duction of the Valley for the past fifty-three years totals about ¼ billion cubic feet, essentially all from Atoka sandstones. It has been estimated that the present proved reserves amount to about four-fifths this amount. Much of the Arkansas Valley and most of the Ozark Highland area have not yet been adequately tested. During the past year an 8-million-cubic-foot well was brought in at 4,000 feet to establish the easternmost commercial production. It is in Pope County, half way between the Oklahoma line and the western margin of the Mississippi River Embayment.

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Pre-Deese Paleogeography of Part of Ardmore Basin, Southern Oklahoma

The part of the Ardmore basin discussed in this paper includes the area south and west of the Arbuckle Mountains, east of the Cruce-Velma trend, and north of the Loco-Criner Hills area; it includes parts of Bryan, Marshall, Johnston, Love, Carter, Stephens, Grady, and Garvin counties. A small part of the Anadarko basin is discussed showing the onlapping of the Deese beds on older Pennsylvanian and pre-Pennsylvanian of the Pauls Valley uplift.

In the Ardmore basin the Deese lies unconformably on top of beds from the Arbuckle to Dornick Hills age. The area of greatest pre-Deese truncation is the Healdton-Criner area. A large part of the basin has Permian beds and Cretaceous beds lying unconformably on Pennsylvanian and pre-Pennsylvanian rocks. A considerable part has Pennsylvanian beds at the surface. The only pre-Pennsylvanian beds exposed in the basin area are on the Mannsville anticline in Marshall County. There are pre-Pennsylvanian rocks cropping out in the Arbuckle Mountains on the north flank of the basin and in the Criner Hills area on the south side of the basin. The Deese has a maximum thickness of 8,000 feet, Dornick Hills 3,000, Springer 6,000, Caney shale 500, Sycamore 600, Woodford 700, Hunton 400, Sylvan 400, Viola 1,100, Simpson 2,400, and Arbuckle 7,300 feet. These are maximum thicknesses and are probably not reached in any one place. Probably the greatest thickness of both the Pennsylvanian and pre-Pennsylvanian is in the area of Ardmore, Oklahoma.

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Structural Geology of Arbuckle Mountain Region

The Arbuckle Mountain region of south-central Oklahoma is made up of thick Paleozoic rocks that were folded and faulted during several orogenic episodes within Middle and Late Pennsylvanian time. Pre-Pennsylvanian rocks ranging in age from Cambrian through Mississippian are differentiated into a southwestern basin province containing nearly 12,000 feet of sediments and a northeastern shelf province containing 7,000 feet of sediments. Ordovician rocks, principally carbonates, make up more than two-thirds of the stratigraphic section, having a thickness of 8,500 feet in the basin and 5,000 feet on the shelf. The region persisted in pre-Pennsylvanian time as a continually sinking site of marine deposition, in which slight local uplift but no mountain-building orogeny is indicated.

During Pennsylvanian time 17,000 feet of strata that are chiefly fine-grained clastic sediments were deposited in the Ardmore basin, adjoining the Arbuckle Mountains on the south, nearly in the same position as, and doubtless the continuation of, the older Ordovician basin. In the central part of the Arbuckle Mountains and along the northern edge, Pennsylvanian marine clastics and limestone are interstratified with conglomerates in a sequence not more than 5,000 feet thick. These rocks were deposited over the site of the earlier shelf area.

Structural differentiation of the Arbuckle Mountains began in early mid-Pennsylvanian time with the slow epeirogenic rise of the shelf area—the Hunton anticline—which resulted in the spreading of conglomeratic strata in surrounding areas of marine deposition. The Hunton anticline evidently remained emergent and was being continually uplifted through most of the Middle and Late Pennsylvanian. Total uplift was approximately 4,100 feet, nearly all of which was attained by gentle domal warping, and the Hunton anticline now stands as the most simple of all the major Arbuckle Mountain structural features. It is the only anticlinal structure to be uplifted so little that Lower Ordovician, Cambrian, and pre-Cambrian rocks are not exposed.

While the shelf area was rising, the basin area continued to sink and to receive sediments, partly derived from the eroding Hunton anticline. Local uplift on the northeast flank of the present Arbuckle anticline and north flank of the Tishomingo anticline resulted in pre-Deese erosion of all or parts of the Atoka, Wapanucka, and Springer formations, but the south flanks of these anticlines are structurally and stratigraphically conformable with the thick Pennsylvanian rocks of the Ardmore basin. Neither the Arbuckle anticline nor the Tishomingo anticline was a significant positive area until after the close of Hoxbar time.

