No. 26   **ILLINOIS PETROLEUM**   July 20, 1935

Oil and Gas Development in Illinois in 1934*

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ILLINOIS produced 5 per cent more crude oil in 1934 than in 1933, because there was less curtailment, and the value of the year's production at the wells was 35 per cent more than that of the previous year. The average price of Illinois crude oil in 1934 was $1.13 as compared with $0.87 in 1933, an increase of 30 per cent.

The quotas of allowable production for Illinois during 1934, as authorized by Oil Administrator Harold L. Ickes, were as follows: January, February, March, 12,000 bbl. per day; April, May, 12,500; June, July, 12,600; August, 12,500; September, October, November, 12,000; December, 11,700. No other restrictions on production were in effect during the year until Oct. 11, when it was found necessary to prorate the fields to 75 per cent, a curtailment of 25 per cent below the quota fixed by the Federal Administrator. On Dec. 1 the curtailment was reduced to 18 per cent and on Dec. 18, to 15 per cent.

Production in Illinois by months during 1934 was as follows:

	BARRELS		BARRELS		BARRELS
January	393,000	May	411,000	September	378,000
February	337,000	June	392,000	October	352,000
March	394,000	July	394,000	November	305,000
April	373,000	August	402,000	December	321,000
				Total	4,452,000

In spite of higher prices for crude oil, fewer wells were drilled in Illinois in 1934 than in 1933 (Tables 1 and 2). Of the 26 wells drilled, 10 were oil producers, 8 were in proved fields and 2 were in a new pool in Wabash County, 1½ miles south of the nearest production, one was a small gas well on the Stubblefield anticline in Bond County, one was an input well for repressuring in the Colmar-Plymouth field, McDonough County, and 14 were dry holes, mostly scattered wildcat tests.

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TABLE 1.—*Oil and Gas Production in Illinois*

Line Number	Field, *County*	Age in Years to End of 1934	Oil + Oil and Gas	Gas	Total	To End of 1934	During 1933	During 1934	Daily Average during Nov., 1934
			Area Proved, Acres			Total Oil Production, Bbl.			
1	Warrenton-Borton, *Edgar*	28	100	0	100	26,000±	730±	730±	2
2	Westfield (Parker Twp.), *Clark, Coles*	30	9,000	50	9,050	x	x	,x	x
3			850	70	920	x	x	x	x
4			9,000	0	9,000	x	x	x	x
5			1,500	0	1,500	x	x	x	x
6	Siggins (Union Twp.), *Cumberland, Clark*	28	3,580	75	3,655	x	x	x	x
7			3,135	55	3,190	x	x	x	x
8			435	15	450	x	x	x	x
9			855	105	960	x	x	x	x
10	York, *Cumberland*		310	40	350	x	x	x	x
11	Casey, *Clark*	28	1,925	55	1,980	x	x	x	x
12			190	15	205	x	x	x	x
13			400	0	400	x	x	x	x
14			1,525	15	1,540	x	x	x	x
15	Martinsville, *Clark*	27	710	155	865	x	x	x	x
16			15	20	35	x	x	x	x
17			275	35	310	x	x	x	x
18			105	0	105	x	x	x	x
19			170	0	170	x	x	x	x
20			195	0	195	x	x	x	x
21			5	0	5	x	x	x	x
22	North Johnson, *Clark*	27	1,320	20	1,340	x	x	x	x
23			1,115	0	1,115	x	x	x	x
24			160	0	160	x	x	x	x
25			820	5	825	x	x	x	x
26			215	0	215	x	x	x	x
27	South Johnson, *Clark*	27	1,715	65	1,780	x	x	x	x
28			185	5	190	x	x	x	x
29			295	0	295	x	x	x	x
30			1,675	35	1,710	x	x	x	x
31			845	5	850	x	x	x	x
32	Bellair, *Crawford, Jasper*	27	1,300	5	1,305	x	x	x	x
33			1,165	0	1,165	x	x	x	x
34			315	0	315	x	x	x	x
35			910	0	910	x	x	x	x
36	Clark County Division[1]		19,960	465	20,425	50,507,000±	475,000±	507,000	1,073
37	Main[2], *Crawford*	28	35,130	510	35,640	x	x	x	x
38			340	0	340	x	x	x	x
39			33,795	510	34,300	x	x	x	x
40			1,000	0	1,000	x	x	x	x
41	New Hebron, *Crawford*	25	1,350	210	1,460	x	x	x	x
42	Chapman, *Crawford*	20	1,045	515	1,560	x	x	x	x
43	Parker, *Crawford*	27	1,310	30	1,340	x	x	x	x
44	Allison-Weger, *Crawford*	y	1,075	20	1,095	x	x	x	x
45	Flat Rock[3], *Crawford*	y	1,375	545	1,820	x	x	x	x
46	Birds, *Crawford, Lawrence*	y	4,370	115	4,485	x	x	x	x
47	Crawford County Division[4]	28	45,655	1,945	47,600	137,311,000	1,471,000	1,572,000	3,500
48	Lawrence, *Lawrence, Crawford*	28	24,150	1,550	25,700	x	x	x	x
49			5,015	35	5,050	x	x	x	x
50			2,240	0	2,240	x	x	x	x
51			345	1,095	1,440	x	x	x	x
52			15,960	220	16,180	x	x	x	x
53			4,020	200	4,220	x	x	x	x
54			6,950	0	6,950	x	x	x	x
55	St. Francisville, *Lawrence*	y	420	0	420	x	x	x	x
56	Lawrence County Division[5]		24,570	1,550	26,120	215,650,000	1,650,000	1,908,000	4,300

[1] Total of lines 1, 2, 6, 10, 11, 15, 22, 27, 32.
[2] Includes Kibbie, Oblong, Robinson, and Hardinsville.
[3] Includes Swearingen Gas.
[4] Total of lines 37, 41, 42, 43, 44, 45, 46.
[5] Total of lines 48 and 55.

The best of the new producers were two wells in the Dupo field, St. Clair County, one of which had an initial production during the first 24 hr. of 257 bbl. and the other 92 bbl. Because of these two wells the average initial production per well in Illinois increased greatly, being 35 bbl. in 1934 as compared with 5.3 in 1933.

A sharp drop in production of the Dupo field in 1934 (total 40,200 bbl. as compared with 150,000 bbl. in 1933) resulted when some of the best producers in the field suddenly fell off in oil production and went almost entirely to water. It was then found that lifting costs for the field were greater than receipts for oil produced and it became necessary to increase production by drilling new wells. About 50 undrilled inside locations remain in the field, and further drilling is planned as new production is needed to fill market requirements.

