IOWA GEOLOGICAL SURVEY

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MINERAL RESOURCES OF IOWA

by
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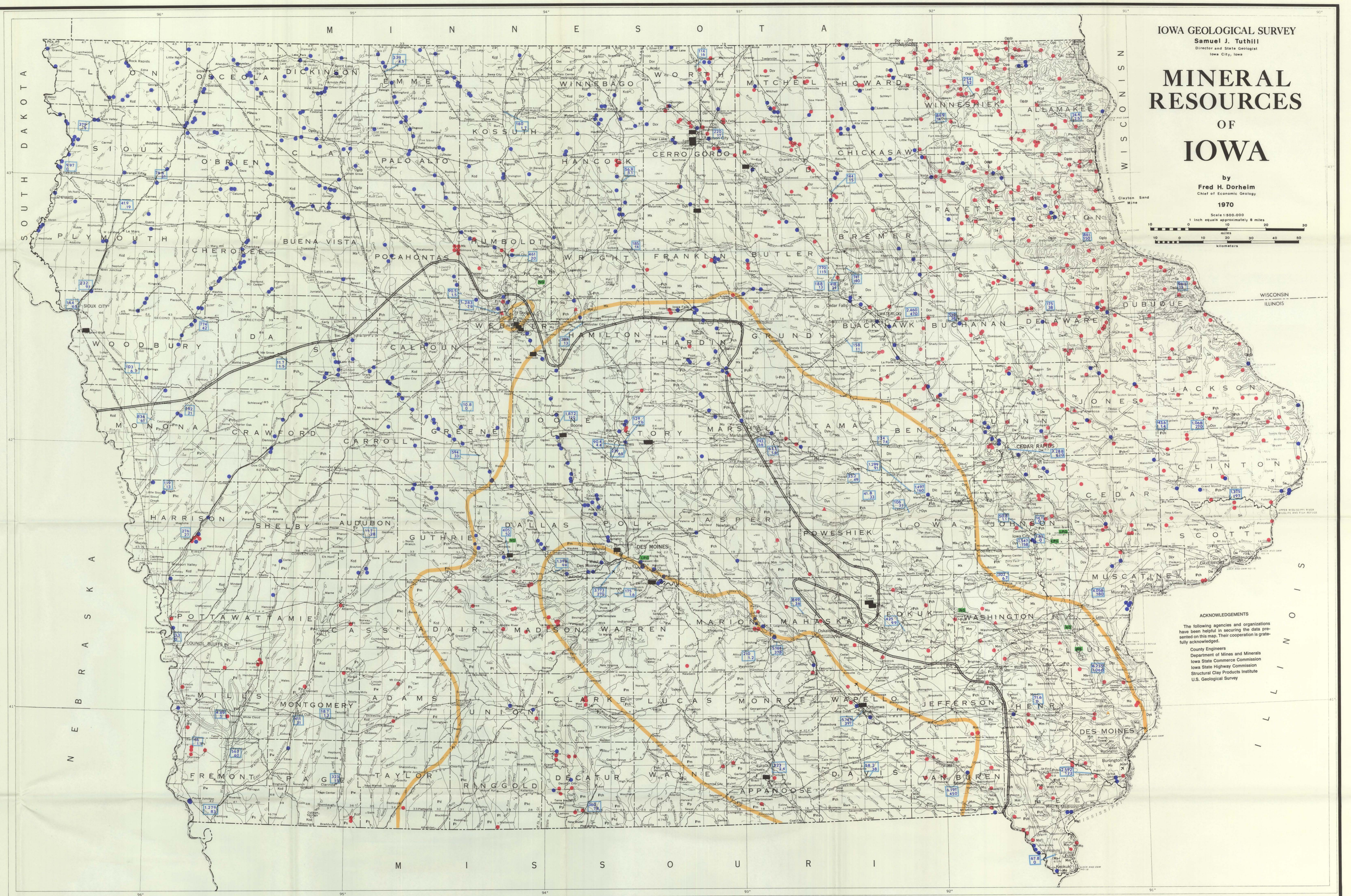
1970

