

THE PETROLEUM INDUSTRY IN INDIANA
IN 1907.

BY

W. S. BLATCHLEY.

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During the year 1907 Indiana took a long step backward in its once leading industry, the production of petroleum. The output for the year was less than for any one since 1900, while the number of wells abandoned was more than three times the number drilled. This great decline was not due to the lack of productive territory, for large areas which undoubtedly contain oil in commercial quantities lie along the border and in the midst of the previous producing Trenton rock field. Rather was it due to the migration of the principal operators to Illinois and other fields where the output per well is much greater than in Indiana. The average oil operator is ever on the lookout for a "gusher" or big producer, and quickly abandons a territory where the wells are light, even though they are lasting and the profits fair, for one which promises a bigger yield per well, though the final profits are less. For that reason and for the further one that there was no material rise in the price of Trenton rock oil during the year, Indiana owes her big slump in oil output. As a very full report,* accompanied by detailed maps, was made on the industry in the State for the year 1906, but brief mention of the more important developments in 1907 will be given in connection with the statistics for the year.

THE TRENTON ROCK OIL FIELDS OF INDIANA FOR THE YEAR 1907.

Grant County.—In this county, which in 1902 and 1903 was the principal seat of operations in the Indiana field, but little new work was done during the year. All the producing bores sunk were light in output, the average initial production of the 103 bores drilled being but 7.5 barrels per well. Much of the productive area in the county yields heavy salt or "blue lick" water, and the gas supply has become so meager that most of the oil must be pumped with steam engines using coal for fuel. Small producing wells can not, therefore, be pumped with profit, and as a

*"The Petroleum Industry in Indiana in 1906," by W. S. Blatchley, in Thirty-first Annual Report Indiana Department Geology and Natural Resources, pp. 429-558.

result 418 of them were abandoned, the iron in many of them being pulled and taken to Illinois, where the majority of the former Grant County operators are now located. Should the price of Trenton rock oil materially increase, many of these operators will doubtless return and start new work in the undrilled intervals between the older wells of Grant County. However, the county will never be what it was in the halcyon days of 1903, when the cough of the gas engine and the churn of the drill were heard on every side, and 1,383 bores, or nearly three times as many as were sunk in the entire State in 1907, were put down within its bounds.

Huntington County.—Inside of known productive limits in this county a bore is as sure a venture as one can make anywhere in the United States in the oil business, since of the 976 sunk within the county during the past five years, but 24, or 2.4 per cent, were dry. There was, however, little doing here, as elsewhere, in the extension of new territory in 1907. The number of new bores sunk was but 48, as against 121 in 1906, while 70 old ones were abandoned. The average initial output of the new wells fell from 13.6 to 10.6 barrels, showing that the stored supply is gradually being exhausted.

Wabash County.—This county lies outside the main producing Trenton rock area, and has as yet produced but little oil. In the old Rich Valley pool in Noble Township but two small producers were drilled during the year, while two of the old wells were abandoned. There are but about 25 producing wells left, all of which are very light in yield.

Liberty Township, in the southeastern part of the county and near productive territory in Grant and Huntington counties, also yielded two producers which started at only five barrels each. This area may in the future produce quite a quantity of oil, as the wells just to the east in Huntington have many of them been above the average.

Blackford County.—But 22 new bores were sunk in this county during the year, and no one of them opened up any new territory. Of the 22, three, or 13.6 per cent, were dry, while the initial production of the others averaged but 7.4 barrels each. The number of abandoned wells in the county was 156, or more than seven times as many as were drilled. Montpelier, in the northeastern part of the county, and once the leading oil town in the State, has during recent years lost much of its prestige, the most of the oil well supply stores and part of the offices of the Ohio (Standard) Oil Company having been removed to more promising territory.

Wells County.—This county ranks among the best in the Indiana field. While most of its productive area has been drilled over, there are hundreds of untested locations among the older wells, as well as considerable outlying territory that has had no drilling done on it since the first tests made during the early development of the field. The percentage of dry holes is as low as anywhere in the State, unless it be in Huntington County, and in 1907 it outranked that county in this respect. During the year 122 bores were sunk, of which only two, or 1.6 per cent, were dry. The average initial output of the 120 producing bores was 8.9 barrels, as against 9.4 in 1906, the loss being less than in any other of the larger producing counties. While the number of abandoned wells in the county was 224, this was below the average as compared with the number drilled.