TABLE 1.—(Continued)

Line Number	Field, County	Age in Years to End of 1934	Area Proved, Acres			Total Oil Production, Bbl.			
			Oil + Oil and Gas	Gas	Total	To End of 1934	During 1933	During 1934	Daily Average during Nov., 1934
57	Allendale, *Wabash*	22	1,670	0	1,670	3,720,000±	220,000±	220,000±	600±
58	Southeastern Illinois Field6		91,855	3,960	95,815	407,188,000	3,816,000	4,207,000	9,473
59	Colmar-Plymouth, *McDonough, Hancock*	20.5 29	2,450	0	2,450	1,900,000	93,900	81,000	235
60	Pike County Gas, *Pike*	Abd. 1920±	0	8,960	8,960	0	0	0	0
61	Jacksonville Gas, *Morgan*	24 25	30	1,290	1,320	2,100	0	0	0
62	Carlinville, *Macoupin*	Abd. 1925±	30	50	80	*x*	0	0	0
63	Spanish Needle Creek, *Macoupin*	19	0	80	80	0	0	0	0
64	Gillespie (Wyen), *Macoupin*	19	40	0	40	*x*	1,095±	1,095±	3±
65	Gillespie-Benld Gas, *Macoupin*	11 18	0	80	80	0	0	0	0
66	Staunton, *Macoupin*	Abd. 1919 55	0	400	400	0	0	0	0
67	Litchfield, *Montgomery*	Abd. 1904 25	100	0	100	22,000	0	0	0
68	Collinsville, *Madison*	Abd. 1921	40	0	40	715	0	0	0
69	Ayers Gas, *Bond*	12 24	0	280	280	0	0	0	0
70	Greenville Gas, *Bond*	Abd. 1923	0	160	160	0	0	0	0
71	Carlyle, *Clinton*	23	915	0	915	3,226,000±	22,427	26,400	75
72	Frogtown, *Clinton*	16	300	0	300	*x*	0	0	0
73	Sandoval, *Marion*	25	770	0	770	2,550,000±	34,800	34,300	94
74	Centralia, *Marion*	24	175	0	175	*x*	*y*	*y*	*y*
75	Wamac, *Marion, Clinton, Washington*	13	250	0	250	300,000±	*x*	25,000±	68±
76	Dupo, *St. Clair*	6 14	670	0	670	773,000	150,000	40,200	93
77	Waterloo, *Monroe*	Abd. 1930 46	125	0	125	166,000	0	0	0
78	Sparta Gas, *Randolph*	Abd. *x*	65	100	165	*x*	0	0	0
79	Ava-Campbell Hill, *Jackson*	17	70	370	440	25,000	0	0	0
80	Total, Illinois7		97,885	15,730	113,615	416,728,0008	4,244,000	4,452,000	10.200

6 Total of lines 36, 47, 56, and 57.
7 Total of lines 58 to 79, inclusive.
8 The total oil production is the figure furnished by the U. S. Bureau of Mines and is not the exact total of the figures given in the table which were obtained from other sources.

TABLE 1.—(Continued)

Line Number	Average Oil Production, Bbl.			Total Gas Production, Millions Cu. Ft.				Number of Oil and/or Gas Wells							
								Com-pleted to End of 1934	During 1934		At End of 1934				
	Per Acre to End of 1934b	Per Acre-foot to End of 1934	Per Well Daily during Nov., 1934	To End of 1934	Dur-ing 1933	Dur-ing 1934	Maxi-mum Daily dur-ing 1934		Completed	Abandoned	Temporarily Shut Down	Producing Oil Only or Oil and Gas	Producing Oil and Gasc	Producing Gas Only	Total Producing
1	260	x	0.2	0	0	0	0	22	0	0	0	12	0	0	12
2	x	x	x	x	0	0	0	1,610	3	30	y	385	0	0	385
3	x	x	x	x	0	0	0	184	0	y	y	y	0	0	y
4	x	x	x	x	0	0	0	1,431	3	y	y	y	0	0	y
5	x	x	x	x	0	0	0	12	0	y	y	y	0	0	y
6	x	x	x	x	0	0	0	995	0	0	y	919	y	0	919
7	x	x	x	x	0	0	0	854	0	0	y	y	y	0	y
8	x	x	x	x	0	0	0	90	0	0	y	y	y	0	y
9	r	x	x	x	0	0	0	192	0	0	y	y	y	0	y
10	x	x	x	x	0	0	0	70	0	0	y	44	y	0	44
11	x	x	x	x	0	0	0	532	2	0	y	514	0	0	514
12	x	x	x	x	0	0	0	41	0	0	y	y	0	0	y
13	x	x	x	x	0	0	0	82	2	0	y	y	0	0	y
14	x	x	x	x	0	0	0	319	0	0	y	y	0	0	y
15	x	x	x	x	0	0	0	212	0	4	y	167	0	0	167
16	x	x	x	x	0	0	0	7	0	y	y	y	0	0	y
17	x	x	x	x	0	0	0	62	0	y	y	y	0	0	y
18	x	x	x	x	0	0	0	21	0	y	y	y	0	0	y
19	x	x	x	x	0	0	0	34	0	y	y	y	0	0	y
20	x	x	x	x	0	0	0	39	0	y	y	y	0	0	y
21	x	x	x	0	0	0	0	1	0	0	0	1	0	0	1
22	x	x	x	x	x	x	x	484	0	2	y	428	y	0	428
23	x	x	x	x	x	x	x	296	0	y	y	y	y	0	y
24	x	x	x.	x	x	x	x	32	0	y	y	y	y	0	y
25	x	x	x	x	x	x	x	177	0	y	y	y	y	0	y
26	x	x	x	x	x	x	x	43	0	y	y	y	y	0	y
27	x	x	x	x	x	x	x	533	0	6	y	499	y	0	499
28	x	x	x	x	x	x	x	38	0	y	y	y	y	0	y
29	x	x	x	x	x	x	x	59	0	y	y	y	y	0	y
30	x	x	x	x	x	x	x	401	0	y	y	y	y	0	y
31	x	x	x	x	x	x	x	170	0	y	y	y	y	0	y
32	x	x	x	x	x	x	x	485	0	0	y	409	0	0	409
33	x	x	x	x	x	x	x	309	0	0	y	y	0	0	y
34	x	x	x	x	x	x	x	63	0	0	y	y	0	0	y
35	x	x	x	x	x	x	x	182	0	0	y	y	0	0	y
36	2,530	80±	0.3	x	y	y	y	4,943	5	42	13	3,334	y	0	3,334
37	x	x	x	x	x	x	x	7,310	1	146	y	5,506	y	0	5,506
38	x	x	x	x	x	x	x	68	0	y	y	y	0	0	y
39	x	x	x	x	x	x	x	7,132	1	y	y	y	y	0	y
40	x	x	x	x	x	x	x	108	0	y	y	y	y	0	y
41	x	x	x	x	x	x	x	295	0	5	y	198	0	0	198
42	x	x	x	x	x	x	x	193	0	3	y	91	0	0	91
43	x	x	x	x	x	x	x	255	0	5	y	221	0	0	221
44	x	x	x	x	x	x	x	146	0	5	y	72	0	0	72
45	x	x	x	x	x	x	x	280	0	1	y	163	0	0	163
46	x	x	x	x	x	x	x	682	0	9	y	477	0	0	477
47	3,000	120±	0.5	x	y	y	y	9,161	1	174	32	6,696	y	0	6,696
48	x	x	x	x	x	x	x	4,381	0	67	5	3,366	y	y	3,366
49	x	x	x	x	x	x	x	1,228	0	y	y	y	y	y	y
50	x	x	x	x	x	x	x	473	0	y	y	y	y	y	y
51	x	x	x	x	x	x	x	243	0	y	y	y	y	y	y
52	x	x	x	x	x	x	x	3,017	0	y	y	y	y	y	y
53	x	x	x	x	x	x	x	684	0	y	y	y	y	y	y
54	x	x	x	x	x	x	x	950	0	y	y	y	y	y	y
55	x	x	x	x	x	x	x	54	0	0	y	45	y	y	45
56	8,800	160±	1.0	x	y	y	y	4,435	0	67	5	3,411	y	y	3,411
57	2,230	112±	1.5	x	y	y	y	407	2	6	0	341	y	0	341
58	4,430	130±	0.7	x	y	y	y	18,946	8	289	50	13,782	y	0	13,782
59	770	37	0.8	0	0	0	0	450	0	0	32	281	0	0	281
60	0	0	0	x	0	0	0	68	0	0	0	0	0	0	0

