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2014 – Flint Hills Land, Sky, and People (Cathy Hoy, Jim Hoy, Marty White, Editors)

Oil in the Flint Hills

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Recommended Citation

Buchanan, Rex (2014). "Oil in the Flint Hills," *Symphony in the Flint Hills Field Journal*. https://newprairiepress.org/sfh/2014/flinthills/4

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The Field Journals are made possible in part with funding from the Fred C. and Mary R. Koch Foundation.

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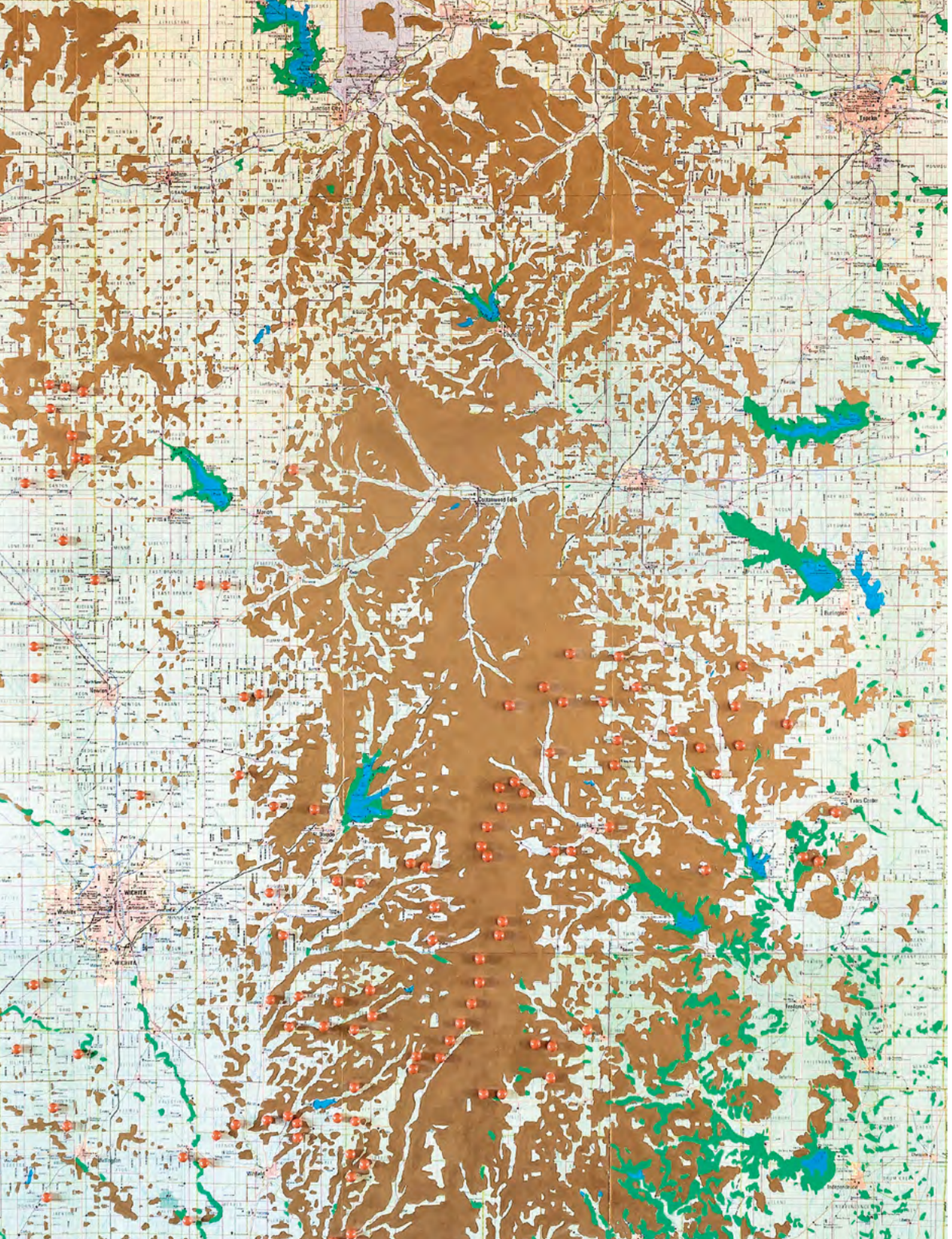


