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PRESS BULLETIN
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EXTENSION OF ALLENDALE OIL FIELD

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The discovery in 1922 of the flowing well on the Della Wright farm in sec. 8, T. 1 N., R. 12 W. initiated an active drilling compaign in the area surrounding the Allendale oil field in Wabash County. In the hope of being able to aid the operators in testing more efficiently the possibilities of the extension of the Allendale oil field, the Illinois Geological Survey made a study of conditions in the area in 1923. A detailed report embodying the results of the field investigation is being prepared, but in order to hasten the availability of certain outstanding points of information which may prove helpful in furthering exploratory drilling this spring, this press bulletin is issued. Paucity of accurate and detailed logs, and a general neglect on the part of drillers to save cores and samples, which serve as the most reliable source of information, rendered definite correlation difficult.

STRUCTURAL RELATIONS OF ALLENDALE OIL FIELD

The Allendale oil field is situated at the southern extremity of the southeastern Illinois oil fields, and is structurally associated with the same major structure—the LaSalle anticlinal uplift—that gives rise to the main oil field. Although this anticlinal structure continues with a regional southward pitch in Wabash County, its crest broadens into several radiating folds centering in the neighborhood of Allendale, and includes wide terrace-like areas on its westward flank (Pl. 1). The main production has been found associated with small domings caused by minor folding, on two step-like terraces situated generally just above the abrupt change to a steep north-west flank dip.

It has been recognized, however, that structure is not the sole consideration in locating areas favorable to oil accumulation in this field. Although holes drilled to the east and north of the producing fields are probably not located exactly on the anticlinal crest, they are structurally higher than the terraces, and expectation of production, from a structural viewpoint, would have been justified. However, dry holes and only small showings of oil have been the results to date.

STRATIGRAPHIC POSITION AND DESCRIPTION OF OIL-BEARING STRATUM

The sand, locally called the Biehl sand, is found at a depth of 1400 to 1600 feet, and lies about 125 feet below the top of the Chester series of the Mississippian system which is immediately overlain by the basal salt water sand of the Pennsylvanian system.

Examination of cuttings from the sand stratum of some producing wells revealed the fact that in places the Biehl sand consists of relatively thin beds of fairly well sorted sand, the maximum grains being of medium size. These beds are quite porous and contain the oil pay. They are interbedded with hard sandstone, composed of very poorly sorted sand ranging in sizes of grain from medium to very fine. This rock is practically non-porous. In some places the drill cuttings are broken in the form of chips instead of grains, and the sandstone has been logged erroneously as "lime" by many drillers. Some of the rock contains particles so small that it might easily be called a coarse shale or siltstone.

LENTICULAR CHARACTER OF OIL SAND

The abrupt change laterally from well sorted sandstone to hard, non-porous siltstone in some places explains the fact that holes offsetting producing wells in the Biehl sand have proved to be dry. The porous beds or parts of the sand bed are apparently lenticular. The accumulation of oil, therefore, is dependent not only upon favorable structure but also upon the existence of porous lenses. The presence or absence of such lenses can not generally be predicted in advance of drilling, and it is recommended that drilling be extended from a given producing well on favorable structure one location at a time. However, when the general trend of the zone characterized by lenticular porosity can be determined, recommendations of locations within the defined zones can be made ahead of the drill.

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ORIGIN OF THE SAND LENSES

It is suggested that the local sorting of the sand may be attributed to the action of waves and shore currents during the time of sand deposition. Although most of the uplift was post-Pennsylvanian, there is evidence that the La Salle anticline had already been slightly uplifted to the north in Chester time. In the shallow waters around the southern nose of the pitching anticlinal axis of the La Salle anticline it is possible that currents paralleling the shores may have had various slight fluctuations in intensity and direction due to slight changes in the shore line during Chester time. If such fluctuations were responsible for the formation of porous lenses, in general they probably would occur as concentric zones around the southern nose of the anticlinal structure. These zones would thus tend to parallel the structure contours as can be seen on the accompanying structure map.

