel at one end and at the other end are the stem and bit, which do the actual drilling. The casing used at the start is called drive pipe, because it must be driven into the hole.

After the well has been spudded in, a wire is spliced on to the rope and is used thereafter. The



A Typical Oil Well

well is drilled in screw lengths from five to seven feet in a length. The screw is a long threaded bolt of iron with a lever at the top and a set of clamps at the bottom. The screw is let down a few inches at a time. When a screw length is reached, the tools are drawn out of the hole, the bailer is run down, and the hole is cleaned out. Another bit is then fastened to the stem, the tools are run back down the hole and drilling begins again. The bit that has been taken off is put into a small forge and into an intense heat. When hot enough it is taken out and resharpened and reshaped to a gauge the size of the casing. From this it can be seen there must be several stems, bits, and bailers.

Frequently there is trouble in drilling. The tools may get stuck in the hole or the cable may break. All operations must then stop and the tools must be taken out. This is called, very appropriately, fishing. There are several types of fishing tools. If the cable is broken, an effort is made to get hold of it and draw the tools out. If it will not draw them out, the cable is cut and other fishing tools sent down to try to get hold of the stem. When and if this succeeds, the process of getting them out is begun. A set of jars that

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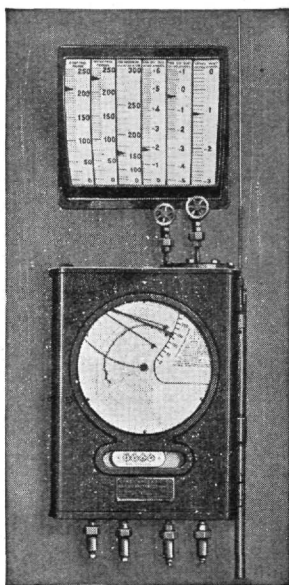
were fastened on the stem when the fishing tools were sent down the hole now take up the task of jarring the drilling tools loose. This may succeed or it may not. I have known cases where tools have been fished for for weeks at a time. If all attempts fail, the hole is plugged according to state laws and the derrick moved. This is done by jacking up the derrick and using pulleys.

If everything goes along smoothly, the well is drilled into the oil sand in about thirty days. These sands are watched carefully and the screw lengths are shortened about half. Some sand is taken from the bailer each time it is run down and watched carefully to note changes. Finally, if the well is successful, oil is struck. It is an anxious time for the owners as the well is being drilled in.

Preparations are then made for shooting the well. The casing must be a safe distance away from the bottom of the well and things that are easily destroyed are moved from the derrick floor. Care is taken to estimate as accurately as possible how many barrels a day it will give. The amount of the charge of nitroglycerine depends on this and the hardness of the sand. When all is ready the "shooter" arrives. The nitroglycerine is

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packed in specially prepared containers. The shooter transfers the liquid from the cans into shells and these are lowered in the hole. Everything is handled very carefully. The nitroglycerine is then set off and everyone runs for shelter or in the direction from which the wind is blowing. The oil, water, and rock usually shoot above the derrick, seventy or eighty feet. This is one of the most spectacular sights of the business.

After the shot has expended its force, the flow is directed into tanks, which have been set a safe distance away. The well is then cleaned out and a pump set over it. If there is sufficient gas, this is used to pump the well. Sometimes, if there are enough paying wells found close enough together in the field, the derrick is torn down, and the well set up on a pumping jack. Several wells, depending on the depth of the hole, can be set up on these and run by one central power. The oil is shipped to the refinery in tank cars by railroad; or, if enough barrels are produced daily, a pipe line is laid to the refinery.