Three or four of the largest producers finished in the State during 1907 were put down in the old developed territory of Jackson Township, one on the Risinger farm, in section 33, starting at 250 barrels, while a second and third on the Younce and Kilander leases, in section 28, made 175 and 150 barrels respectively during the first 24 hours. Such wells as these, in the midst of numerous small ones starting at five to 15 barrels, put new hope in the heart of the operator and go to prove that each new bore, even though surrounded by well drilled territory, is almost as much of a gamble as the rankest wildcat, far outside of productive limits. It is this element of chance, ever present, which adds to the excitement and pleasure of the oil industry, and so tends to keep the beginning operator a life-long devotee before its shrine.

Adams County.—This county has produced Trenton rock oil only in its southern third, but here, as elsewhere, developments were at a minimum during 1907. But 30 bores were sunk, while 125 old wells were abandoned. Of the new ones, four, or 9.1 per cent, were dry, while the average initial output of the others was 5.7 barrels, or four barrels below the average of the Trenton rock field.

Jay County.—This county was the most active in the older Indiana oil district during the year, 152 bores, or more than one-fourth of the total in the Trenton rock area, having been sunk within its bounds. Of these 30, or 19.7 per cent, were dry. This large percentage was due to a number of wildcat bores put down in search of new territory, the majority of which came in barren.

One of the most important of these tests was on the Strong farm, east half of the northwest quarter of section 29, Richland

Township, about three miles southwest of Redkey and the same distance south of Dunkirk. This well is accredited with producing 100 barrels in the first 24 hours. Another test on the Smith lease in the northeast quarter of the same section, finished in October, was even better, starting at the rate of 150 barrels. These two wells are but a few miles northeast of the productive Albany pool in Delaware Township, Delaware County, and denote an extension of that pool in that direction. That the territory is spotted here as elsewhere was shown by a bore on the Murphy farm in the southwest quarter of the same section, which came in dry.

Some new territory was also opened up in the southeastern part of Bear Creek Township, in the northeastern part of the county, where a test bore on the Pape lease started at 75 barrels. No less than 105 of the 152 bores sunk in the county were drilled in Bear Creek Township. Of these 16 were dry, while the average initial output of the others ran about 12.5 barrels. To the prospective operator Jay County offers as good undrilled territory as can be found anywhere in the State. In a number of isolated test bores put down at wide intervals in the county, oil in commercial quantities has been found. The most of these bores were sunk by companies with small capital which could not develop their leases after they had made a fair strike. A list, with localities, of these test bores was published in the 1906 report above cited. There is little doubt but that Jay will continue to produce large quantities of oil as long as the price justifies the sinking of a number of new bores each year.

Randolph County.—The effect of the slump in the Indiana oil industry during the past five years is nowhere more effectively shown than in the record of Randolph and its neighboring county, Delaware, in the once famous Muncie-Selma-Parker field. In the small portion of that field lying in Randolph County there were drilled in 1903, 128; in 1904, 113; in 1905, 80; in 1906, 26, and in 1907, five bores. Of the five sunk in 1907 two were dry, while 71 of the old wells were abandoned.

On the E. and Z. Cecil leases just northeast of Parker, the site of the greatest producing oil pool in the deep pay sand of Indiana, no less than 33 wells were abandoned during the year. This territory was, however, always very spotted, the per cent of dry holes averaging about 40 for the years mentioned. Judging from its past record, Randolph offers little to induce the prospective oil operators to locate within its bounds.

Delaware County.—Nowhere in the State has the petroleum in-

dustry shown greater retrogression during the past three years than in Delaware County. The original home of the deep pay bores, it enjoyed a boom during 1904 and 1905 which resulted in a big producing but short lived pool. Backing up an abundance of oil was an inexhaustible flow of salt water which drowned out many of the best wells while yet in their prime. The early operators who were fortunate enough to hold big leases and sell them before the water made its appearance made some money, but the purchasers lost hundreds of thousands of dollars by the quick flooding of the field.

The rise and fall of the industry in the county is graphically shown by the number of producing wells and dry holes sunk during the years 1903 to 1907 inclusive, as follows:

Year.	Producing Wells.	Dry Holes.	Average Initial Output, Bbls.
1903.....	74	48	20.7
1904.....	831	121	44.4
1905.....	570	83	32.6
1906.....	141	39	33.2
1907.....	49	16	14.6

The best producing well put down in the county in 1907 was a test bore on the Hitchcock lease, in the southwest quarter of section 23, Delaware Township, which is said to have started at 200 barrels. Several other good ones were drilled on the Michaels farm, in section 15 of the same township, where the first deep pay bore was sunk in 1903. During the year 330 of the old producing wells were abandoned, while the number abandoned in 1906 was 208.

