Press Bulletin Series Issued Twice Quarterly

STATE OF ILLINOIS
DEPARTMENT OF REGISTRATION AND EDUCATION
A. M. SHELTON, *Director*

DIVISION OF THE
STATE GEOLOGICAL SURVEY
M. M. LEIGHTON, *Chief, Urbana*

No. 1 **ILLINOIS PETROLEUM** April 17, 1926

CONTENTS

FOREWORD

Illinois Petroleum is a new Press Bulletin series which is to be issued by the Illinois State Geological Survey, in order to make the results of investigations bearing on the exploration and recovery of oil and gas in Illinois available for the benefit of the petroleum industry of the State at the earliest possible moment. *Illinois Petroleum* is to appear twice quarterly. It will give information on recent oil developments in Illinois, new areas deserving investigation, new horizons worthy of testing, and new technical methods which should help to increase or maintain present production. In the succeeding early numbers, articles will appear regarding the use of the core bit for cable tools, the advisability of testing deeper horizons in certain parts of Wabash County, and developments in Illinois during the first quarter of 1926.

In 1905, the production of petroleum in Illinois began to assume an important role. In that same year, the State Legislature established by enactment the State Geological Survey. Its office was organized in the fall of 1905, and by February, 1906, the State Geological Survey had its oil geologist in the field. Ever since that date, the Survey has maintained a close association with the operators and drillers, and by studying the trends of the geologic structure and by identifying and differentiating the oil-bearing horizons, has been able to provide information leading to further development and maintenance of production.

In issuing *Illinois Petroleum*, for the express purpose of promoting the welfare of the oil and gas industry of this State, acknowledgment is cordially made in this first number of the fine cooperative spirit which the oil

industry has shown in the past, and the Survey seeks their continued cooperation in this newly added effort. Prompt reports from the operators on new developments, and filing with the Survey of carefully kept logs and well cuttings, will be extremely helpful in furthering scientific studies, whose results we hope will in turn favorably react on the industry. All such information should be addressed to The Petroleum Section, Illinois State Geological Survey, Urbana, Illinois.

M. M. LEIGHTON, *Chief.*

OIL AND GAS POSSIBILITIES NEAR SPARTA

By Gail F. Moulton

INTRODUCTORY STATEMENT

Following the depletion of the gas supply which was discovered within the corporate limits of Sparta about 40 years ago, there has been haphazard testing for oil and gas in the vicinity. The most important oil development in recent years took place in 1922 and 1923 in an area a short distance northeast of Sparta. One well was drilled on the J. C. Foster farm in sec. 31, T. 4 S., R. 5 W., and another on the Josiah McIlroy farm in sec. 6, T. 5 S., R. 5 W. At the present time the Foster well is being pumped and produces about three barrels a day.

During the past few months a new test well has been started near the Foster-McIlroy area and a second test about six miles to the north in the vicinity of Tilden. Other tests are likely to be started in the near future. Therefore this preliminary report is issued in the hope that the geologic data obtained during the summer of 1925 may be of assistance in furthering the present development. Although a detailed report on the area is being prepared, it seems advisable to make the general conclusions available in the present report in advance of the best drilling season.

GENERAL GEOLOGIC RELATIONS

Over much of the Sparta area, the surface is covered with unconsolidated deposits which have no significant relation to the structure of the underlying Pennsylvanian and Mississippian formations, in which most of the oil and gas of Illinois are commonly found. Along many of the streams, however, the Pennsylvanian and Mississippian formations outcrop and provide data on the character and structure of these beds in which the oil occurs.

The characteristic succession of rocks in the area is indicated by the stratigraphic column on Plate I. The thickness of the Pennsylvanian rocks varies from nothing to about 850 feet at Coulterville where the maximum thickness has been determined from a well log. Underlying all of the area, there is a series of sandstones, shales, and limestones of Upper Mississippian age which represent the Chester series. It is from these beds that the present oil and gas production in the Sparta area is obtained.

