

HISTORY OF SCIENCE

Chairman: HOWARD H. MICHAUD, Purdue University
STEPHEN VISHER, Indiana University, was elected chairman for 1959

Indiana's Minerals and the State's Development

STEPHEN S. VISHER, Indiana University

The annual value of the output of minerals in Indiana has long been greater than that of 35 other states, greater indeed than the combined value of ten other states. This output has been almost altogether of coal, oil, gas, stone, gravel, sand, and clay, as Indiana has produced almost no metals.

Minerals have played an important role in the development of the state, although production was small in the pre-railway era (before 1860). Extensive coal-mining commenced shortly after the Civil War, increasing from about a million tons in 1880 to 6 million in 1900 and 26 million in 1920. The discovery of natural gas in quantity in east-central Indiana in 1886 induced a great boom during which several former rural villages became industrial cities. Examples are Muncie, Marion, Newcastle, Alexandria, Elwood, and Kokomo. The gas supplies were abundant in that area for only 10 to 20 years, after which the industries which had developed with the help of the cheap gas either moved away, or if they remained, used much coal and oil.

The production of oil in the north east central gas-belt reached its height in 1904, with a production of 11,000,000 barrels. Indiana lost its place as one of the leading oil producing states soon after 1900, when large production commenced in Texas, California, Oklahoma, and elsewhere. Oil had much less influence in Indiana than did gas, but it helped the industrialization, including that in southwestern Indiana, which in recent years has yielded more oil than the entire state produced in 1904.

Stone was used locally even while Indiana was very young, but the quarrying of considerable amounts of Indiana's famous oolitic limestone began in the 1880s and increased rapidly in the 1890s. Indiana obtained first rank in the production of cut-stone about 1900. The Bloomington-Bedford area has been, since soon after 1900, the world's largest producer of cut building stone.

Crushed limestone commenced to be used when the making of macadamized roads and of concrete was introduced in the 1890s. It has continued to expand and now vastly surpasses in value the cut limestone. Limestone was used for the making of some lime and cement earlier, but it became important in the 1890s. The extensive use of pulverized limestone to counteract the normally excessive acidity of Indiana's soil

became widely important in the 1930s, with the assistance of the New Deal government.

Gravel has been used in steadily increasing amounts for road-making, commencing in the 1860s, and for the making of concrete soon thereafter. Indiana is fortunate in possessing much gravel. Sand has been used in cement, plaster and glass since the 1890s, and vast quantities of Indiana's dune sand have been taken to Chicago where it was used to elevate the railway tracks, as well as for construction.

The use of Indiana's clay for the production of brick and tile reached sizable proportions in the 1870s and 1880s when extensive areas of Indiana's almost level lands commenced to be tile-drained, and when the cities began to have sewers. Many buildings were constructed partly of brick after about 1870, and some roads were paved with brick in the early 1900s. Indiana's "fire clay" just below the coal, in Clay county especially facilitated the development of a specialized tile, electric wire conduits and fire brick industry, especially near Brazil. Huntingburg developed a pottery industry early.

A small amount of nearby bog iron ore influenced the location of the Studebaker Brothers wagon plant at South Bend in 1852, but the strictly limited supplies were soon supplemented by iron ore brought into the state.

One of the conspicuous ways in which minerals have affected the development of Indiana has been the cheapness with which iron ore from the Lake Superior region can be brought on Lake Michigan to Indiana Harbor, and after 1906 to Gary. During the Civil War a small amount of iron was made from iron concretions found in some sandstones near Terre Haute. It was used especially for the construction of Civil War cannon and cannon balls. These strictly limited supplies of lowgrade iron ore ceased to have value after the Lake Superior supplies became available.

In the 1880s and 1890s and to a lesser degree in the early 1900s Indiana's supplies of mineral waters were used in numerous health resorts, several of which became popular. Martinsville and French Lick were especially notable.

Ordinary water, the mineral which is so abundant in Indiana that it ordinarily is not considered to be a mineral, has had a profound influence on the development of the state. Most early homes were located near a spring or stream. Villages which could not cheaply obtain enough good water failed to grow into cities. Bodies of water in streams and lakes had additional, often great significance, on the development of Indiana.

In addition to the minerals already mentioned several others had significance in the development of certain Indiana localities. Some sandstones of the unglaciated part of southern Indiana were used for grinders. Some mixtures of sand and clay formed an exceptionally good "moulding sand." Relatively large quantities were shipped very widely to foundries from some deposits near Martinsville. Some impure limestones have been melted and made into rock-wool, especially along the Upper Wabash Valley. At least locally in Owen County a limestone

has been used as a flux in iron blast furnaces. (Nearly all the limestone used in the steel mills of Gary comes by boat from Michigan.) Some deposits of marl, a sort of lime-clay layer under some northern Indiana lakes, formerly was used as a fertilizer. Small amounts of gold have been found in gravels brought from Canada by ancient glaciers. Nowhere in Indiana has enough gold been found to be profitably mined, but gold caused local excitement at various times in the early decades of the state's history. Diamonds, the mineral most valuable per ounce, have also been found occasionally in glacial gravels, more than 100 of them in Indiana. They too have added a bit of excitement in gravel pits, especially a short distance south of Indianapolis.

Although, as already remarked, Indiana has produced almost no metals, in addition to the iron ore brought into the state, also significant have been the large amounts of zinc and copper fabricated here, enroute from western mines to eastern markets. Tin used to coat steel for tinplate also has been extensively used in Indiana.

Geological surveys, partly by sons of the distinguished Robert Owen of New Harmony fame, were made early in Indiana and were of educational and scientific significance although little affecting the development of the state.