If the new producing wells drilled south of Dunkirk, in Richland Township, Jay County, are any criterion, quite an area of productive territory may yet be opened up in the northeast corner of Delaware County, but aside from this there is little hope of locating a new area of any importance within its limits.

The following table gives the output of the Muncie-Selma-Parker field by months for the years 1904 to 1907, inclusive:

Number of Barrels of Oil Piped or Shipped from the Muncie-Selma-Parker Oil Field in 1904 to 1907, Inclusive, by Months.

	1904.	1905.	1906.	1907.
January	42,835	358,483	182,927	74,970
February	33,081	282,773	143,410	70,681
March	40,869	321,650	145,442	72,206
April	46,504	305,129	143,823	72,139

	1904	1905	1906	1907
May	73,102	320,287	151,860	76,545
June	115,048	311,030	143,309	65,516
July	176,624	277,177	134,479	68,111
August	240,050	255,854	132,482	59,018
September	311,098	230,970	107,129	54,434
October	384,380	218,052	113,151	53,985
November	356,173	210,724	90,742	40,603
December	382,302	200,163	85,905	50,340
Totals	2,202,126	3,292,292	1,574,659	768,148

Madison County.—But little can now be said of the oil industry in this county, though the record for 1907 was better than that for 1906. Only five bores were sunk within its limits during the year, and two of these were barren; the average initial output of the others being 16.6 barrels. Of the old producing wells 25 were abandoned, as against 32 in 1906. The new producers are on the Gray lease in Monroe Township, east of Alexandria. The total output of the Alexandria field during the year was but 64,141 barrels.

Miami County.—In this county there was not a bore sunk in 1907 and but one in 1906. The number of wells abandoned in 1907 was 13, and in 1906, 16, thus showing progression backward at a rapid rate.

Hamilton County.—The isolated pools about Olio and Horton, which were fully described last year, and which at one time created quite an excitement among the oil fraternity, had only three dry holes to their credit during the year 1907. Four of the old producing wells were abandoned. There was produced in the Olio pool and shipped from Noblesville during the year 3,234 barrels, while the Horton pool yielded for the same time 2,961 barrels.

Marion County.—No new bores were sunk or old ones abandoned in this county during the year. Six or seven wells are yet being pumped at intervals on the Wiggins and Lee tracts near Broad Ripple. Their total output for the year was only 556 barrels. There is doubtless quite a quantity of oil yet stored in the Trenton in the immediate vicinity of the old Broad Ripple pool, the limits of which were never clearly defined. The proximity to Indianapolis and the fact that no big wells or "gushers" were struck prevented the rapid growth and greater extension of the pool at the time it was most productive.

STATISTICS OF THE INDIANA TRENTON ROCK PETROLEUM INDUSTRY
FOR 1907.

The past year was the third in succession that the output of Trenton rock petroleum fell below what it was the previous year. The loss in 1905 was 388,592 barrels, or 3.4 per cent; in 1906 it was 3,129,613 barrels, or 28.8 per cent, while in 1907 the loss was 2,803,717 barrels, or 36.1 per cent. As already noted, this loss of more than one-third of the production of the previous year was due almost wholly to the small number of new bores sunk, the operators seeking other fields where the prospective outlook was more promising.

The fluctuation in price was less during 1907 than in any other year in the history of the field, there being but four cents difference between the minimum and maximum prices paid. Starting the year at 85 cents per barrel, it held this figure until February 11, when it rose to 87 cents, and again on March 9 to 89 cents, the maximum, which price it held to the end of the year. The average price for the year, taking both days of time and amount received into consideration, was 88 $\frac{2}{5}$ cents, as against 88 $\frac{3}{5}$ cents in 1906 and 84 $\frac{4}{5}$ cents in 1905.

The total production of Trenton rock oil in Indiana in 1907 was 4,959,108 barrels, which, at the average price of 88 $\frac{2}{5}$ cents, had a value of \$4,383,851, this sum being \$2,494,006, or 36.2 per cent, less than was received by the producers in 1906.

The first of the following tables gives a complete record of the monthly production of petroleum from the Trenton limestone fields of Indiana for the 17 years beginning January 1, 1891, and ending December 31, 1907. This does not include the amount used in the field for fuel and other purposes, or that wasted by the burning of tanks or the leaking of pipes, but only that shipped or piped by the companies who purchase the oil from the operators. The second table shows the annual production, the average yearly price and the total value by years for the same period:

I. TOTAL PRODUCTION OF TRENTON LIMESTONE PETROLEUM IN INDIANA FROM 1891 TO 1908 BY MONTHS.

(Barrels.)