The structural conditions which have resulted in the accumulation of the oil and gas near Sparta seem to be comparatively simple. The structures are small, rather abrupt domes which occur at the upper end of the Sparta syncline. The presence of these domes is not indicated by data on the coal, but they are well developed in the Chester formations. Within the area of these favorable structures there is some localization of oil production due to the irregular nature of the sand horizon from which the production has been obtained. Since the production is limited to these domes, however, it seems evident that further prospecting should be guided by structural considerations.

Structure of the Sparta Area

The Sparta area is located on the southwestern side of the Illinois Coal Basin. Consequently, the regional dip of the consolidated rocks is toward the northeast. Several interruptions in the regularity of this dip have been determined from the altitude of the No. 6 coal at various points within the area. An interpretation of these data is given by the structural contours shown on Plate I. A pronounced syncline extends from the vicinity of Sparta in a northeasterly direction at least as far as Coulterville. Several domes of at least local importance are as follows: north of Blair in secs. 23, 24, 25 and 26, T. 5 S., R. 6 W. (area No. 1); in the vicinity of Tilden in sec. 6, T. 4 S., R. 5 W., and sec. 1, T. 4 S., R. 6 W. (area No. 2); north of Schuline in secs. 8, 9, 16 and 17, T. 5 S., R. 6 W. (area No. 3); southeast of Sparta in secs. 15, 16, 21 and 22, T. 5 S., R. 5 W. (area No. 4); north of Percy in secs. 34 and 35, T. 5 S., R. 5 W. (area No. 5); north of Percy in secs. 18 and 19, T. 5 S., R. 4 W. and secs. 13 and 24, T. 5 S., R. 5 W. (area No. 6); and east of Tilden in sec. 5, T. 4 S., R. 5 W. (area No. 7). Other structural irregularities probably occur but they were not indicated by the data obtainable.

In western Illinois the general structure of the Chester series is slightly different from that of the Pennsylvanian system because there was some folding following the deposition of the Chester and prior to the deposition of the Pennsylvanian. The available records of wells which have been drilled into the Chester series in the Sparta area indicate that this condition obtains here. Consequently, in considering the oil possibilities of any favorable structure which has been determined from data on the altitude of a coal bed, it is necessary to take this difference into account. Those structures in the coal which are characterized by the most pronounced folding are given more favorable recommendations than those which are rather broad and gentle, because the Chester series has been subjected to all of the folding which affects the Pennsylvanian in addition to that which affected the Chester in pre-Pennsylvanian times.

Areas to be Tested

The areas recommended in the Sparta region should be tested probably in the order in which they are given (Pl. I) except that areas 1 and 2 de-