b Footnotes to column headings and explanation of symbols are on page 14.

The two wells in Wabash County that opened a new pool 1½ miles south of the nearest production had initial productions of 12 bbl. (after shot) and 2 bbl. (natural), respectively. The productive area is bounded by dry holes one location to the northwest and southwest but it may extend eastward. Experience has shown that the production in Wabash County is very spotty, so the new pool probably will not be large. The producing horizon is the Biehl sand near the base of the Pennsylvanian system.

Nine of the 14 dry holes were drilled without reference to geological conditions and in areas where detailed structure is not known. Of the remaining five, one was in the old Sparta gas field, Randolph County; one on the Martinsville dome in Clark County between the Martinsville and North Johnson pools; one in northern Crawford County, where many dry patches are interspersed in the producing territory; one was an offset to one of the new wells in Wabash County mentioned above and one was on the Stubblefield anticline, Bond County, but not on structural closure.

Through the cooperation of the oil companies excellent information is being obtained from the new drilling. Sample cuttings saved at frequent regular intervals were obtained from 22 of the 26 new wells and from two wells that were deepened. The cuttings are studied in the subsurface laboratory of the State Geological Survey, where they

TABLE 1.—(Continued)

Line Number	Average Oil Production, Bbl.			Total Gas Production, Millions Cu. Ft.				Number of Oil and/or Gas Wells							
								Completed to End of 1934	During 1934		At End of 1934				
	Per Acre to End of 1934b	Per Acre-foot to End of 1934	Per Well Daily during Nov., 1934	To End of 1934	During 1933	During 1934	Maximum Daily during 1934		Completed	Abandoned	Temporarily Shut Down	Producing Oil Only or Oil and Gas	Producing Oil and Gasc	Producing Gas Only	Total Producing
61	70	14±	0	x	0	0	0	53	0	y	y	0	0	y	y
62	x	x	0	x	0	0	0	8	0	0	0	0	0	0	0
63	0	0	0	14.44	0±	0	0	7	0	0	7	0	0	0	0
64	x	x	0.75±	0	0	0	0	11	0	0	0	4	0	0	4
65	0	0	0	135.8	6.53	0	0	4	0	0	4	0	0	0	0
66	0	0	0	1,050	0	0	0	18	0	0	0	0	0	0	0
67	220	x	0	x	0	0	0	17	0	0	0	0	0	0	0
68	x	x	0	0	0	0	0	5	0	0	0	0	0	0	0
69	0	0	0	67	13.4	13.45	x	10	0	0	0	0	0	7	7
70	0	0	0	990	0	0	0	4	0	0	0	0	0	0	0
71	3,500±	175±	0.8	0	0	0	0	164	0	0	6	92	0	0	92
72	x	x	0	0	0	0	0	12	0	.0	0	0	0	0	0
73	3,250±	162±	2.8	0	0	0	0	122	0	10	9	34	0	0	34
74	x	x	y	0	0	0	0	22	0	y	.y	y	0	0	y
75	1,200±	60±	1.5	0	0	0	0	103	0	11	0	45	0	0	45
76	1,150	23	2.2	0	0	0	0	227	2	9	6	42	0	0	42
77	1,328	y	0	0	0	0	0	23	0	0	0	0	0	0	0
78	x	x	0	x	0	0	0	20	0	.0	0	0	0	0	0
79	35	x	0	x	0	0	0	35	0	.0	0	0	0	0	0
80	4,260		0.72	x	y	y	y	20,329	10	319	107	14,280	y	7	14,287

TABLE 1.—(Continued)

Line Number	Average Depth, Ft. — Bottoms of Productive Wells	Average Depth, Ft. — To Top of Productive Zone	Oil Production Methods at End of 1934 — Number of Wells, Pumping	Oil Production Methods at End of 1934 — Injection into Reservoir	Pressure, Lb. per Sq. In. — Initial	Pressure — Average at End of 1933	Pressure — Average at End of 1934	Gravity A.P.I. at 60° F. — Maximum	Gravity A.P.I. at 60° F. — Minimum	Gravity A.P.I. at 60° F. — Weighted Average	Sulfur, Per Cent	Base	Character of Gas — B.t.u. per Cu. Ft.	Character of Gas — Gal. Gasoline per M. Cu. Ft.
1	215	159	12		x	x	x	x	x	x	y	y		
2			385		200±	x	x	38.4	28.3	34.0	y	M	x	x
3	376	281	y		x	x	x	x	y	30.0	y	M	x	x
4	446	334	y		x	x	x	y	y	33.5	y	M	x	x
5	2,568	2,265	y		x	x	x	y	y	37.0	y	M	x	x
6			919	A2	x	x	x	36.9	27.4	33.0	y	M	x	x
7	465	367	y		x	x	x	y	y	(34.0)	y	M	x	x
8	662	478	y		x	x	x	y	y	(33.6)	y	M	x	x
9	590	556	y		x	x	x	y	y	(25.7)	y	M	x	x
10	680	588	44		x	x	x	33.9	30.0	(30.3)	y	M	x	x
11			514	9	x	x	x	37.2	27.2	29.2	y	M	x	x
12	358	263	y		x	x	x	y	y	(31.9)	y	M	x	x
13	426	309	y		x	x	x	y	y	(30.1)	y	M	x	x
14	505	444	y		x	x	x	y	y	(33.6)	y	M	x	x
15			167	A2	x	x	x	37.5	30.2	36.8	y	M	x	x
16	411	255	y		x	x	x	y	y	y	y	y	x	x
17	511	449	y		x	x	x	y	y	y	y	y	x	x
18	506	477	y		x	x	x	y	y	y	y	y	x	x
19	1,418	1,340	y		x	x	x	y	y	(38.9)	y	M	x	x
20	1,596	1,553	y		x	x	x	y	y	y	y	y	x	x
21	2,830	2,708	1		x	x	x	y	y	(39.6)	y	M	x	x
22			428		x	x	x	36.2	27.7	31.0	y	M	x	x
23	486	416	y		x	x	x	y	y	y	y	y	x	x
24	451	314	y		x	x	x	y	y	y	y	y	x	x
25	508	465	y		x	x	x	y	y	y	y	y	x	x
26	554	534	y		x	x	x	y	y	y	y	y	x	x
27			499		x	x	x	35.1	28.5	32.2	y	M	x	x
28	549	392	y		x	x	x	y	y	y	y	y	x	x
29	518	453	y		x	x	x	y	y	y	y	y	x	x
30	570	489	y		x	x	x	y	y	y	y	y	x	x
31	618	598	y		x	x	x	y	y	(28.5)	y	M	x	x
32			409	AG2	x	x	x	35.6	27.3	33.7	y	M	x	x
33	726	561	y		x	x	x	y	y	(32.4)	y	M	x	x
34	907	817	y		x	x	x	y	y	y	y	y	x	x
35	920	886	y		x	x	x	y	y	(37.0)	y	M	x	x
36			3,334	G1 A7 AG13	x	x	x	39.6	25.8	33.0	y		x	x
37			5,506	10	425±	y	y	38.6	25.1	33.0	0.23	M	960	2.5
38	822	508	y		x	x	x	y	y	y	y	y	x	x
39	960	900	y	11	425±	x	x	36.8	25.1	32.8	y	M	960	2.5
40	1,416	1,337	y		x	x	x	y	y	y	y	y	x	x
41	975	940	198	G2	x	x	x	35.0	24.3	30.1	y	y	x	x
42	1,015	995	91	AG1	x	x	x	y	y	y	y	y	x	x
43	1,025	1,000	221		x	x	x	y	y	y	y	y	x	x
44	930	912	72		x	x	x	30.4	22.6	29.5	y	y	x	x
45	945	935	163		x	x	x	26.6	18.5	22.5	y	y	x	x
46	950	930	477	A7	x	x	x	34.1	20.0	31.3	y	y	x	x
47			6,696	12	425±	x	x	38.6	18.5	32.5	y	M	960	2.5