Scale 1:500,000
1 inch equals approximately 8 miles



EXPLANATION

CEMENT

In 1968 the value of cement produced in Iowa totaled $49,261,000. Nearly all of the production was sold in Iowa and the bordering states. Over half of the production was sold to ready-mix concrete companies. The manufacture of cement requires large quantities of limestone, shale, and gypsum (limestone — 83 percent, shale — 14 percent, and gypsum — 3 percent). The limestone used in cement manufacture in Iowa is obtained from the Pennsylvanian and the Devonian; gypsum from the Jurassic, and shale from the Pennsylvanian and Devonian. Limestone from the Mississippian (the Gilmore City Formation) has been used for cement manufacture and is a desirable source of raw material.

There are two cement manufacturing plants operating in the Mason City area, two near Des Moines, and one near Davenport.

Selected references:

Dorheim, F.H., 1966, Gypsum resources of Iowa; *in* A symposium on the geology of cement raw materials, Indiana Geol. Survey, p. 73-82.

CLAY-SHALE

Clay Pit

In 1968 the clay and shale production in Iowa was valued at $1,747,000. Most of the clay produced was used in the manufacture of brick, tile, sewer pipe, cement, and light-weight aggregate. Lesser amounts were used for mortar-mix and for ceramic arts. Clay products were manufactured in 17 of the 99 counties in Iowa, with the shales of the Cretaceous, the Pennsylvanian and the Devonian Systems being utilized.

Selected references:

Gwynne, C.S., 1941, Ceramic shale and clay deposits in Iowa: Iowa Geol. Survey, Ann. Rept., v. 38, p. 263-377.

COAL

Area of coal occurrence

The area underlain by potential coal-bearing strata is enclosed by the black boundary shown on this map. During 1968 there were about five and one-half million tons of coal consumed in Iowa. Of this, the Iowa coal industry produced about 15 percent for a dollar value of $3,289,000. All of the coal came from the Pennsylvanian System.

Selected references:

Landis, E. R. and Van Eck, O.J, 1965, Coal resources of Iowa: Iowa Geol. Survey, Tech. Paper 4, 141 p.

GYPSUM

Area of gypsum occurrence

Iowa ranked third in the United States in the quantity of crude gypsum produced in 1968. The value of gypsum produced was $5,838,000.

On this map the term gypsum has been used to include not only gypsum ($CaSO_4.2H_2O$) but also anhydrite ($CaSO_4$).

Gypsum occurs in Iowa at three stratigraphic horizons: (1) in the Jurassic rocks of the Fort Dodge area, (2) in the Mississippian rocks of south-central Iowa, and (3) in the Devonian rocks of central and southeast Iowa.

The bulk of production is centered around Fort Dodge, although one gypsum mine produces from the Devonian near Sperry, in southeast Iowa. Currently there is no production from the Mississippian in Iowa, although it was mined near Centerville prior to 1930.

There has been recent exploratory activity for gypsum in the Mississippian of Marion and Monroe Counties. Southern Grundy County and northwest Tama County are logical areas for future exploration in the Devonian.

Selected references:

Dorheim, F. H., 1966, Gypsum resources of Iowa: *in* A symposium of the geology of cement raw materials, Indiana Geol. Survey, p. 73-82.

Lemish, John and Sendlein, L.V.A., 1968, Exploration drilling to determine subsurface gypsum potential near Albia, Iowa: Eco. Development Admin., Tech. Assistance Proj., U.S. Dept. Commerce, 87 p.

LIMESTONE AND DOLOMITE

Quarry

The production of limestone and dolomite is, next to water, Iowa's largest minerals industry. In 1968 the production of stone exceeded twenty-six million tons. This was one and one-half times the production of sand and gravel and many times, in tonnage, the production of gypsum, clay, or cement. The value of stone production for 1968 reached $40,397,000.

About 75 percent of the production goes into road construction and maintenance. Other uses are in cement manufacture, production of agricultural limestone, mineral feeds, chemical (high-calcium) uses, dimension stone, and rip-rap.

Limestone and dolomite are abundantly available in eastern Iowa, far less abundant in southwest Iowa, and have practically no economic development in northwest Iowa.