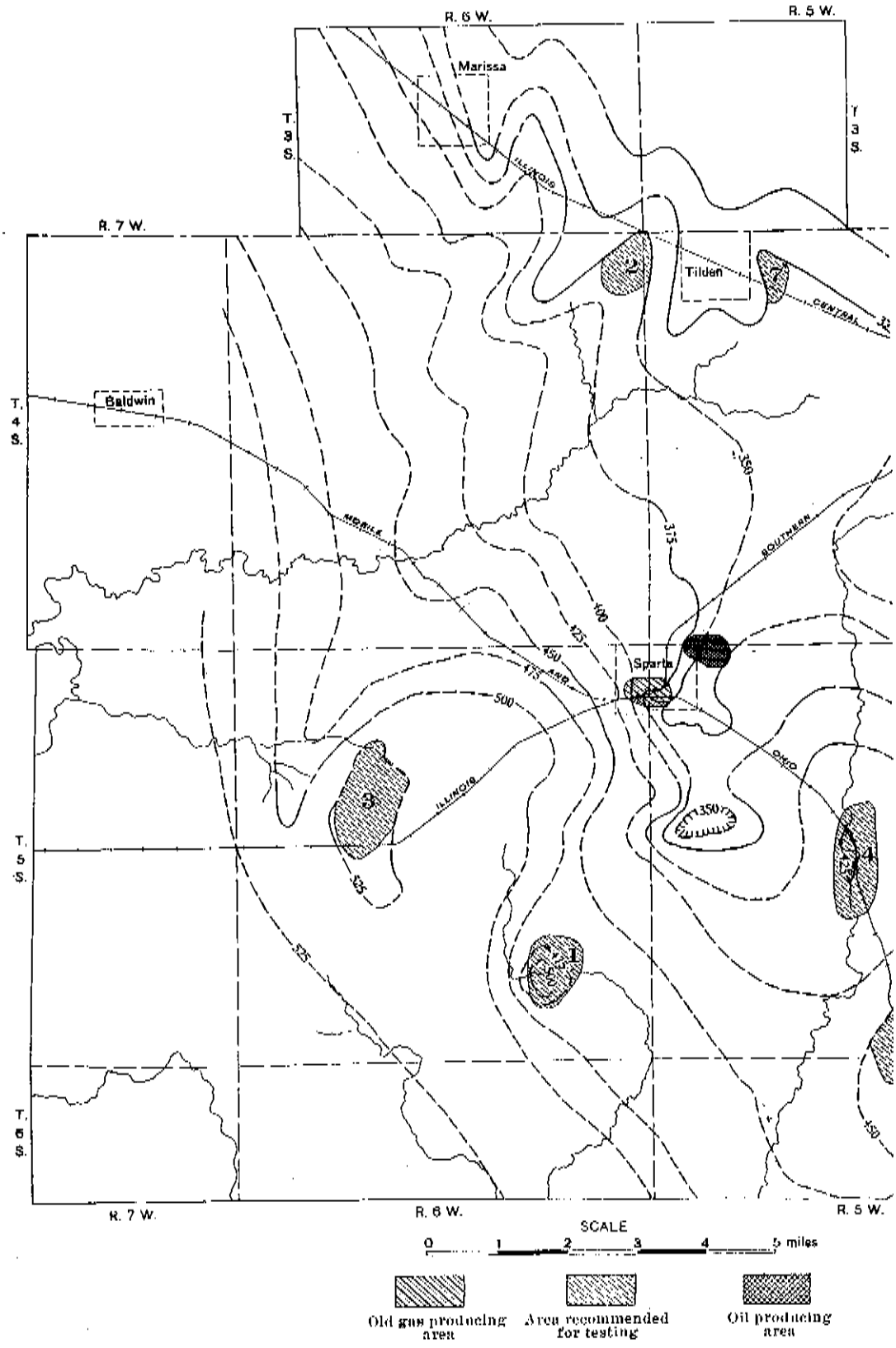
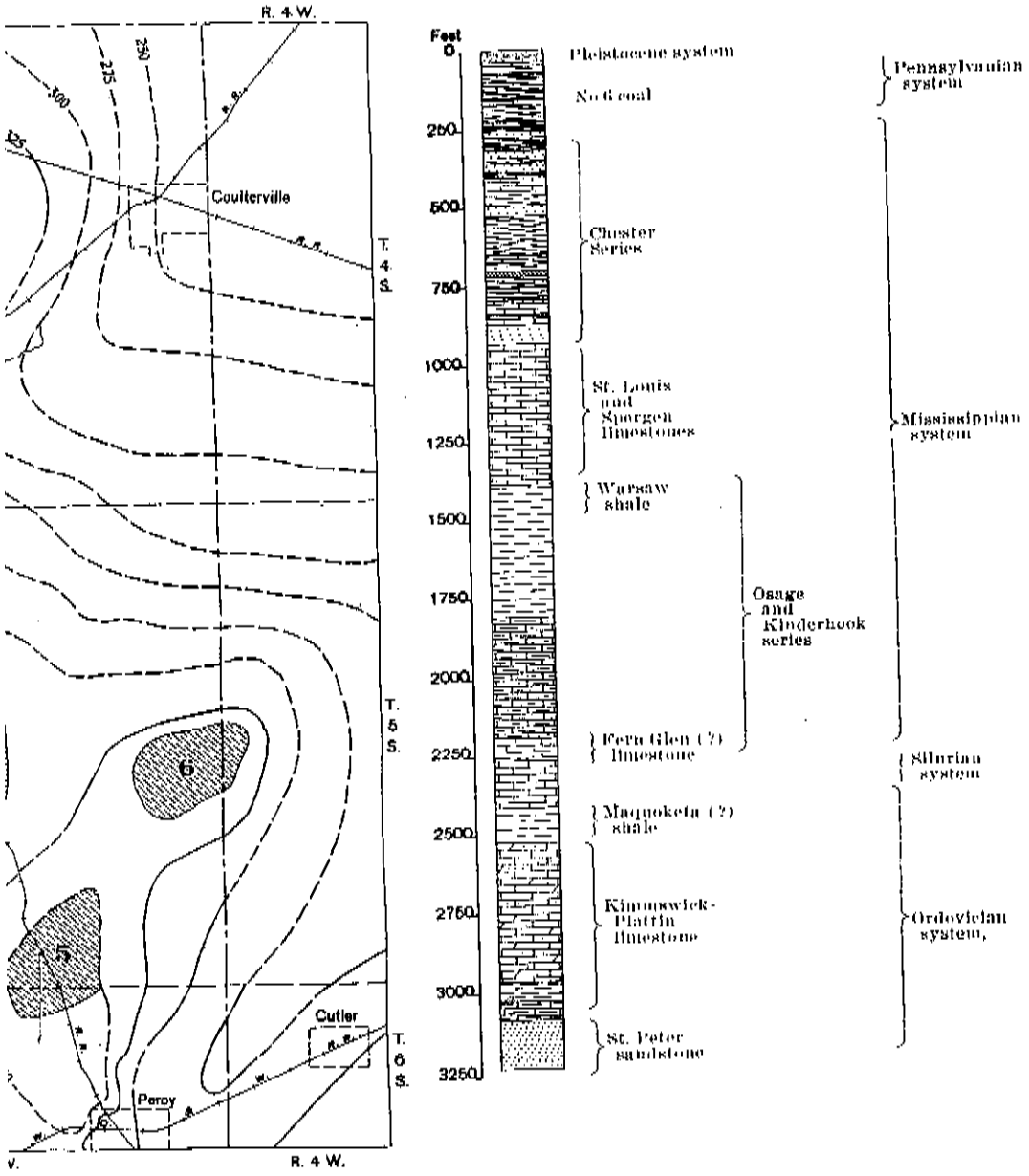


