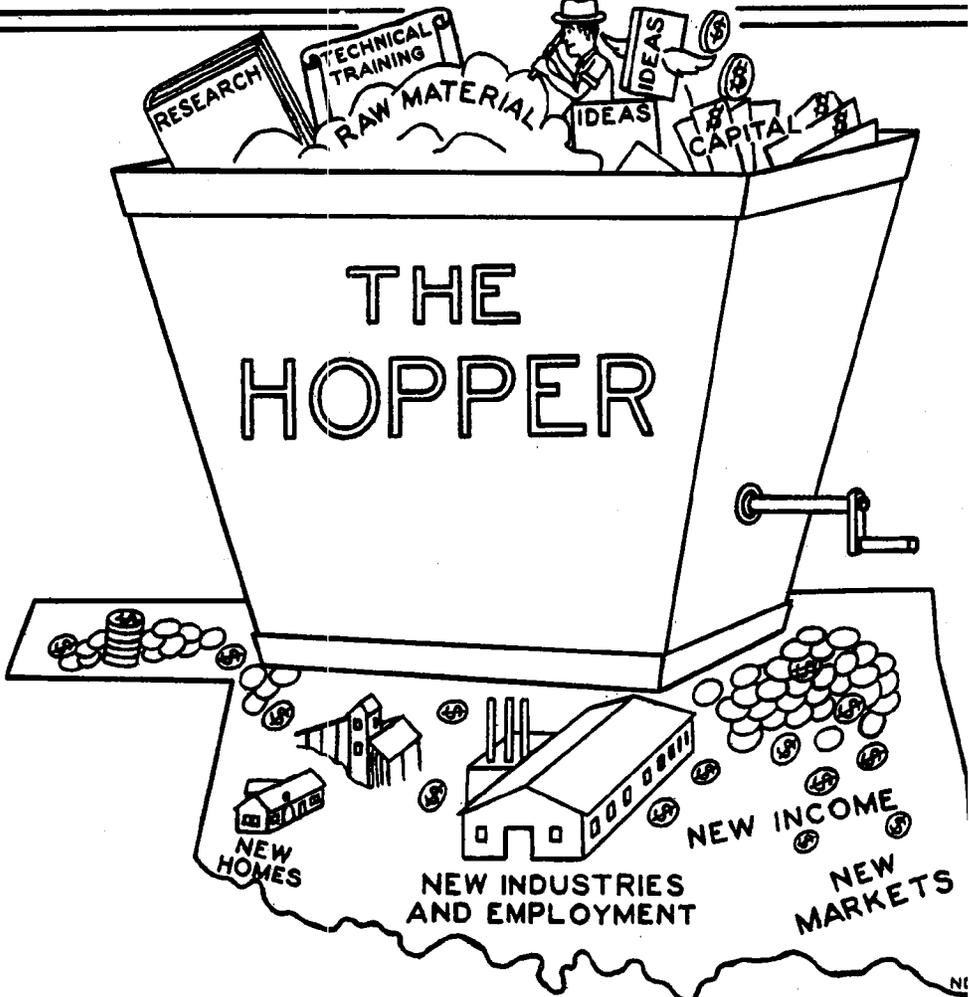


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LIMESTONE, ONE OF OKLAHOMA'S OLDEST MINERAL INDUSTRIES

by

John H. Warren

The Indians who built the Spito mounds were the first known users of limestone in Oklahoma, probably some 1,000 to 1,200 years ago. Most Indian tribes which inhabited Oklahoma, probably, at one time or another, used limestone for making instruments for grinding grain and the like. Although the use which Indians made of limestone was somewhat restricted and a very small volume was used, it is now the product of one of the major mineral industries of the state.

The first definite record of limestone being used by white men in Oklahoma was in the construction of Fort Towson in 1824. Fort Gibson, in Muskogee County, was built in the same year. It was built of wood and later of masonry, but it is most likely that lime was used for mortar in the foundation and chimneys of the original structures. It is probable that the Goodland limestone was used in the construction of Fort Towson and the Pitkin or Hale, in the construction of Fort Gibson; since each fort is situated close to outcrops of the respective stones. Although there are no definite records to establish the fact, it has been assumed by some historians that lime, probably burned, was used in construction at Union Mission, in Mayes County, as early as 1820.