[d] A special definition of d for application to this table follows: W, water; G, gas; A, air; AG, air-gas mixture. Numbers in this column indicate numbers of injection wells.

[l] A special definition of l for application to this table follows: All gravities given (except those in parentheses) were from data for the year 1925 furnished by the Illinois Pipe Line Co. Gravities in parentheses are for particular samples; see Illinois State Geol. Survey *Bull.* 54, Table 3. The values have been converted from Baumé to A.P.I. gravities.

[9] G1, A3, AG11.

[10] G15, A24, AG20, W1.

[11] G15, A24, AG20, W1.

[12] G17, A31, AG21, W1.

are preserved for comparison with other well cuttings, and reports on the cuttings received are furnished to the well owner. The Survey's Baker cable-tool core barrel[1] was used twice during 1934 to obtain cores of producing formations in Illinois fields. One core was obtained in the Colmar-Plymouth field and the other in the Dupo field, both in western Illinois. The thicknesses of strata cored were 24½ and 45 ft. respectively. Tests in the Survey laboratories for porosity, saturation and permeability

TABLE 1.—(*Continued*)

Line Number	Average Depth, Ft.		Oil Production Methods at End of 1934		Pressure, Lb. per Sq. In.[e]			Character of Oil Approx. Average during 1934					Character of Gas Approx. Average during 1934	
	Bottoms of Productive Wells	To Top of Productive Zone	Number of Wells, Pumping	Injection into Reservoir[d]	Initial	Average at End of		Gravity[l] A. P. I. at 60° F.			Sulfur, Per Cent	Base[f]	B.t.u. per Cu. Ft.	Gal. Gasoline per M. Cu. Ft.
						1933	1934	Maximum	Minimum	Weighted Average				
48	1,000	800	3,366	A1	650±	x	x	39.3	26.7	32.9		M	x	2.4
49	1,265	1,250	y		x	x	x	y	y	y	0.27	y	x	x
50	1,345	1,330	y		x	x	x	y	y	y	0.24	y	x	x
51	1,430	1,400	y		x	x	x	y	y	y	y	y	x	x
52	1,580	1,560	y		600	x	x	y	y	y	0.20	y	x	x
53	1,580	1,560	y		650	x	x	y	y	y	0.17	y	x	x
54	1,710	1,700	y		x	x	x	y	y	y	0.35	y	x	x
55	1,865	1,843	45		600	x	x	37.3	37.3	37.3	y	y	x	x
56			3,411	A1		x	x						x	
57	1,460	1,425	341	G1	x	x	x	35.9	24.1	35.1	0.25	y	x	x
58			13,782	G19 A38 AG34 W1				39.3	18.5	33.1			y	2.4
59	468	447	281	A9	x	x	x	y	y	37.5	y	y		
60	275	265	0		x	x	x						x	x
61	330	335	0		x	x	x	x	x	x	x	y	898	0.05
62	398	380	0		135	x	x	x	x	27.7±	x	y	x	x
63	405	385	0		x	x	x						y	y
64	670	650	4		x	x	x	y	y	29.2	x	y		
65	555	542	0		155	x	x						788	y
66	491	461	0		145	x	x						x	x
67	674	644	0		x	x	x	x	x	21.7	x	y	x	x
68	1,400	1,305	0		x	x	x	x	x	x	x	x	x	x
69	945	940	0		345	x	315±						y	y
70	993	927	0		x	x	x						1,050	0
71	1,055	1,035	92	W3	x	x	x	37.0	34.2	35.2	y	y	x	x
72	957	950	0		x	x	x	y	y	31.9	y	y	x	x
73	1,560	1,540	34		x	x	x	35.1	32.7	34.5	y	y		
74	1,150	1,130	y		x	x	x	35.0	31.0	32.3	y	y		
75	760	720	45	W5	x	x	x	30.8	29.3	30.2	y	P.		
76	601	651	42		x	x	x	y	y	32.7	y	y		
77	460	410	0		x	x	x	30.1	29.5	30.0	x	x		
78	857	850	0		x	x	x	x	x	x	x	x	x	x
79	798	780	0		115	x	x	x	x	x	x	x	x	x
80			14,280	G19 A38 AG34 W9										

[d] A special definition of *d* for application to this table follows: W, water; G, gas; A, air; AG, air-gas mixture. Number in this column indicate numbers of injection wells.

[l] A special definition of *l* for application to this table follows: All gravities given (except those in parentheses) were from data for the year 1925 furnished by the Illinois Pipe Line Co. Gravities in parentheses are for particular samples; see Illinois State Geol. Survey *Bull.* 54, Table 3. The values have been converted from Baumé to A.P.I. gravities.

[1] For a discussion of the use of the core-barrel see: A. H. Bell and R. J. Piersol: The Need for Sand Coring in the Southeastern Illinois Oil Field. Ill. State Geol. Survey, Illinois Petroleum No. 21 (Dec. 19, 1931).