PLATE I. Structure map and generalized columnar section of Sparta area. Contour lines designate ap



ur lines represent the elevation of the top of the Herrin (No. 6) coal. Broken contour approximate trend.

serve equally favorable consideration. If one or both of these structures produce important amounts of oil or gas, then tests should be drilled on the other areas of slightly less promise. Further drilling in the vicinity of the old oil production should yield profitable results if undertaken with the guidance of careful geologic work for the determination of structural and sand conditions. The well being drilled near Sparta at the present time should show what may be expected in further tests.

What appears to be the most favorable area for testing for oil or gas outside of the vicinity of the present production of the Sparta region, is the small dome located in secs. 23, 24, 25, and 26, a short distance northeast of Blair in T. 5 S., R. 6 W. (area No. 1). This dome is considered favorably because of the very abrupt west dip which can be determined from outcrops along the branch of Little Marys River where it crosses the Sparta-Blair road. According to observations at this point, there is an abrupt dip of at least 25 feet to the west in a distance of about one-eighth of a mile. It is believed that a well located near Little Marys River, a few rods east of the road, would test this area.

The area immediately west of Tilden (area No. 2) shows a well defined structure as determined from data on the coal. Although a deep well is now being completed a short distance from this structure, it does not condemn the area as a possible oil and gas producer, for the elevation of the coal at that point is 40 or 50 feet lower than on the highest part of the structure. A well located near the center of sec. 1 west of Tilden should be a test of its oil and gas possibilities.

The other areas which are recommended should be tested only after the conditions in the two most promising areas have been determined. It is likely that tests located in the central parts of these areas would have the preference for testing their possibilities.

Horizons to be Tested

Obviously, all of the test wells drilled for the purpose of obtaining oil and gas should be carried to the Chester stratum which has given the oil and gas production in the vicinity of Sparta. In addition, it would be advisable to drill at least one test into some of the lower rocks which are possible producing horizons. As may be seen from the stratigraphic section accompanying the map there are several of these as follows: The St. Louis limestone, the Silurian limestone, and the Kimmswick-Plattin limestone. While it may not be practical to drill deep enough to test the Kimmswick-Plattin, it seems that testing of the others should be undertaken.