In 1838, limestone was burned for masonry work at Fort Smith. "Lime for this construction was burned on both sides of the Oklahoma-Arkansas line. It is also reported that at this time lime was burned somewhere up the Arkansas River, supposedly near Fort Gibson in what is now Muskogee County, and was shipped down the river by steamboat to Fort Smith." From 1842 until 1852 lime was used in construction of other forts and institutions. Among

them were Fort Washita, Choctaw Indian Academy, and Fort Arbuckle.

After 1852 and before 1892 there are no records of limestone or lime being produced in Oklahoma. "In 1892, Mr. H. C. Hoover, of the Geological Survey of Arkansas, found at the government lime-kiln, three miles northwest of Pawhuska, Oklahoma Territory, Osage Agency, a bed of massive limestone about 100 feet thick..." Although 1898 is the first year for which the value of produced limestone is available, being \$3,000.00 that year, considerable quantities doubtless were crushed and used as railroad ballast between 1870 and 1898. In 1947 the value of limestone produced in Oklahoma had risen to more than four million dollars annually.

Limestones produced in Oklahoma have four major uses; (1) use as concrete aggregate, road construction material, and railroad ballast; (2) as agricultural limestone; (3) as a component of portland cement, and as a raw material for making hydrated and unhydrated lime; (4) use as building stone.

The most common use of Oklahoma limestone is for concrete aggregate and road construction material. Limestone from nearly all quarries within the state is suitable for this purpose; however, in a few localities the stone may be too soft or have other objectional qualities for these uses. In the construction of recent concrete dams in Oklahoma, limestone has been used almost exclusively as an aggregate stone. This extensive use of limestone may in part be caused by its proximity to the project, or, in part, to the belief of some engineers, that it makes a concrete product which is slightly superior to some other types of aggregate. It is the opinion of some engineers that there is a stronger bond formed between limestone and cement

than there is between cement and some other types of rocks. Further there is less possibility of undesirable chemical reactions between limestone and cement than there is between cement and some of the siliceous rocks. In one dam which is now under construction it is reported that it has even been found desirable to use limestone for fine as well as coarse aggregate.

The increase in the use of limestone for construction may be shown by production figures for three years selected from the Minerals Yearbooks. This production is as follows; 1935, 566,180 short tons; 1940, 802,390 short tons, 1947, 1,050,700 short tons. All quarries producing crushed stone within the state do not report their production, therefore the above figures show only the relative increase.

With increasing realization in recent years that lime is an important constituent to the growth of plants, especially in soils which are too acid, there has been an increase in consumption of limestone for that purpose. Most of the limestones in the state which are used for agricultural limestone are well above the specifications set up by the government, i.e., contain at least 80 per cent calcium carbonate or its equivalent. Subsidy from the Federal Government along with increased recognition by the farmer of the benefits of lime to plant growth no doubt account for some of the increase in consumption of this stone. At this time there are at least five quarries which confine their operations to the production of agricultural limestone. To these may be added several of the producers of construction stone who also supply some ag-lime as a by-product.

Most limestones of Oklahoma have not been found to be sufficiently pure to burn for lime. Although several would be suitable for making quicklime for masonry work, most of them are not

suitable for lime that is required by the glass, chemical and other similar industries.

The limestone which is now being burned in Oklahoma may be utilized by most industries requiring high grade calcium carbonate; as in the manufacture of glass; in the manufacture of whitening substances; in certain metallurgical processes; and many other uses requiring lime of exceptional purity.

There seems to be certain advantages in using burned lime for agricultural purposes; the main one being that it reacts with the soil much faster than does unburned lime. The cost of burned lime is somewhat higher than the unburned; however, this cost is partly compensated for in the decreased cost in shipping, the weight of the burned being a little more than one half that of the unburned.

Most limestone companies which have undertaken quarrying operations in Oklahoma have experienced considerable success. Of the few unsuccessful operations, most of them can be attributed to a poor grade of stone, lack of initial capital, or excessive distance from rail transportation. The future of Oklahoma's limestone industry appears to be good as several proposed highways, dams, and other construction projects are now under consideration, which will require large amounts of stone.