TABLE 1.—(Continued)

Line Number	Producing Rock Name	Age[g]	Character[4]	Porosity[i]	Net Thickness, Average Ft.	Structure[j]	Number of Dry and/or Near-dry Holes to End of 1934	Deepest Zone Tested to End of 1934 Name	Depth of Hole, Ft.
1	Unnamed	Pen	S	Por	x	ML	0	Pen	715
2	See below.					D	99	Trenton (Ord)	2,918
3	Shallow gas sand	Pen	S	Por	36	D	x		
4	Westfield lime	MisL	L	Por Cav	x	D	x		
5	Trenton	Ord	L	Por	x	D	x		
6	See below.					D	28	Dev limestone	2,010
7	First Siggins sand	Pen	S	Por	x	D	x		
8	Second and Third Siggins sand	Pen	S	Por	x	D	x		
9	Lower Siggins sand	Pen	S	Por	x	D	x		
10	York sand	Pen	S	Por	x	AM	2		960
11	See below.					AM	20	MisL	808
12	Upper gas sand	Pen	S	Por	x	AM	5		
13	Lower gas sand	Pen	S	Por	x	AM	12		
14	Casey sand	Pen	S	Por	x	AM	20		
15	See below.					D	5	St. Peter	3,411
16	Shallow sands	Pen	S	Por	x	D	1		
17	Casey sand	Pen	S	Por	x	D	5		
18	Martinsville sand	MisL	L	Por	x	D	1		
19	Carper	MisL	S	Por	x	D	1		
20	"Niagaran"	Dev	L	Por	x	D	3		
21	Trenton	Ord	L	Por	x	D	1		
22	See below.					AM	16	Mis	965
23	Claypool sand	Pen	S	Por	x	AM	12		
24	Shallow sands	Pen	S	Por	x	AM	4		
25	Casey sand	Pen	S	Por	x	AM	12		
26	Upper Partlow	Pen	S	Por	x	AM	16		
27	See below.					AM	29	Mis	1,160
28	Claypool sand	Pen	S	Por	x	AM	3		
29	Casey sand	Pen	S	Por	x	AM	11		
30	Upper Partlow	Pen	S	Por	x	AM	29		
31	Lower Partlow	Pen	S	Por	x	AM	10		
32	See below.					AM	14	MisL	1,471
33	"500-ft. sand"	Pen	S	Por	x	AM	3		
34	"800-ft. sand"	Pen	S	Por	x	AM	3		
35	"900-ft. sand"	MisU	S	Por	x	AM	12		
36					33±		213		
37	See below.					ML	200±	Trenton (Ord)	4,620
38	Shallow sand	Pen	S	Por	x	ML	x	Trenton (Ord)	4,620
39	Robinson sand	Pen	S	Por	25±	ML	167	Mis	1,479
40	Oblong	Mis	S or L	Por	x	A, ML	23	MisL	2,056
41	Robinson sand	Pen	S	Por	x	ML	5	Mis	2,279
42	Robinson sand	Pen	S	Por	x	ML	10	Pen?	1,127
43	Robinson sand	Pen	S	Por	x	ML	10	Pen	1,041
44	Robinson sand	Pen	S	Por	x	ML	6	Pen	1,032
45	Robinson (Flat Rock)	Pen	S	Por	x	ML	8		
46	Robinson sand	Pen	S	Por	x	ML	12	MisL	1,731
47		Pen, Mis	S	Por	x	ML	251	Trenton (Ord)	4,620
48	See below.					A	83	St. Peter	5,190
49	Bridgeport sand	Pen	S	Por	40	A	19		
50	Buchanan	Pen	S	Por	15	A	3		
51	"Gas" sand	MisU	S	Por	15	A	5		
52	Kirkwood	MisU	S	Por	30	A	10		
53	Tracy	MisU	S	Por	10	A	11		
54	McClosky	MisL	L	Por	10	A	23		
55	Kirkwood	MisU	S	Por	22	ML	0	Mis	1,900
56							83	St. Peter	5,190
57	Biehl sand	Pen	S	Por	35±	AM	43	MisL	2,228
58							590		
59	Hoing sand	Dev	S	Por	21	A	0	Trenton (Ord)	805
60	Niagaran	Sil	L	Por	10	A	0	St. Peter	893
61	Gas sand	Pen Mis	S, H, SL	Por	5	ML	8	Trenton (Ord)	1,390

are now in progress and the results are to be published. It is planned that further coring of Illinois oil sands will be carried on as opportunity arises, in order to furnish data regarding Illinois oil sands that are needed in the application of improved recovery methods.

The second annual petroleum conference of Illinois, sponsored by the Illinois-Indiana Petroleum Association and the Illinois State Geological Survey, was held June 1, 1934, at Robinson. About 125 oil men attended. Among the subjects discussed at the conference were air repressuring, water-flooding, acid treatment of wells, treatment of crude oil emulsions, exploration for new fields, and the research needs of the Illinois-Indiana petroleum industry[2].

The air-repressuring project of the Ohio Oil Co. in the Plymouth field, McDonough County, mentioned in last year's report, began operation Feb. 10, 1934. Monthly production of one lease in this pool was increased from about 800 bbl. per month to about 1300 bbl. by repressuring. The gain in production in the leases affected, however, was not sufficient to offset losses in other parts of the field (Table 1). A considerable extension of repressuring in the Colmar-Plymouth field is planned and new machinery is being installed. This was the only new repressuring operation in Illinois during 1934. All repressuring plants previously in operation were continued during the year.

TABLE 1.—(*Continued*)

| Line Number | Producing Rock | | | | | | Number of Dry and/or Near-dry Holes to End of 1934 | Deepest Zone Tested to End of 1934 | |
	Name	Age[g]	Character[h]	Porosity[i]	Net Thickness, Average Ft.	Structure[j]		Name	Depth of Hole, Ft.
62	Unnamed	Pen	S	Por	x	A	0	Pen	410
63	Unnamed	Pen	S	Por	x	D	1	Pen	495
64	Unnamed	Pen	S	Por	x	T	9	Trenton (Ord)	2,560
65	Unnamed	Pen	S	Por	x	A	0	Pen	575
66	Unnamed	Pen	S	Por	x	A	0	Trenton (Ord)	2,371
67	Unnamed	Pen	S	Por	x	D	0	Pen	681
68	Trenton	Ord	L	Por	20	ML	0	Trenton (Ord)	1,500
69	Lindley	MisU	S	Por	5	A	0	MisL	1,150
70	Lindley	MisU	S	Por	x	A	0	Mis	1,065
71	Carlyle	MisU	S	Por	20	A	17	Sil	2,620
72	Carlyle	MisU	S	Por	7	D	0	Carlyle y	962±
73	Benoist	MisU	S	Por	20±	D	7	Mis	1,732
74	Dykstra, Wilson, Benoist	MisU	S	Por	20	D, ML	6	MisL	1,779
75	Petro	Pen	S	Por	20	D	0	Benoist	1,484
76	Trenton	Ord	L	Por Cav	50	A	0	Trenton	819
77	Trenton	Ord	L	Por	50	A	19	Trenton	845
78	Sparta gas sand	MisU	S	Por	7	D	5	MisU	985
79	Unnamed	MisU	S	Por	18	A	y	Dev	2,530
80							661±		

[2] Papers on Improved Methods of Exploring for and Recovering Petroleum in Illinois. Ill. State Geol. Survey and Ill.-Ind. Petr. Assn. (December, 1934). Available on request to the Chief, Illinois State Geological Survey, Urbana.