MONTH.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
January.....	6,171	15,841	111,824	250,000	300,568	365,582	290,746	317,014
February.....	5,981	18,946	96,025	232,107	230,559	241,743	309,922	272,780
March.....	5,159	24,794	134,649	282,376	310,303	386,586	341,961	325,301
April.....	4,973	26,184	146,493	287,330	352,077	395,032	328,779	310,034
May.....	5,757	31,033	186,939	321,502	397,001	417,963	340,023	311,208
June.....	8,136	40,888	209,616	333,479	403,569	434,167	369,803	320,477
July.....	10,809	49,203	241,666	327,349	424,376	422,968	375,249	314,861
August.....	11,603	56,109	248,353	345,031	420,132	407,238	371,921	322,777
September.....	16,500	66,034	245,615	319,588	409,169	415,675	362,528	326,264
October.....	19,029	95,699	252,568	329,424	393,153	394,283	408,179	319,490
November.....	20,801	129,270	245,607	304,030	373,789	337,331	430,958	300,644
December.....	21,715	144,067	236,038	337,450	361,436	362,164	423,069	300,457
Totals.....	136,634	698,068	2,335,293	3,688,666	4,386,132	4,680,732	4,353,138	3,751,307

MONTH.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
January.....	297,291	353,451	425,140	554,038	651,355	714,594	1,038,324	759,518	471,926
February.....	230,440	302,493	384,735	460,073	568,789	664,058	804,100	657,201	438,532
March.....	290,257	364,590	432,922	573,412	724,969	797,133	1,037,320	678,788	447,174
April.....	325,774	381,804	447,261	579,711	680,921	804,121	964,242	684,810	457,287
May.....	344,831	426,363	482,118	635,752	751,245	851,071	1,011,859	701,766	466,270
June.....	334,282	446,492	481,807	639,452	806,438	940,391	1,011,965	692,390	423,333
July.....	329,086	437,087	506,065	696,911	831,005	998,229	937,960	684,056	446,740
August.....	347,621	466,127	523,106	697,040	838,615	1,084,560	916,803	673,721	410,581
September.....	323,283	418,716	519,087	672,611	857,117	1,104,771	840,804	563,100	366,752
October.....	326,781	467,521	532,960	725,973	873,160	1,136,000	791,881	607,178	369,255
November.....	326,802	406,684	510,788	656,457	778,323	1,098,832	765,078	547,134	334,146
December.....	332,266	441,847	479,485	650,131	796,291	1,084,270	772,102	513,163	327,013
Totals.....	3,807,714	4,912,675	5,725,474	7,535,561	9,161,331	11,281,030	10,892,438	7,762,825	4,959,108

II. PRODUCTION OF TRENTON ROCK PETROLEUM IN INDIANA FROM 1891 TO 1908, WITH VALUE.

	1891.	1892.	1893.	1894.	1895.	1896.
Total production (barrels of 42 gal.).....	136,634	698,068	2,335,292	3,688,666	4,386,132	4,680,732
Total value at wells of all oils produced, excluding pipeage.....	\$54,787	\$260,620	\$1,050,882	\$1,774,260	\$2,807,124	\$2,954,411
Value per bbl.....	\$0 40	\$0 37	\$0 45	\$0 48	\$0 64	\$0 63

	1897.	1898.	1899.	1900.	1901.	1902.
Total production (barrels of 42 gal.).....	4,353,138	3,751,307	3,807,714	4,912,675	5,725,474	7,535,561
Total value at wells of all oils produced, excluding pipeage.....	\$1,871,849	\$2,228,276	\$3,331,750	\$4,740,731	\$4,775,045	\$6,450,440
Value per bbl.....	\$0 43	\$0 59½	\$0 87½	\$0 96½	\$0 83½	\$0 85½

PRODUCTION OF TRENTON ROCK PETROLEUM IN INDIANA—Continued.

	1903.	1904.	1905.	1906.	1907.
Total production (barrels of 42 gal.)	9,161,331	11,281,030	10,892,438	7,762,825	4,959,108
Total value at wells of all oils produced, excluding pipeage	\$10,457,659	\$12,127,107	\$9,236,798	\$6,877,863	\$4,383,851
Value per bbl.	\$1 14 $\frac{3}{8}$	\$1 07 $\frac{1}{2}$	\$0 84 $\frac{1}{2}$	\$0 88 $\frac{3}{4}$	\$0 88 $\frac{3}{4}$

From the first of the above tables it will be found by addition that the total production of Indiana Trenton rock oil for the 17 years reached the enormous sum of 90,068,156 barrels, which sold for \$75,383,443, or an average of \$4,434,320 per year.

