

sity of Nebraska Press, 1969), a new and useful kind of academic history has developed. It is a serious attempt to explain the rise, development and, yes, triumph of the public institutions of higher education. And it has succeeded in an important way. We now can understand more clearly the rocky path toward "mass" education on the college level: the vision of college presidents and faculty to develop more democratic goals for higher education, their sacrifices for those goals (even their own money at times in the case of Penn State), is largely an unsung story that Americans need to be more aware of. At the same time these newer books show that public colleges were dependent on legislative appropriations, not tuition, for survival. As a result, the interplay of academic vision balanced by political realities and skullduggery makes an interesting, at times even dramatic, story of great import in the history of many states in the Union, not least of all to Pennsylvania.

John Gazella's book, *Penn State: An Illustrated History*, is this latter kind of academic history. It is arguably the most informative yet interesting history of a public university yet to be written. With the well-developed documentary resources available to him, Gazella is able to tell a full and complete story interweaving state politics, faculty-administration disputes, and student life. The reader will see Penn State as more than Joe Paterno's school (Paterno is mentioned in passing just once), but as one of the most important educational experiments ever tried in the Commonwealth. ■

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"The Anticlinal Theory of Oil and Gas Accumulation in the Inception of the Natural Gas and Modern Oil Industries in North America." By John T. Galey.
In Geology and Ideas, a History of American Geology.
 (Geological Society of America: 1985. \$37.50.)

Most Western Pennsylvanians are aware that the oil industry began with the Drake Well discovery near Titusville in 1859. However, this discovery, and the yield from the wells drilled during the next forty

years, were insufficient to create the modern oil industry. It did not begin until 1901 with the discovery in East Texas, at Spindletop near Beaumont, of the most highly productive well drilled in the world up to that time. The yield from this well demonstrated the availability of oil in virtually limitless quantities. The inception of the liquid fuel age — the modern oil industry — was the result. The natural gas industry had its inception in Western Pennsylvania as a result of enormous discoveries at Murrysville, Westmoreland and nearby counties, and the ingenuity of George Westinghouse, who acquired the Philadelphia Company in 1884.

The prolific gas discoveries at Murrysville, Tarentum, and Hickory and oil at Spindletop resulted from the application of a geological theory by men of vision whose ability and courage led them to undertake the risks in exploring for them. Galey's is the story of how the theory evolved and of the men who developed and utilized it.

The treatise does more than describe the role of the anticlinal theory of oil and gas accumulation in the inception and development of the modern oil and gas industries. It also memorializes the particular contributions of many individuals, most from Pennsylvania, Ohio, and West Virginia, who propounded, questioned, or tested the theory in the nineteenth century. Some were college professors; some were state geologists; some were self-taught entrepreneurs. Western Pennsylvania, Ohio, and West Virginia were the sites of many tests of the theory which led to discoveries that changed the history of the world.

The anticlinal theory, reduced to its simplest terms, is that gas, oil, and water separated by gravity often concentrate in porous rocks in traps created by geological disturbance whereby the rocks have been dislocated. Such traps have often been located by examination of the structure of the rocks at the surface. The treatise is sometimes heavy going for a non-technical reader, but not so heavy as to turn away anyone interested in the development of the geological concepts underlying one of the basic industries of our region and the world. Together with its extensive bibliography, it will serve to guide any historian of the region or the industry to sources of further information with respect to early oil and gas fields of Western Pennsylvania, Ohio, and West Virginia, as well as conflicting views of geologists.

It will also provide information about individuals who were indispensable to the development of the industry. These include S. P. Hildreth, who published the first major article on the subject; Henry and William Rodgers, who were the first state geologists for Pennsylvania and Virginia respectively; and J. Peter Lesley, who directed

John F. Carll to prepare a report which confirmed the anticlinal theory and led to its acceptance.

A most successful proponent of the anticlinal theory, who applied it in two dramatic discoveries, was John H. Galey (great-uncle of the author). He was a native Pennsylvanian and a self-taught geologist who first achieved prominence in 1860 at age twenty by drilling a gusher in Venango County. In 1884, convinced of the anticlinal theory, he achieved its first confirmation in Pennsylvania by locating and drilling a sensational gas well near Tarentum. He sold the well to George Westinghouse and convinced him of the utility of the theory. Westinghouse, who had organized the Philadelphia Company and needed gas, was beginning its distribution to Pittsburgh. Westinghouse's acceptance of the theory accelerated its credibility. Thus was demonstrated the commercial value of natural gas, once considered a nuisance only to be vented into the atmosphere or burned at the well head. To assure Westinghouse a continuing supply of natural gas, Galey, with Col. James M. Guffey of Pittsburgh as financial promoter, and I. C. White (the author of a report for the Pennsylvania Geological Survey), operated the "Pittsburgh Syndicate," which explored a half million acres in eleven counties of Pennsylvania and West Virginia.

Later, in 1901, John H. Galey, prospecting in Texas with Colonel Guffey, used the theory to locate and drill the world's first great oil well at Spindletop with money borrowed from the Mellons. This well demonstrated the availability of oil in such large quantity that it literally initiated the liquid fuel age, the modern oil industry, and led to the development of several major oil companies, including Gulf Oil Corporation and the Texas Company.

John T. Galey is the fourth generation of his family in the gas and oil industry. He is an independent professional geologist and natural gas operator, a graduate of Princeton University, a Fellow of the Geological Society of America, and an Honorary Member of both the American Association of Petroleum Geologists and the American Institute of Professional Geologists. ■

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