TABLE 2.—*Summary of Drilling Operations in Illinois*
(Figures in body of tabulation represent number of holes.)

County	Completed Prior to January 1, 1935									Completed during 1934				Drilling or Incomplete at End of 1934	
	Dry and/or Near-dry Holes								Productive Wells (For Details, See Table 1)	Dry and/or Near-dry Holes			Productive Wells (For Details, See Table 1)		
	Total Depths, Ft.							Total		Total Depths, Ft.		Total			
	Less than 1,000	1,000-2,000	2,000-3,000	3,000-4,000	4,000-5,000	5,000-6,000	Unknown			Less than 1,000	1,000-2,000			Within Fields	Exploratory
Adams	0	8	1	0	0	0	0	9	0	0	0	0	0	0	0
Alexander	0	3	0	0	0	0	0	3	0	0	0	0	0	0	0
Bond	5	29	8	0	0	0	0	42	14	0	2	2	0	0	0
Boone	0	2	1	0	0	0	0	3	0	0	0	0	0	0	0
Brown	5	1	0	0	0	0	0	6	0	0	0	0	0	0	0
Bureau	0	8	2	0	0	0	0	10	0	0	0	0	0	0	0
Calhoun	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Carroll	0	2	1	0	0	0	0	3	0	0	0	0	0	0	0
Cass	0	3	0	0	0	0	0	3	0	0	0	0	0	0	0
Champaign	3	11	0	0	0	0	0	14	0	0	0	0	0	0	0
Christian	1	6	1	0	0	0	0	8	0	0	0	0	0	0	0
Clark	334	13	9	1	0	0	507	864	3,335	2	0	2	5	1	1
Clay	0	3	6	0	0	0	0	9	0	0	0	0	0	0	0
Clinton	6	84	3	0	0	0	2	95	180	0	1	1	0	0	0
Coles	20	9	6	0	0	0	4	39	127	0	0	0	0	0	0
Cook	0	183	34	0	0	0	0	217	0	0	0	0	0	0	0
Crawford	213	261	3	0	1	0	914	1,392	9,545	1	0	1	1	0	2
Cumberland	69	8	4	0	0	0	27	108	974	1	0	1	0	0	0
De Kalb	0	8	1	0	0	0	0	9	0	0	0	0	0	0	2
De Witt	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Douglas	11	7	1	0	0	0	0	19	0	0	0	0	0	0	1
Du Page	0	7	14	0	0	0	0	21	0	0	0	0	0	0	0
Edgar	8	6	4	0	0	0	0	18	22	0	0	0	0	0	0
Edwards	0	7	3	0	0	0	0	10	0	0	0	0	0	0	1
Effingham	1	5	1	0	0	0	0	7	0	0	0	0	0	0	0
Fayette	0	9	3	0	0	0	0	12	0	0	1	1	0	0	0
Franklin	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Fulton	2	11	3	0	0	0	0	16	0	0	0	0	0	0	0
Gallatin	1	14	1	2	0	0	0	18	0	0	0	0	0	0	0
Greene	0	5	0	0	0	0	0	5	0	0	0	0	0	0	2
Grundy	0	4	1	0	0	0	0	5	0	0	0	0	0	0	0
Hamilton	0	2	1	0	0	0	0	3	0	0	0	0	0	0	0
Hancock	0	3	0	0	0	0	0	3	17	0	0	0	0	0	0
Hardin	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Henderson	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Henry	2	17	3	0	0	0	0	22	0	0	0	0	0	0	0
Iroquois	2	4	0	0	0	0	0	6	0	0	0	0	0	0	0
Jackson	22	32	2	0	0	0	0	56	35	0	0	0	0	0	0
Jasper	4	11	2	0	0	0	0	17	17	0	0	0	0	0	1
Jefferson	0	8	5	0	0	0	0	13	0	0	1	1	0	0	0
Jersey	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Jo Daviess	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Johnson	0	3	2	0	0	0	0	5	0	0	0	0	0	0	0
Kane	0	10	11	0	0	0	0	21	0	0	0	0	0	0	0
Kankakee	1	4	0	0	0	1	0	6	0	0	0	0	0	0	0
Kendall	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Knox	1	10	3	0	0	0	0	14	0	0	0	0	0	0	0
Lake	0	27	7	0	0	0	0	34	0	0	0	0	0	0	0
La Salle	0	19	7	0	0	0	0	26	0	0	0	0	0	0	0
Lawrence	83	301	69	0	0	1	56	510	4,519	0	0	0	0	0	0

TABLE 2.—(Continued)