In the third table there is shown the number of wells completed in the Indiana Trenton limestone fields by months from June, 1891, to January, 1908:

III. NUMBER OF WELLS COMPLETED IN THE INDIANA TRENTON LIMESTONE OIL FIELDS FROM 1891 TO 1908 BY MONTHS.

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1891.....							6	6	15	15	15	8	65
1892.....	11	13	18	13	17	19	17	30	25	52	33	47	295
1893.....	20	30	31	36	45	47	47	55	27	72	56	76	542
1894.....	90	103	103	80	110	107	84	123	100	107	97	85	1,189
1895.....	81	45	81	111	122	153	132	140	129	106	102	85	1,267
1896.....	76	90	86	136	148	180	113	121	70	58	66	66	1,180
1897.....	41	35	40	47	49	52	60	45	55	69	119	54	680
1898.....	41	23	29	43	38	38	55	53	80	72	82	92	694
1899.....	75	48	68	64	87	99	77	104	106	118	106	105	1,057
1900.....	113	67	98	148	165	163	158	155	135	152	118	108	1,580
1901.....	111	72	81	121	167	171	167	169	184	207	220	132	1,802
1902.....	176	113	169	182	247	297	288	279	323	295	320	243	2,932
1903.....	168	178	233	236	331	408	377	387	337	366	375	290	3,686
1904.....	235	157	234	202	296	393	394	383	378	388	320	344	3,724
1905.....	194	130	149	185	196	167	159	145	130	108	163	166	1,882
1906.....	135	90	84	68	106	142	120	100	93	69	66	59	1,132
1907.....	46	40	63	44	49	63	56	52	40	52	38	41	584
Total.....													24,297

From this table we learn by subtraction that 548 fewer bores were sunk for oil in the Trenton rock fields of Indiana in 1907 than in 1906. This was a loss of 48.4 per cent, as against a loss in 1906 of 39.8 per cent over the previous year.

From the table it may also be learned that up to January 1, 1908, 24,297 bores had been drilled in the Trenton rock fields of Indiana for oil alone. On that date there were 15,210 producing wells in the Trenton rock fields, as against 16,221 on January 1, 1907, a loss of 1,011 for the year.

By subtraction it will be noted that of the total number of bores sunk for oil in the Trenton rock fields of the State, 9,087 have proven dry, or have been abandoned as nonproductive. The number abandoned in 1907 was 1,510, or 472 more than in 1906, while the number of dry holes drilled during the year was 85, or 39 less than in 1906. Of the total number of bores sunk in 1907 14.5 per cent were dry, as against 10.9 per cent of those drilled in 1906 and 12.6 per cent of those sunk in 1905.

The following table shows the number of producing wells, number of dry holes, total bores, average initial production of wells drilled, and number of wells abandoned in each of the Trenton rock oil producing counties of Indiana in 1906 and 1907:

COUNTIES.	Producing Wells, 1906.	Producing Wells, 1907.	Dry Holes, 1906.	Dry Holes, 1907.	Total Bores, 1906.	Total Bores, 1907.	Percentage of Dry Holes, 1906.	Percentage of Dry Holes, 1907.	Av. Initial Output of Productive Wells, Bbls., 1906.	Av. Initial Output Productive Wells, Bbls., 1907.	Abandoned Wells, 1906.	Abandoned Wells, 1907.
Adams.....	44	30	4	3	48	33	8.3	9.1	10.	5.7	120	125
Blackford.....	55	19	9	3	64	22	14.0	13.6	12.6	7.4	152	156
Delaware.....	141	49	39	16	180	65	21.7	24.6	33.2	14.6	208	350
Grant.....	216	103	20	12	236	115	8.5	10.4	8.1	7.5	507	418
Hamilton.....	6	0	3	3	6	3	33.3	100.0	26.6	0	2	4
Huntington.....	121	46	2	2	123	48	1.6	4.1	13.6	10.6	6	76
Jay.....	178	122	27	30	205	162	13.1	19.7	15.4	11.2	65	72
Madison.....	2	3	1	2	3	5	33.3	40.0	15.0	16.6	32	25
Miami.....	1	0	0	0	1	0	0	0	10.0	0	16	13
Randolph.....	18	3	8	2	26	5	30.7	40.0	33.7	18.3	5	71
Wabash.....	2	2	0	0	2	4	0	0	10.0	5.0	0	2
Wells.....	224	140	11	2	235	122	4.6	1.6	9.4	8.9	125	224
Henry.....	0	0	0	10	0	10	0	100.	0	0	0	0
Totals.....	1,008	499	124	85	1,132	584	*10.9	*14.5	*14.6	*7.7	1,088	1,510

*Denotes average.