Principal deformation of the Arbuckle Mountains was during the Late Pennsylvanian Virgil epoch. The Hunton anticline underwent its last and one of its strongest orogenic pulses just before Ada (mid-Virgilian) time, and it is inferred that the chief folding of the Arbuckle anticline, as well as the Tishomingo anticline, Mill Creek syncline, and Belton anticline, occurred during this episode. This was a short but severe time of structural deformation. The Arbuckle anticline was sharply folded, overturned on its north flank and locally on its south flank, and faulted in its axial part by thrusting. Parts of the fault systems probably were established at this time. Structural uplift was so great that the Reagan sandstone of Cambrian age was locally exposed, from which it can be deduced that 11,000 feet of pre-Pennsylvanian rocks and probably at least 5,000 feet of Pennsylvanian strata had been stripped away.

The orogenic product derived from this deformation was the Collings Ranch conglomerate, a massive limestone boulder deposit which has an exposed thickness of 2,000 feet and a probable initial thickness of 3,000 feet. From the character of the rocks comprising the conglomerate, it is certain that the source areas were the Arbuckle and Tishomingo anticlines.

A slightly later surge of orogeny continued and even intensified the deformation. Block faulting, accompanied by some folding, broke the folded complex along previously established structural lines into grabens and horsts elevating the anticlines to greater heights and permitting the exposure, after erosion, of large granite areas in the Tishomingo and Belton anticlines. The Collings Ranch conglomerate was mostly eroded except where preserved in grabens, and the new orogenic deposit, the Vanoss conglomerate of latest Pennsylvanian age, was spread as a feldspar-rich blanket on the strongly folded and eroded edges of the older rocks. This younger conglomerate has a maximum thickness of 650 feet on the western edge of the Mill Creek syncline, nearest the Arbuckle and Tishomingo anticlines. At a few places the lower part of the Vanoss conglomerate is faulted and slightly folded by a final weak pulse, but the overlying younger rocks, including the Hart limestone which is considered to be the base of the Permian system, are virtually flat and mark the close of the Arbuckle orogeny in this region.

One of the major problems in Arbuckle Mountain structural interpretation concerns the nature of the northwest-trending through-going faults, principally the Washita Valley fault, Reagan fault, and the Sulphur fault zone. These have been variously interpreted as normal, thrust, scissor, and rift faults. Dips observed or inferred on the outcrop, together with information from drill holes, indicate that these faults locally have normal and locally thrust relations, and the conclusion is reached that both the Washita Valley and Reagan faults have a component of strike-slip movement. The Tishomingo anticline is believed to have moved northwestward between these two faults, probably as a result of stress transmitted from the Ouachita Mountains.

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Continuous Dipmeter, New Geological Tool

One of the newest tools of the exploration and exploitation geologists is the continuous dipmeter which was introduced to the industry in 1952. This paper describes the basic instruments and outlines some of the methods of calculation of dip and strike from data acquired by the instruments. The accuracy of the graphical method of calculating is plus-minus $\frac{1}{2}°$ of dip and plus-minus 1° of strike. This is not the over-all accuracy of the dipmeter, but merely the accuracy of the calculations. The over-all accuracy is influenced most by stratigraphy and micro-structure which are uncontrollable in the calculation procedure.

Several examples of continuous dipmeter surveys are given, with examples of the pitfalls in working dipmeters. A plea is made for competent company personnel to interpret the logs rather than leaning so heavily upon service-company personnel.

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Stratigraphic Study of Palo Duro Basin, Texas Panhandle

It was recognized as a basin in 1926 by Charles N. Gould who gave it its present name. Exploration and drilling have been slow and sporadic since that time, the present deep-well saturation being less than one test per 150 square miles. At present, there are one small gas field and one oil field within its limits; around its margins eight other oil pools are producing, of which the Anton-Irish is the largest.

It is bounded on the north by the Amarillo Mountains and their westward continuance, the Bravo dome; on the west by the New Mexico Highlands; and on the south by the Matador line of basement peaks. Having approximately 1,000 feet of general closure along its deepest axis, it opens eastward into the Hollis-Hardeman basin, and southward into the Midland basin.

Structure within its limits is complex with sharp folding accompanied by high-angle faulting trending primarily northwest-southeast. Subordinate to this prominent trend, a low-relief countertrending system of folding is becoming more apparent with latest control.

The basin probably had its inception near the beginning of Pennsylvanian time when the surrounding regional structural components had their initial movement. Structural movement along these axes has continued through the most recent deposits in the area. Movement along the buried Amarillo Mountains was noted as recently as three years ago when the last tremor emanating from the area was felt.

Historically, the area was an embayment of the major Permian-Pennsylvanian sea on the south and east. Sediments in this interval are closely akin to their counterparts in the surrounding area. Lower Permian and Pennsylvanian shales, carbonates, and sands appear identical with the same