Oil in the Flint Hills

On a December day in 1915, on a rise just north of El Dorado, drillers gathered around a well. They were using a cable tool rig, one that lifts and drops a sharpened iron tool into the ground, pounding a hole into the earth, really, rather than drilling. Back in September and October, they'd seen shows of oil on their way down, at 550 feet and 650 feet. But on this day, at about 2,500 feet, they found more. Much more.

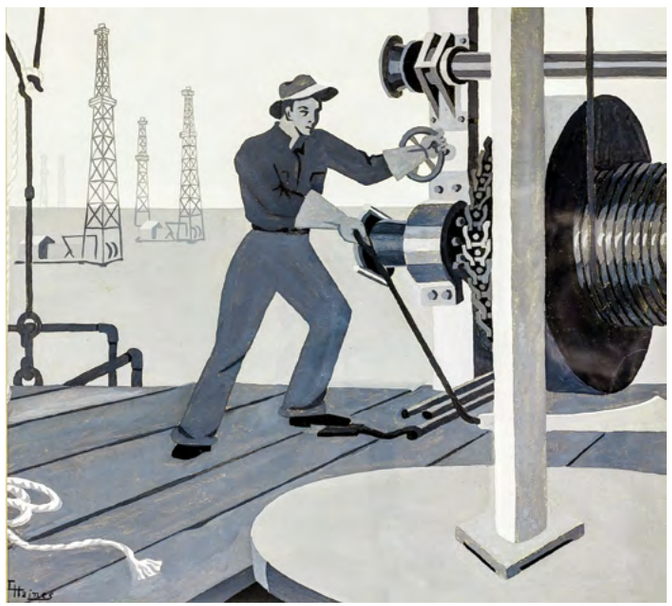
The well wasn't a gusher. Oil didn't explode to the surface like it does in the movies (or did in real life in other Kansas wells). But oil came out. At least 150 barrels a day. The well was labeled Stapleton #1, after the landowner. Few people realized it, but big-time oil production had hit Butler County.

Some Kansas towns have names that sound like wishful thinking. El Dorado (sometimes translated as "a place of fabulous wealth") got its name from the land's rich appearance in 1857, long before anybody dreamed of oil here. But for El Dorado,

OPPOSITE PAGE: OIL FIELDS MAP (DETAIL)
Grassland painted metallic gold; Reservoirs painted blue; Woods and Marshland painted green; Oil Fields marked with red map tacks.
Bill McBride

the name was spot on, both in terms of the land and the oil beneath it. Stapleton #1 opened up the El Dorado oil field, the most prolific oil field in Kansas history (it has produced more than 300 million barrels of oil since 1915). Even today Butler County remains the most prolific oil-producing county in Kansas history (it has produced 584 million barrels of oil).

At least some of the credit for this discovery went to Erasmus "Daddy" Haworth, the first director of the modern Kansas Geological Survey. By carefully mapping rocks at the surface and the angle at which they lay, Haworth postulated the presence of an anticline, or dome in the subsurface rocks, that allowed oil and gas to accumulate at its peak.



ABOVE: WORKING RIG, HARMON LEASE (1918)
Irene Haines
Courtesy Butler County History Center and Kansas Oil Museum

Just to be clear, Stapleton #1 wasn't the beginning of the oil business in Kansas. Oil seeps led to drilling in the 1860s in Miami County, near the town of Paola. In 1892, a well (Norman #1) at Neodesha in Wilson County opened up drilling and production throughout the midcontinent.