From the table it will be seen that in all of the counties the number of productive wells drilled fell off very greatly. For the first time Jay County took the lead in new work, having ranked third in both 1905 and 1906. The average initial output of the new wells fell off 4.9 barrels per well, which was less than the loss in 1906, when it was six barrels per well. The greatest loss was in the initial output of the productive deep pay wells in Delaware County, where it was 18.6 barrels per well. The percentage of dry holes in this county was also much above the average.

Wells still maintains its good record among the older producing counties, there being but two dry holes among the 122 bores sunk within its bounds. This was a percentage of but 1.6, against the average of 14.6 for the field. From a careful study of the

table one can learn many other facts of interest regarding the relative importance of each county in the field.

The record of the year as above stated shows that the petroleum industry in the Trenton rock area of Indiana has passed its zenith point in development and output, and the future must reveal a constant decline unless the unexpected happens in the way of discovery of new territory.

CORNIFEROUS ROCK PETROLEUM.

The "Corniferous rock" or Corniferous limestone is the oldest and lowest division of the Devonian system of rocks in Indiana. It ranges up to 65 feet in thickness and is immediately overlain by a thick bed of blackish or brownish shale, known as the New Albany or Genesee shale. This ranges up to 195 feet in known thickness and forms the necessary impervious cover which has retained the oil of the Corniferous in the limestone in which it is found.

Petroleum in commercial quantities is being produced from the Corniferous rocks in Indiana at present only in or near Terre Haute, Vigo County, and northwest of Medaryville, Jasper County. The production from the latter place was never large, and has dwindled in recent years so that it is no longer worthy of record.

Vigo County.—A full and detailed history of the production of oil in this county up to January 1, 1907, was given in the last (Thirty-first) Report of this Department. Only a brief record of the new developments and output for the year 1907 will therefore be given.

The Phoenix well, operated by Prox & Brinkman, and located near the center of the city of Terre Haute, still continues to yield a good supply of oil. This well was finished in May, 1889, and is the oldest and best paying oil well ever sunk in Indiana. For 12 or more years it yielded an average of 1,000 barrels per month. In the last few years this has gradually lessened, and in 1907 it averaged about 425 barrels per month. Two other wells, located but a short distance from the Phoenix, are producing oil from the same stratum at a depth of about 1,660 feet. One of these, known as the McWhinney well, has been a small producer since it was finished in 1899, but was shut down during the greater part of the year. The other was completed by Geo. C. Foulkes in May, 1907, and is located on a lot just across the street from the Phoenix. It started at about 25 barrels, and when pumped yielded about eight barrels per day during the last five months of the year.

The total amount of oil produced from the three wells during

the year was 7,098 barrels. This was sold to local consumers at an average price of 94 cents per barrel, the whole amount received being \$6,672.

In the so-called Riley field, 10 to 15 miles southeast of Terre Haute, there was much drilling during the year, but the great majority of the bores produced nothing but salt water. The first well in this field was completed by the Vi-Clay Oil Company in November, 1906. It was located on the Joslin tract in the southeast quarter of the northeast quarter of section 23 (11 N., 8 W.), Riley Township, and yielded 132 barrels the first day. On January 1, 1907, the output was about 50 barrels per day. The oil was found about 16 feet below the top of the Corniferous, at a depth of 1,614 feet.

The usual excitement fostered by a new strike in wildcat territory followed the successful shooting of the well. Oil men from everywhere flocked to the vicinity, and leases were taken on hundreds of farms within a radius of 20 miles. The Vi-Clay Company was offered \$100,000 for their holdings, but refused that price and let the contract for a second well. During the year 1907 16 bores were completed in Riley Township, only seven of which yielded oil in paying quantities. These started at 20 to 30 barrels each per day and were all located within one mile of the original Joslin well. Five of the seven producers were drilled by the Vi-Clay Company, which sunk the first well.

Mr. E. D. Fagin, of Riley, who was the leading promoter of the first well sunk in the field, has kindly furnished me the data for the following table of information regarding the bores sunk in Riley Township during the year:

RECORD OF BORES SUNK IN RILEY TOWNSHIP (11 N., 8 W.), VIGO COUNTY, IN 1907.