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GROUNDWATER STUDIES STARTED IN SOUTHEASTERN OKLAHOMA

Good progress is being made on the mapping of the geologic formations of Cretaceous and Quaternary age in the southern half of McCurtain County, it is reported by Stuart L. Schoff, District Geologist, Ground Water Branch, U. S. Geological Survey. The project in McCurtain County is part of

the program of cooperative ground-water investigations conducted on a fifty-fifty basis since 1937 by the Oklahoma Geological Survey and the U. S. Geological Survey. The objective of this program is to evaluate the ground-water resources of the state and to make the results available through publications.

Field work in McCurtain county is being done by Charles L. Fair, a graduate of Oklahoma Agricultural and Mechanical College in the class of 1949. He was appointed geologist in the Federal Geological Survey shortly after graduation, reported for duty in Norman early in August, and since mid-September, 1949, has spent most of his time in McCurtain County, mapping and studying the rock formations to provide a body of facts fundamental to an understanding of the occurrence and behavior of the ground water.

Geologic mapping done in McCurtain County in 1948 and 1949, by graduate students of the University of Oklahoma, under the direction of Dr. George G. Huffman, of the School of Geology, with field supervision by Dr. Hugh D. Miser, of the U. S. Geological Survey, is being utilized in the current investigation. The geologic phase of the work will be followed by an inventory of water wells, sampling of water for mineral analysis, collection of records of pumpage where available and significant, and analysis of fluctuations of water level.

The principal objective in the McCurtain County investigation is the Trinity sand, an immense underground reservoir for water extending from near the western boundary of Love County eastward to the Arkansas line. It is tapped for municipal water supplies at Marietta, Kingston, Pennington, Hugo, Valliant, Millerton, Garvin, and other towns in southern Oklahoma. It is a potential source of water supply of great--but as yet undetermined--value for industrial use. The Trinity

sand is reported to range up to 800 feet in thickness, but it includes some layers of clay, and all the sands are not of equal value as aquifers. Although for years the Geological Survey has been suggesting the Trinity to those seeking ground-water supplies in southern Oklahoma, the gaps in the Survey stock of information have been both numerous and large, and they have been worst in McCurtain County.

The geologic investigation by Fair is being coordinated with topographic mapping currently in progress in the same area under the Topographic Branch of the U. S. Geological Survey. S. D. Farmer, in charge of the topographic work, has helped Fair to obtain copies of large-scale planimetric maps on which to show the geology and has furnished many altitudes of surface points, thereby eliminating the need for running miles of level lines.

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OKLAHOMA TAXES AND THE PETROLEUM INDUSTRY

by

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In the field of public finance or tax economics I suppose I would be considered unorthodox, because the practical experience I have had in this field over the past 20 years has led me to form certain conclusions which don't always agree with the textbooks on public finance.

At the risk of seeming pedantic I should like to open my remarks with a few general observations concerning taxation as applied to our southwestern states.

The major conclusion to which I have come might be summed up in the statement that a state's

tax policy should be rooted in the fundamental economy of the state - and this includes its hopes and aspirations and economic opportunities as well as its existing sources of taxable wealth.

It follows that as state economies and opportunities vary so also may their tax policies legitimately differ one from the other. Each state has a somewhat different economic situation and, therefore, tax problem.

Furthermore, as economic conditions change, state tax policy may also need to be changed. A tax policy sound at one stage of the economic cycle may be wholly unsound ten years later.

What are the basic economic facts to our southwestern states in 1950, to which state tax policy should be oriented?

First and foremost fact is the tremendous capital investment currently being made in producers' goods - the great expansion in manufacturing and processing, transportation and utilities, oil and gas production, and other lines of business. Capital expenditure for 1949 has been estimated at \$14.3 billions, and at \$12.4 billions for 1950. Incidentally, over a billion of this will occur in the petroleum industry. This is the time to grow if we are ever going to.

The southwest is gaining more than its pro rata share of this new investment in industry, but unfortunately most of it appears to be by-passing Oklahoma.