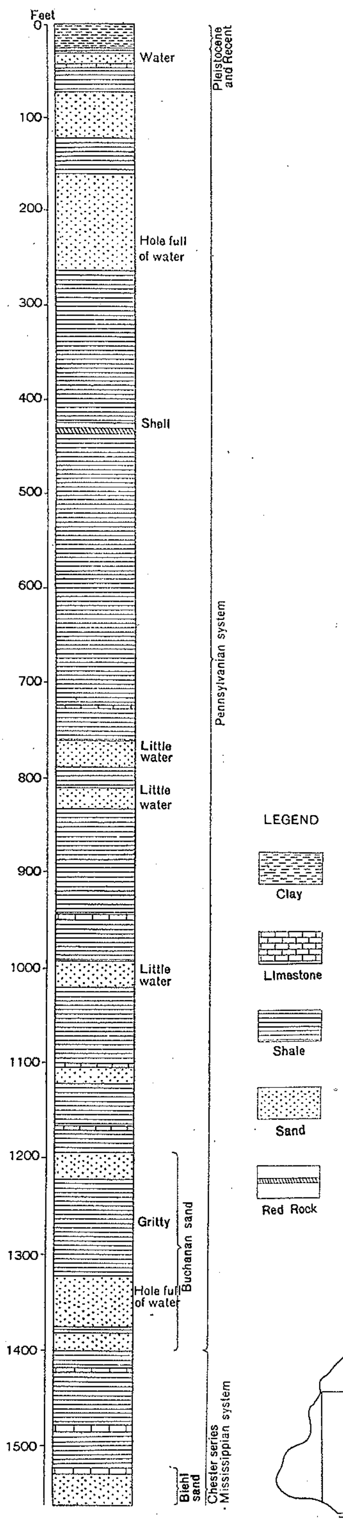
PROMISING AREAS FOR FURTHER DEVELOPMENT

Several promising anticlinal areas occur outside the present producing areas in secs. 3, 4, 5, 8, 9, and 10, T. 1 N., R. 12 W. There are anticlinal noses in the vicinity of (a) sec. 36, T. 2 N., R. 12 W., and sec. 1, T. 1 N., R. 12 W.; (b) secs. 15, 20, and 21, T. 1 N., R. 12 W.; (c) secs. 15, 22, and W.½ sec. 27, T. 1 N., R. 12 W.; (d) common corner of secs. 8, 9, 16, and 17, T. 1 S., R. 12 W.; (e) secs. 26, 27, 28, and 29, T. 1 N., R. 13 W.; and monoclinal terraces in the vicinity of (a) sec. 18, T. 1 N., R. 11 W.; (b) secs. 25 and 26, T. 1 N., R. 13 W., and secs. 30 and 31, T. 1 N., R. 12 W.; (c) sec. 1, T. 1 S., R. 13 W., and E.½ secs. 6, 7, and 18, T. 1 S., R. 12 W. If complete local closures in the Biehl sand occur on the monoclinal terraces, the locations of the crests will probably be found slightly up the regional dip from the crests of the Friendsville coal closures, as shown on the map. This is due to a thickening down dip of the interval between the coal and the Biehl sand.

In the consideration of all favorable structures, porosity must be taken into account. Some structurally favorable areas have nearby dry holes in structural depressions. If these show the existence of porous sand containing salt water a more favorable chance for production would be found on nearby anticlinal noses or domings. Areas that have nearby dry holes without salt water or small showings of oil with very hard and non-porous sand, should not be selected until more favorable areas have been drilled.

ECONOMIC POSSIBILITIES

In the extension of the field, 26 dry holes and 18 producing wells have been drilled. If the cost of drilling producing wells is distributed conservatively over their life; if most of the drilling cost of the dry holes is charged to the first year's production with the remainder charged to the following year's production brought in on proven acreage; and if the yearly cost of lifting and other appropriate charges are also placed against the first year's production, it will be seen that the first year's balance would show hardly any profit. But in the later life of the field, with added production from semi-proven acreage and careful drilling on geologically recommended locations, economic gain to the operator should be expected. With a view to furthering cooperation between the operators and the Illinois Geological Survey, the Biehl sand should be cored in order that its character may be entirely revealed, and in addition, samples and logs should be carefully and accurately kept.



Typical driller's log in sec. 5, T. 1 N., R. 12 W.