County	Completed Prior to January 1, 1935									Completed during 1934				Drilling or Incomplete at End of 1934	
	Dry and/or Near-dry Holes								Productive Wells (For Details, See Table 1)	Dry and/or Near-dry Holes			Productive Wells (For Details, See Table 1)		
	Total Depths, Ft.							Total		Total Depths, Ft.		Total			
	Less than 1,000	1,000-2,000	2,000-3,000	3,000-4,000	4,000-5,000	5,000-6,000	Unknown			Less than 1,000	1,000-2,000			Within Fields	Exploratory
Lee	0	9	1	0	0	0	0	10	0	0	0	0	0	0	0
Livingston	0	10	3	0	0	0	0	13	0	0	0	0	0	0	0
McDonough	1	5	1	0	0	0	0	7	433	1	0	1	0	0	0
McHenry	0	3	3	0	0	0	0	6	0	0	0	0	0	0	0
McLean	0	3	2	0	0	0	0	5	0	0	0	0	0	0	0
Macon	0	6	7	0	0	0	0	13	0	0	0	0	0	0	0
Macoupin	24	0	4	0	0	0	0	28	48	0	0	0	0	0	1
Madison	2	13	0	4	0	0	0	19	5	0	0	0	0	0	1
Marion	3	28	4	0	0	0	0	35	240	0	0	0	0	0	1
Marshall	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Mason	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Massac	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mercer	0	4	0	2	0	0	0	6	0	0	0	0	0	0	0
Monroe	20	2	1	0	0	0	0	23	23	1	0	1	0	0	1
Montgomery	5	7	2	1	0	0	0	15	17	0	0	0	0	0	0
Morgan	22	6	0	1	0	0	0	29	53	1	0	1	0	0	0
Moultrie	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Ogle	0	4	2	0	0	0	0	6	0	0	0	0	0	0	0
Peoria	0	8	0	0	0	0	0	8	0	0	0	0	0	0	0
Perry	0	21	0	2	0	0	0	23	0	0	1	1	0	0	0
Piatt	0	4	1	0	0	0	0	5	0	0	0	0	0	0	0
Pike	12	0	0	0	0	0	0	12	68	0	0	0	0	0	0
Pope	1	2	0	2	0	0	0	5	0	0	0	0	0	0	0
Pulaski	0	2	1	0	0	0	0	3	0	0	0	0	0	0	0
Putnam	0	4	0	0	0	0	0	4	0	0	0	0	0	0	0
Randolph	11	12	0	0	0	0	0	23	20	1	0	1	0	0	0
Richland	4	2	0	0	0	0	0	6	0	0	0	0	0	0	0
Rock Island	1	10	4	0	0	0	0	15	0	0	0	0	0	0	1
St. Clair	16	3	0	0	0	0	0	19	227	1	0	1	2	0	0
Saline	0	19	6	1	0	0	0	26	0	0	0	0	0	0	0
Sangamon	1	2	2	0	0	0	0	5	0	0	0	0	0	0	0
Schuyler	23	10	0	0	0	0	0	33	0	0	0	0	0	0	0
Scott	2	1	0	0	0	0	0	3	0	0	0	0	0	0	0
Shelby	0	11	0	0	0	0	0	11	0	0	0	0	0	0	0
Stark	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0
Stephenson	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Tazewell	0	2	2	0	0	0	0	4	0	0	0	0	0	0	0
Union	0	3	4	0	0	0	0	7	0	0	0	0	0	0	0
Vermilion	2	10	0	0	0	0	0	12	0	0	0	0	0	0	0
Wabash	2	168	10	0	0	0	145	325	407	0	1	1	2	0	0
Warren	0	2	2	0	0	0	0	4	0	0	0	0	0	0	0
Washington	4	14	0	0	0	0	0	18	3	0	0	0	0	0	0
Wayne	0	5	0	0	0	0	0	5	0	0	0	0	0	0	0
White	0	4	2	0	0	0	0	6	0	0	0	0	0	0	0
Whiteside	0	6	0	0	0	0	0	6	0	0	0	0	0	0	0
Will	0	32	0	0	0	0	0	32	0	0	0	0	0	0	1
Williamson	0	6	0	0	0	0	0	6	0	0	0	0	0	0	0
Winnebago	0	15	1	0	0	0	0	16	0	0	0	0	0	0	0
Woodford	0	3	2	0	0	0	0	5	0	0	0	0	0	0	0
Total	950	1,665	294	16	1	2	1,655	4,533	20,329	9	7	16	10	1	17

No new water-flooding operations were begun in Illinois in 1934 but that begun in 1933 by the Tide Water Oil Co., on the Drake and Stifle leases, secs. 1 and 12, T.7N., R.13W., Crawford County, has had marked success to date.   Water has been injected into one well since October, 1933, and three offset wells began to show increases in production before the beginning of 1934.   The total increase in production due to flooding during 1934 was about 2000 bbl., which represents an increase in production of about 60 per cent for the two leases affected.   This operation is reported to have been carried on at practically no additional operating expense.

The only other controlled water-flooding in Illinois is in the Carlyle field, Clinton County.   Gains in production have been small but this is believed to be due to unfavorable sand conditions in the small part of the field that is now affected.   The increase in production for the field from about 22,400 bbl. in 1933 to about 26,300 bbl. in 1934 is mainly due to reduction of artificial curtailment.

Large quantities of oil undoubtedly remain underground in Illinois fields.   Using available data, this quantity is estimated at 1,600,000,000 bbl.   Because natural gas pressure in the reservoirs is now practically exhausted, artificial restoration of pressure is necessary in order that substantial quantities of oil may be recovered in the future.   In recent years economic conditions have retarded the adoption of new repressuring and water-flooding operations but doubtless these will be greatly extended when economic conditions are favorable.

Experiments with the acid treatment of wells producing from calcareous formations were begun in Illinois in the fall of 1933 and carried on during the first half of 1934.   Of 11 wells treated with acid in 1934, eight yielded increased production.   Seven of the latter were wells in the McClosky "sand" (Ste. Genevieve limestone, Lower Mississippian) and one was in the Kimmswick ("Trenton") limestone.   The best increases were all in the McClosky wells in Lawrence County, several of which increased from 2 or 3 bbl. per day to 15 or 16 bbl. per day average for the first two weeks.   Data are not available on the subsequent decline of these wells but in most cases the cost of the acid treatment is doubtless less than the increased returns from the oil produced.   Acid treatment in wells in the Westfield lime (St. Louis and Salem limestones, Lower Mississippian) have all been failures.   Two of the operations during 1934 were on new wells that did not produce, so that these failures cannot be counted as failures of acid treatment.   Acid treatment in Illinois ceased about the middle of 1934, when curtailment of new production became necessary on account of lessened market demand.   As about 1344 wells are producing from limestone in Illinois, opportunities exist for further use of acid treatment to stimulate production when market demand warrants.

Statistics of natural gas production in Illinois in 1934 are not yet available. Only one field, the Ayers, Bond County, is now producing gas for municipal supply (Table 1). Total production for the state, including gas used for power on oil leases, was 1,631,000,000 cu. ft. in 1933. The average value at the wells was 8 cents per thousand cubic feet.

A preliminary estimate of natural gasoline production in Illinois for 1934 is 3,789,000 gal.[3] Table 3 gives data concerning natural gasoline from 1929 to 1933 inclusive. On Jan. 1, 1934, there were 79 natural gasoline plants in Illinois, two of which were shut down[4]. All are of the compression type. One is in Wabash County, 26 in Lawrence County, 7 in Clark, and 43 in Crawford County.

TABLE 3.—*Natural Gasoline Produced in Illinois*

Year	Production, Thousands of Gallons	Value		Natural Gas Treated, Millions Cu. Ft.	Yield, Gal. per M. Cu. Ft.
		Total Thousands of Dollars	Unit Cents		
1929	7080	617	8.7	2760	2.57
1930	6840	420	6.1	2721	2.52
1931	5024	204	4.6	2106	2.39
1932	4558	139	3.2	1924	2.37
1933	3673	194	5.3	1701	2.14

PRODUCED BY COUNTIES IN 1932

Counties					
Clark and Cumberland...	495	18		317	1.56
Crawford..............	1895	70		742	2.55
Lawrence..............	2168	51		865	2.51
State total............	4558	139		1924	2.37

Production data for oil and gas were furnished by the U.S. Bureau of Mines; the Illinois Pipe Line Co., Findlay, Ohio; the Ohio Oil Co., Marshall, Ill.; Petro Oil and Gas Co., St. Louis, Mo.; Bond County Gas Co., Greenville, Ill.; and Illinois Power and Light Corporation, Hillsboro, Ill. Mr. P. S. McClure of the Illinois State Geological Survey assisted the writer in assembling the data. Messrs. Frederick Squires and Frank Marshall, both formerly of the Survey staff, assembled many data which are repeated in this year's report. Mr. Squires also obtained the data regarding the Tide Water Oil Company's water-flooding operation in Crawford County.