LEASE.	Top of Sand, Feet	Total Depth, Feet.	Character of Well.	Location by Section.
D. Close	1,598	1,614	Producing.	W. $\frac{1}{4}$ of S. E. $\frac{1}{4}$ of N. E. $\frac{1}{4}$ of 23
Nancy Jeffries No. 1	1,615	1,629	Producing.	S. E. of N. E. of 23.
Nancy Jeffries No. 2	1,628	1,641	Producing.	S. E. of N. E. of 23.
A. Hixon	1,618	1,639	Producing.	N. E. of S. W. of 24.
C. Fox	1,622	1,637	Producing.	E. $\frac{1}{4}$ of N. W. of 24.
John Beece	1,644	1,659	Producing.	E. $\frac{1}{4}$ of N. W. of 23.
Alma Donham	1,619	1,631	Producing.	E. $\frac{1}{4}$ of S. E. of 24.
Z. Stewart			Dry.	E. $\frac{1}{4}$ of N. W. of 22.
E. D. Fagin	1,647	1,709	Dry.	W. $\frac{1}{4}$ of S. E. of 13.
H. C. Jeffries		1,670	Dry.	W. $\frac{1}{4}$ of S. E. of 23.
Emma Coble			Dry.	N. W. $\frac{1}{4}$ of S. E. $\frac{1}{4}$ of 24.
D. Swank			Dry.	S. E. of S. E. of 24.
C. Dailey No. 1			Dry.	S. W. of S. E. of 14.
C. Dailey No. 2			Dry.	S. W. of S. E. of 14.
M. E. Hensley			Dry.	N. $\frac{1}{4}$ of S. E. of 9.
E. Shaw			Dry.	N. E. $\frac{1}{4}$ of 26.

The drive pipe in the Riley Township wells runs from 15 to 40 feet in length, and the $6\frac{5}{8}$ -inch casing averages about 1,440 feet. The "pay streak" of the limestone is thin, running only four to seven feet in thickness. The elevation of the surface of the wells is about 622 feet above tide, or 130 feet higher than that of the Phoenix well at Terre Haute. Coal mined in the immediate vicinity is used for fuel, though many of the producing wells would yield sufficient gas for pumping. From January until September 1st the oil was classed with that of the Illinois field and sold at 68 cents per barrel. It is, however, of much higher grade, a fact finally acknowledged by the present purchasers, the Indiana Pipe Line Company, and on September 1st they began paying 89 cents, or the same as paid for the Trenton limestone oil of eastern Indiana. The total amount of oil shipped during the year from the station of Riley, where a loading rack was built, was 20,112 barrels, valued at \$15,195.

Besides the nine dry holes drilled in Riley Township during the year, one was sunk just to the south on the Pierson lease in the northwest quarter of section 1, Pierson Township, and another on the Reed tract in Prairie Creek Township, to the southwest. Five dry holes were also drilled in Perry Township, Clay County, in a vain endeavor to extend the Riley pool to the eastward. The cost of each of these completed wells was about \$6,000, or \$144,000 for the twenty-four bores so far sunk in the Riley field. Besides this amount spent in legitimate drilling, as much or more was paid out for bonuses and for leases on tracts which were never tested. The developments to date show the Riley pool to be extremely spotted territory, and one which only an operator with "money to burn" should tackle.

Clay County.—Besides the dry holes above mentioned as having been sunk in the vicinity of Corey, Perry Township, there were drilled in Clay County during the year the following: One bore to a depth of 2,200 feet on the land of the Excelsior Clay Company, just northeast of the city of Brazil; a second near Center Point, in Center Township, to a depth of 1,300 feet; a third on the Scherbe lease near Clay City, and a fourth near Poland, in Cass Township, in which the top of the Corniferous was found at 1,186 feet. All of these came in dry. The well at Brazil developed a large amount of a very salty mineral water, which a chemical analysis shows to possess excellent medicinal properties.

Sullivan and Knox Counties.—On account of their proximity to the large productive area just across the Wabash River in Illi-

nois, these two counties were the center of much oil excitement during the year. As most of the wells drilled in Sullivan County were sunk for gas, B. A. Kinney, the State Gas Supervisor, has given the principal data available concerning them in his report in another part of this volume. Of those drilled for oil in that county, only three came in as small producers, starting at 10 to 15 barrels each. Two of these were on the Jamison lease in Fairbanks Township, the other on the Coulson tract, section 31, Hamilton Township. Six or seven dry holes were drilled in the immediate vicinity of these producers. The oil is found in a sandstone at a depth of about 750 feet.