But the El Dorado field marked the beginning of production at a new and larger scale. After Stapleton #1, much larger, more productive wells came in. By 1916, more than 600 wells had been drilled in the El Dorado field. The population of the town of El Dorado more than tripled. Just three years after its discovery, the El Dorado field had produced an incredible 29 million barrels of oil, energy that was especially welcome in the waning days of World War I.

What's striking about the El Dorado field is how many subsurface rock layers contribute to its production. Eight different zones produce oil, starting with rocks deposited about 300 million years ago during the Permian Period of geologic history (although in the subsurface here in Butler County, rocks of this same age crop out at the surface farther northeast of here in the Flint Hills) to much older rocks deposited during the Cambrian Period, about 500 million years ago. One notable oil-producing rock layer is often informally referred to as the "Bartlesville sand," named after the town in Oklahoma. These sandstones were deposited in river channels during the Pennsylvanian Subperiod, shortly before the Permian, and are sometimes referred to as shoestring sands (because of the wavy lines they make when plotted on a map, like shoestrings dropped on a piece of paper) or squirrel sands (because the sandstone locations were unpredictable and seemed to jump around; they were "squirrely").

Though huge, the El Dorado field is only one of many oil fields around here. Five miles north of the town of Rosalia, the Rosalia field has produced about 825,000 barrels of oil over time, though

ROTARY ENGINE
Morris Fimreite
Courtesy Butler County History Center and Kansas Oil Museum

annual production is down to about 3,500 barrels these days. Northeast of Rosalia, the Sallyards oil field, named for a small town in Greenwood County, has produced over ten million barrels of oil.

In many ways, these fields mirror the history of Kansas oil and gas exploration, at least until the recent past. Because Kansas has produced oil and gas for a long time, it is generally known as a "mature" oil and gas producing region. Kansas oil production peaked in the 1950s, at better than 100 million barrels per year.

Production has generally declined since. Or at least it did until the past few years, when new technology and stable (and relatively high) prices kicked off a drilling boom. Companies used three-dimensional seismic reflection to get a more precise image of the deep subsurface. They experimented with horizontal drilling, drilling laterally away from the well, boring through considerably more oil-bearing rock. Horizontal drilling, combined with hydraulic fracturing designed to get oil out of those rocks, generated a surge in drilling and leasing, mostly in counties southwest of here, such as Harper, Barber, and Comanche. Not all of these wells were highly productive, but a few produced 700 to 800 barrels of oil per day, vastly more than the initial production from Stapleton #1.

The jury is still out on this new exploration, generally referred to as the "Mississippian limestone play" (named after the age and type of subsurface rocks that are being explored). Some of the larger companies that came into Kansas to lease and drill have since left. But others remain, along with small independent oil companies that have long typified Kansas oil and gas exploration.

Today Kansas remains a top-ten oil and natural gas producing state, pumping just over 43.7 million barrels of oil and 300 billion cubic feet of natural gas in 2012. The value of this production was over four billion dollars, not counting the economic impact of leasing and drilling activity.

For the most part, that Mississippian play hasn't extended into this part of the Flint Hills. But oil and gas remains an important part of the landscape here. Pumping continues, providing jobs and income for operators, leaseholders, and land owners. And the landscape has physical reminders, not just the pumpjacks that bob up and down. In places, like the ghost town of Teterville east of Cassoday, one can still see the remains of pumphouses, concrete foundations and pads, and even pipes and old machinery.

To learn about all this, head to the Kansas Oil Museum in El Dorado. They display ten-acres worth of equipment, including pumpjacks, a cable tool drilling rig, and the re-creation of an oil boomtown.

And to see where it all started, visit Stapleton #1, just north of El Dorado. It's been almost 100 years since that cold day when the Stapleton #1 came in. But its influence reverberates throughout Butler County, the Flint Hills, and the rest of Kansas.

Rex Buchanan, a Fellow of the Geological Society of America, grew up near Little River, in Rice County, Kansas. He is currently the Interim Director of the Kansas Geological Survey, where he has served since 1978. He has an undergraduate degree from Kansas Wesleyan University and graduate degrees from the University of Wisconsin-Madison.