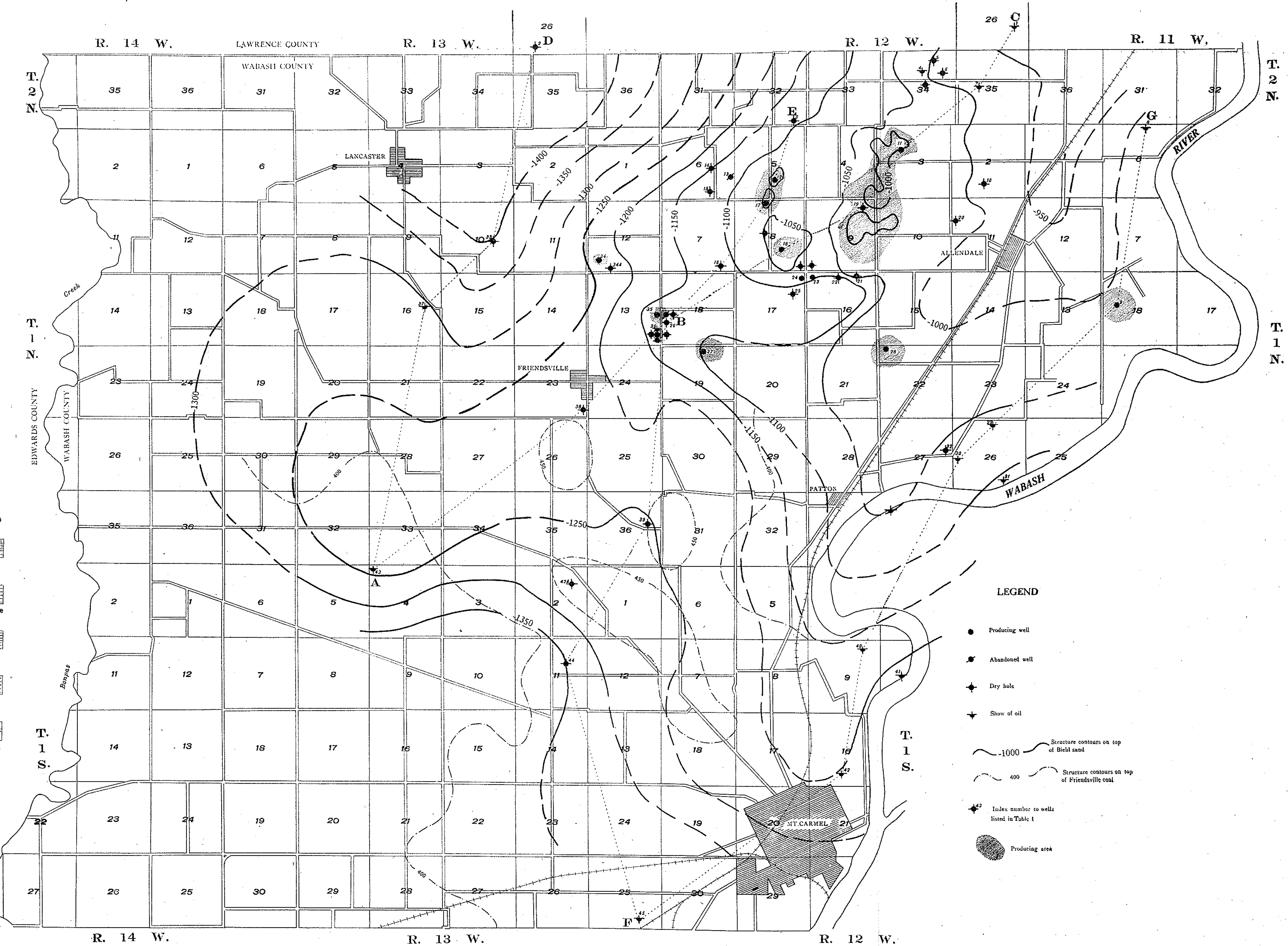


PLATE 1. Structure map of Allendale oil field, showing contours on Biehl sand (heavy lines) and contours on Friendsville coal (light dash-and-dot lines) relative to sea level. Index numbers refer to wells which will be listed in main report. Wells located in secs. 3, 4, 5, 8, 9, and 10, T. 1N., R. 12 W. will be indicated on Plate II of main report.