[3] Communication from G. R. Hopkins, Acting Chief Economist, Petroleum Economics Division, U.S. Bureau of Mines, Feb. 5, 1935.

[4] G. R. Hopkins and E. M. Seeley: Natural-gasoline Plants in the United States, January 1, 1934. U.S. Bur. Mines *Inf. Circ.* 6808 (November, 1934).

FOOTNOTES TO COLUMN HEADINGS—TABLE 1

[a] In areas where both oil and gas are produced, unless gas is marketed outside the field, such areas are included in column headed "Oil." Manufacture of casinghead gasoline and carbon black is interpreted as outside marketing of gas.

[b] Production per acre is determined by dividing into the number of barrels of oil the sum of the number of acres assigned to "Oil" plus such number of acres of the total assigned to "Oil and gas" as represents the portion thereof occupied by oil.

[c] Wells producing both oil and gas are classified as "Producing oil only" unless gas from them is marketed off the lease.

[d] W, water; G, gas; A, air; AG, air-gas mixture. Numbers following letters indicate number of injection wells.

[e] Bottom-hole pressures are preceded by "e." All other figures represent pressures at casinghead with well closed.

[f] P, paraffin; A, asphalt; M, mixed.

[g] Cam, Cambrian; Ord, Ordovician; Sil, Silurian; Dev, Devonian; Mis, Mississippian; MisL, Lower Mississippian; MisU, Upper Mississippian; Pen, Pennsylvanian; Per, Permian; Tri, Triassic; Jur, Jurassic; CreL, Lower Cretaceous; CreU, Upper Cretaceous; Eoc, Eocene; Olig, Oligocene; Mio, Miocene; Pli, Pliocene.

[h] S, sandstone; SH, sandstone, shaly; Ss, soft sand; H, shale; L, limestone; LS, limestone, sandy; C, chalk; A, anhydrite; D, dolomite; Da, arkosic dolomite; GW, granite wash; P, serpentine.

[i] Figures are entered only for fields where the reservoir rock is of pore type. Figures represent ratio of pore space to total volume of net reservoir rock expressed in per cent. "Por" indicates that the reservoir rock is of pore type but said ratio is not known by the author. "Cav" indicates that the reservoir rock is of cavernous type; "Fis," fissure type.

[j] A, anticline; AF, anticline with faulting as important feature; Af, anticline with faulting as minor feature; AM, accumulation due to both anticlinal and monoclinal structure; H, strata are horizontal or near horizontal; MF, monocline-fault; MU, monocline-unconformity; ML, monocline-lens; MC, monocline with accumulation due to change in character of stratum; MI, monocline with accumulation against igneous barrier; MUP, monocline with accumulation due to sealing at outcrop by asphalt; D, dome; Ds, salt dome; T, terrace; TF, terrace with faulting as important feature; N, nose; S, syncline.

[k] Information will be found in text as indicated by symbols; A, name of author, other than above, who has compiled the data on the particular field; C, chemical treatment of wells; G, gas-oil ratios; P, proration; U, unit operation; R, references; W, water; O, other information.

INTERPRETATIONS*

Generally in Table 1 the unit for presentation of data is a field. For our purposes a field is defined as the whole of a surface area wherein productive locations are continuous. Such unit commonly includes and surrounds nonproductive areas. Such unit commonly includes a great variety of geologic conditions—several units of continuous productive reservoirs of distinctly different structure and of distinctly different stratigraphy. Therefore it is hoped that our authors will subdivide "field" so as to enable students to make analyses that may have scientific and/or commercial value.

As to each space in the tabulation, it is either (1) not applicable, (2) the proper entry is not determinable, (3) the proper entry is determinable, but not determinable from data available to the author, (4) the proper entry is determinable by the author. In spaces not applicable, the author will please draw horizontal lines; in spaces where the proper entries are not determinable, the author will please insert x; in spaces where the proper entries are determinable but not determinable from data available to the author, the author will please insert y; in spaces where the proper entries are determinable by the author he will, of course, make such entries. Generally, y implies a hope that in some future year a definite figure will be available.

Inability to determine precisely the correct entry for a particular space should not lead the author to insert merely y. Contributions of great value may be made by the author in many cases where entries are not subject to precise determination. In such

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* Quoted from Circular to Authors by Frank A. Herald, Consulting Petroleum Geologist and Engineer; Vice Chairman for Production, A.I.M.E. Petroleum Division, 1933 and 1934.

cases hte author should use his good judgment and make the best entry possible under the circumstances. For many spaces, the correct entries represent the opinion of the author (for example, "Area Proved") and in such cases the entries need not be hedged to such extent as in cases where the quantities are definite yet can be ascertained only approximately by the author.

In cases under definite headings but where figures are only approximate, the author may use x. For example, if the total production of a field is known to be between 1,800,000 and 1,850,000, the author may report $1,8xx,xxx$; or if the production is between 1,850,000 and 1,900,000, the author may report $1,9xx,xxx$.

Where a numeral is immediately to the left of x or y, such numeral represents the nearest known number in that position.

As to quantity of gas produced from many fields the question will arise as to whether the figures should include merely the gas marketed or should include also estimates of gas used in operations and gas wasted. Although rough approximations may be involved, our figures should represent as nearly as possible the total quantity of gas removed from the reservoir.

While we have not provided a column for showing the thickness of the productive zone, generally the difference between average depth to bottoms of productive wells and average depth to top of productive zone will represent approximately the average thickness of the productive zone. For fields where this is not true because of unusually high dips, or for other reasons, it is suggested that the authors indicate in their texts the approximate average thickness of the productive zone.

The figure representing net thickness of producing rock should correspond to the total of the net portions of the producing zone which actually yield oil into the drill hole. It is recognized that for some fields the authors can make only rough guesses—so rough that figures would be of no value. In such cases the authors should enter either x or y, whichever is more appropriate. Production per acre-foot will have to be treated, of course, in the same manner for the corresponding fields.

We are particularly anxious to have every author give due consideration to the determination of structural conditions of each oil and/or gas body. Please consider each oil and/or gas reservoir and indicate its structure. The mere fact that a reservoir is on an anticline is not proof that the structural condition affecting the accumulation is anticlinal; for example, an oil and/or gas body limited by the upper margin of a lens on the limb of an anticline is "ML" as to structure. By all means, if the oil body occupies any position in the lens other than its upper limit, please so indicate clearly by footnote, for "ML" means, unless modified, that the accumulation is at the upper part of the lens. In every case where the oil and/or gas body terminates short of the up-dip continuity of the reservoir, please carefully check your evidence and then appropriately record your conclusion. "Terrace," "Nose" and "Syncline" are the only terms in our legend which presume such continuity.

Please note that the heading "Number of Dry and/or Near-dry Holes" is intended to cover only such holes as are within the limits of the defined fields. The holes entered here will be distributed in Table 2 by counties and by depths.