In Knox County six test bores were completed during the year, five of which came in wholly barren, while the only producer, one near Little Rock, started at only ten barrels. As far as the results of the year show, the counties of Knox and Sullivan hold out little hope for the prospective oil operator.

HURON SANDSTONE PETROLEUM.

Petroleum from the Huron sandstone, one of the upper formations of the Subcarboniferous or Mississippian period, has been produced for a number of years near Princeton, Gibson County, and was formerly produced near Loogootee, Martin County. A full account of the Princeton field to January 1, 1907, with accurate detailed map, was prepared by R. S. Blatchley and published in the 1906 report of this department. Up to the beginning of the year 1907, 176 bores had been sunk in the Princeton field. Of these 44 were wholly dry and 11 were abandoned after producing a short time, leaving 122 producers on January 1, 1907. During the year 1907 only 19 bores were drilled in the field, three of which were dry. The average initial output of the 16 producers was 17 barrels. No one of the new wells increased the limits of the known productive area to any great extent.

The output of the Princeton field by months for the years 1904 to 1907, inclusive, is shown in the following table:

Number of Barrels of Huron Sandstone Oil Piped or Shipped from the Princeton Field in the Years 1904 to 1907, Inclusive, by Months.

	1904.	1905.	1906.	1907.
January	1,412	4,043	8,026	9,163
February	1,390	3,637	6,127	9,875
March	2,920	5,400	7,322	6,534
April	1,319	5,262	9,033	7,713
May	2,047	5,559	8,403	10,304

	1904.	1905.	1906.	1907.
June	2,315	4,523	10,201	10,209
July	2,071	5,509	9,408	9,693
August	2,991	6,296	9,429	11,029
September	3,345	6,141	9,469	8,484
October	3,093	6,805	9,312	11,372
November	4,554	6,116	8,204	10,056
December	3,841	5,395	8,382	8,957
Totals	32,207	64,806	103,843	116,979

By subtraction the gain in the field for the year was 13,136 barrels, or 12.6 per cent, as against a gain of 39,037 barrels, or 60.2 per cent, in 1906. Of the amount produced in 1907, 74,520 barrels were sold to the Indiana Pipe Line Company at an average price of 67.4 cents per barrel, the price being 21 cents lower than that paid for Trenton rock oil during the entire year. The remainder, amounting to 42,459 barrels, was sold to independent purchasers at an average price of 78.3 cents per barrel, the total value of the oil produced in the Princeton field being \$83,495 for the year.

Other Counties in Southwestern Indiana.—A number of test bores were sunk in other counties in southwestern Indiana during the year, almost all of which came in barren. One of these was on the Houchins lease in the southwestern part of Patoka Township, Pike County, and about two and a half miles east of Oakland City. It was finished on November 15 to a depth of 1,444 feet.

A bore completed about three miles farther east, near the town of Arthur, produced about ten barrels per day from a formation about 25 feet thick and 1,165 feet deep. Another bore on an adjoining farm and about 400 feet south was barren.

Near Rutherford, Martin County, a small producer was finished in September, but two other bores in the same vicinity were dry. This was not far from the former productive Huron rock wells at Loogootee.

Dry holes or very small producers were also drilled in Vigo, Linton and Washington Townships, Greene County; near Montgomery, Daviess County, and in Fulton Township, Fountain County.

No one of the wells drilled in southwestern Indiana during the year was productive enough to cause much excitement among the leading operators. Hundreds of thousands of dollars were spent in wildcatting in that section of the State, but the results may be classed as wholly negative.

Adding to the output of the Trenton rock petroleum fields that produced by the Corniferous limestone at Terre Haute and Riley, and by the Huron sandstone at Princeton, we find the total production and value of petroleum in Indiana for the last four years to be as follows:

TOTAL PRODUCTION AND VALUE OF CRUDE PETROLEUM PRODUCED IN INDIANA IN THE YEARS 1904 TO 1907 INCLUSIVE.

	1904.		1905.		1906.		1907.	
	Barrels.	Value.	Barrels.	Value.	Barrels.	Value.	Barrels.	Value.
Trenton Rock Petroleum..	11,281,030	\$12,127,107	10,892,438	\$9,236,758	7,762,825	\$6,877,863	4,959,108	\$4,383,851
Corniferous Rock Petroleum.....	18,103	21,040	12,064	13,270	7,269	8,456	27,210	21,867
Huron Rock Petroleum..	32,405	28,951	64,806	55,413	103,843	81,770	116,979	83,495
Total....	11,331,538	\$12,177,098	10,969,308	\$9,305,473	7,873,937	\$6,968,089	5,103,297	\$4,489,213