Most of the states in this area are more or less cognizant of their opportunities in this period of growth and development; and most of them have adjusted and modified their tax policies to conform to this new and fundamental economic trend.

The second basic economic fact about the southwest (and one which leads to the same tax conclusions as the first) is that this region is still industrially under-developed.

Agriculture, which was its original primary source of wealth, has since been augmented by the discovery and production of the great mineral wealth which we know today. And we have only recently become acquainted with the third leg which supports our basic economy, namely, manufacturing and processing of our raw materials, by which their value is increased many fold.

But notwithstanding our growth and seeming prosperity, no state in this region has an average per capita income equal to the United States average of \$1410 (1948). Not even in Texas, which is first in the production of petroleum and contains the fastest growing industrial area in the world at Houston - does the per capita income of \$1192 approach that of the United States.

Oklahoma probably is less conscious of its need and opportunities for industrial development than most. Although we have had fairly stable conservative government over the past ten years, still it was not until 1945 that our legislature began to take seriously the contention that our laws were stifling the state's industrial development, and did something about it.

Oklahoma's last major tax increases occurred in 1941, and were considered necessary as a corollary of the budget-balancing amendment adopted in that year. Since 1941 there have been two subsequent increases in the state gasoline tax: the first being a temporary increase of 2 cents per gallon, which expired at the beginning of 1947; and the other being a permanent increase of 1 cent per gallon enacted last year. Motor vehicle license fees were readjusted and increased somewhat in 1945.

But on the credit side, Oklahoma has been about the only state which has reduced taxes since the end of the war - certainly the only one in the southwest. We made a very substantial reduction in our excessively high state income tax, both for individuals and corporations; and several tax exemptions were enacted of no little benefit to Oklahoma industry, particularly to aviation and manufacturing industries.

So, on balance, Oklahoma has enjoyed more stability in taxation during the past ten years than many other states. While we have "held the line", so to speak, other southwestern states have been gradually catching up with us, and at least one state has passed us in the tax burdens placed on industry generally, and on the oil and gas industry in particular.

But this has not been accomplished without opposition. There has been greatly increased pressure for higher appropriations, and for higher taxes with which to finance those appropriations. Thus far, spending demands have been held within the increased revenues which inflated economic conditions and a somewhat broadened tax base have provided. But it now appears that we may have reached the apex of the inflation spiral (at least temporarily), and that state revenues, particularly in the general fund, may decline several million dollars by the time the 1951 session rolls around.

Thus we may expect increased pressure in the 1951 session for higher tax rates, with something of a financial crisis and perhaps a turning point in state affairs. Most of these tax proposals will touch the oil and gas industry in one way or another. I might review for you briefly some of the proposals introduced in the last session that failed of passage but which will no doubt be tried again in 1951.

First there was the proposal (or, in fact, several of them) to levy a severance or gathering tax on natural gas; and its companion, the bill to fix a minimum price for natural gas at the well-head at substantially above present price levels. The effect of either would have been to increase the cost of fuel to Oklahoma consumers.

Heavy fuel-consuming manufacturers are the backbone of the state's manufacturing industries. Of the total "value added" by manufacture in Oklahoma during 1947, amounting to \$341,027,000, the five classifications of heavy fuel consuming industries accounted for \$207,824,000 or 60.9 percent. These same five groups of manufactures accounted for 76.9 percent of total wages and salaries paid by manufacturing establishments during 1947.

Contrast this \$207 millions of new wealth and income, plus another \$100 to \$150 millions spent for raw materials, fuel and power, - contrast all of this as a base for tax purposes against a total value of Oklahoma's natural gas production of around \$20 millions!

House Bill No. 136 levying a tax of 1 cent per gallon on motor fuel at the refinery, in lieu of the retail gasoline tax, actually passed the House in the closing hours of the last session, and remains a continuing threat to the refining industry in the next session.

Then there was the proposed tax on royalty interests when severed from the fee ownership.

No change has been made in the gross production tax since 1935, and the industry may possibly expect an attempt in 1951 to increase this tax on oil and gas production, or perhaps to impose a severance tax in addition to the present gross production tax of 5 percent.