Drilling previous to the date of this report has indicated that the occurrence of the present producing sand near Sparta is somewhat irregular. Accordingly, a well could not be considered to have condemned a structure unless it should find this sand present and full of water. Obviously, no production could be expected if only non-porous rocks were found to occur at the producing horizon.

Cooperation of the Illinois Geological Survey

In order to further their own interests, operators in western Illinois should be particularly careful to cooperate with the Illinois Geological Survey by providing very careful information concerning the formations through which they drill. Although many tests have already been drilled in the Sparta area, there is a comparatively small number for which the data have been kept with a sufficient degree of accuracy to obtain the maximum benefits. As a result, information which would probably be worth several thousand dollars to operators intending to prospect for oil and gas in the Sparta area is not available and may be obtained only from the examination of careful records of several wells which may be drilled in the future. Accordingly, it is urged that the State Geological Survey be given full information regarding all future tests so that the maximum assistance may be provided for further prospecting.

PETROLEUM DEVELOPMENTS DURING 1925

By Gail F. Moulton

New developments in Illinois during 1925 were fairly satisfactory, for the percentage of dry holes was reasonably low and the average size of the producing wells was the largest in recent years. The following table shows the results of drilling for the past three years in summary form.

Year	Completions	Total initial production	Dry holes	Gas	Ave. initial production of oil wells
			Per cent		
1923	260	5,014	113 (43.4)	18	33
1924	174	5,568	51 (29.3)	2	45.1
1925	231	10,028	70 (30.3)	6	64.7

The new production developed during the year was of sufficient importance to cause a reduction in the rate of production decline, so that the production for 1925 was nearly as great as that for 1924, or almost 8,000,000 barrels.

Prospecting proved up about 900 acres of new territory in Wabash County, about 100 acres of new territory in Clark County, 80 acres in Marion County, and some minor additions in other portions of the State.

The principal drilling activity continued in Clark and Wabash counties during 1925. In Crawford and Lawrence counties a small amount of drilling was done on edge locations and a few wildcat tests were drilled without satisfactory results. Similar development work was carried on in the minor producing areas in central and western Illinois. No important discoveries resulted from this work.

The greatest activity took place in Wabash County where real boom conditions existed for a time after the discovery of some large wells north of Allendale. Several of the wells had an initial production of more than 500 barrels, and at one time 4 of the wells in the field would flow if allowed to stand. The producing wells drilled here during the last three months of the year average about 150 barrels initial production, and the percentage of dry holes was reasonably low.

Wabash County drilling tested the Biehl horizon at a depth of about 1400 feet over a considerable area, but some tests which were located on favorable structures failed to find the Biehl sand and unfortunately were not drilled deep enough to test the several possible oil producing horizons beneath which are the equivalent of the Kirkwood, Tracey, and McClosky sands of Lawrence County.

In Clark County, there was considerable activity in the Martinsville deep sand area. Some additional areas were tested, but the principal activity was in deepening the wells already producing from the Carper sand in the Mississippian black shale at 1400 feet to the Devonian limestone at 1600 feet. Although a considerable amount of water must be handled with the deeper oil, no extra casing is needed so that the additional cost is comparatively small.

The James Oil Company opened a new pool in Marion County about two miles east of the older production. Four producing wells have been obtained which find their production in sands in the Pennsylvanian system. None of these wells is deep enough to test the horizons from which most of the production in the Sandoval, Junction City, and Centralia pools is obtained. Although the geology has not been worked out in detail yet, it seems possible that the accumulation may be caused by a small fault. Since faults are known to occur in adjacent areas, and if this accumulation has been caused by such a structure, much additional prospecting should be done in the vicinity.

A well drilled in McDonough County, east of Plymouth, on Gin Ridge obtained 10 to 15 barrels of heavy black oil at a depth of 650 feet from the Hoing sand horizon of the Plymouth field. Further prospecting in adjacent areas is in progress and will help to determine the extent of the Hoing sand.

Drilling in other parts of the State failed to yield any results of particular importance.