The production of high-grade limestone from mines has increased appreciably during the last decade and is expected to continue to do so in the future. Some of the formations that should be considered as potential high-grade aggregate sources obtainable by mining are: the Gilmore City, Wassonville, Spergen, and parts of the Cedar Valley, Wapsipinicon, and the LeClaire.

Selected references:

Wood, L. W., 1933, Road and concrete materials of southern Iowa: Iowa Geol. Survey, Ann. Rept., v. 36, p. 7-310.

Hershey, H. G., Brown, C. N., Van Eck, O. J, and Northup, R. C., 1960, Highway construction materials from the consolidated rocks of southwestern Iowa: Iowa Hwy. Research Board Bull., v. 15, 151 p.

SAND AND GRAVEL

Sand and gravel pits

Large quantities of sand and gravel are obtained from river alluvium and from glacial deposits which cover most of Iowa.

The total value of sand and gravel obtained in Iowa in 1968 was $15,192,000, with an average price per ton of $0.93.

Road construction and maintenance accounted for about two-thirds of the sand and gravel market with building construction being the next major user.

Selected references:

Wood, L. W., 1933, Road and concrete materials of southern Iowa: Iowa Geol. Survey, Ann. Rept., v. 36, p. 7-310.

Kay, G. F., and Miller, P. T., 1939, Pleistocene gravels of Iowa: Iowa Geol. Survey, Ann. Rept., v. 37, p. 1-231.

SANDSTONE

The only sandstone produced in the state is from the St. Peter Sandstone at the Clayton Sand Mine located near the town of Clayton in northeast Iowa. Sand from this mine is used primarily as foundry sand and in finish plaster, with secondary use in sand blasting and as part of the texture paint industry.

STREAM FLOW DATA

The blue rectangles on the map represent the locations of stream gaging stations operated by the U.S. Geological Survey and the Iowa Geological Survey. The upper figure in these rectangles represents the average discharge as computed from relations contained in Iowa Natural Resources Council Bulletin 10. The lower figure represents the low flow, a discharge that is equalled or exceeded 90 percent of the time (same reference).

UNDERGROUND GAS STORAGE

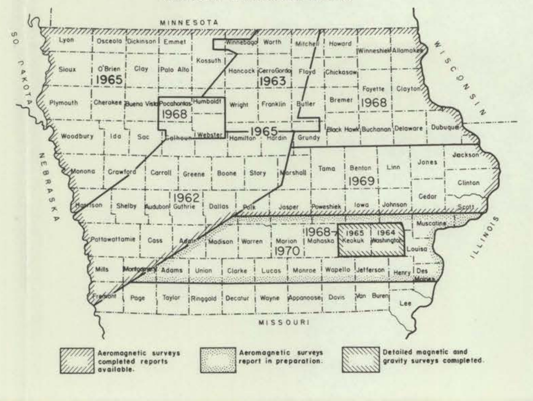
Natural gas storage NG

L.P.G. storage LPG

Although there is no production of either natural gas or of liquid petroleum gas (L.P.G.) in Iowa the state does have geologic conditions suitable for the underground storage of these products. Underground storage makes it possible to provide these products more economically to a much larger market in Iowa and adjacent states than would otherwise be possible.

L.P.G. includes propane, ethane, and butane or a mixture of these products.

STATUS OF GEOPHYSICAL MAPPING



References:

Hase, D. H., 1964, Geologic interpretation of magnetic map, Washington County, Iowa: Iowa Acad. Sci. Proc., v. 71, p. 284-292.

........, 1965, Geologic interpretation of magnetic map, Keokuk County, Iowa: Iowa Acad. Sci., v. 72, p. 312-316.

.... and Koch, D. L., 1968, Geophysical study of the Keota Dome — Keokuk and Washington Counties, Iowa: G.S.A. Bull., v. 79, p. 935-940.

Henderson, J. R., *et al*, 1962, Preliminary interpretation of an aeromagnetic survey in central and southwestern Iowa: U.S. Geol. Survey in cooperation with the Iowa Geol. Survey, 30 p.

........, *et al*, 1963, Preliminary interpretation of an aeromagnetic survey in north-central Iowa: U.S. Geol. Survey in cooperation with the Iowa Geol. Survey, 27 p.

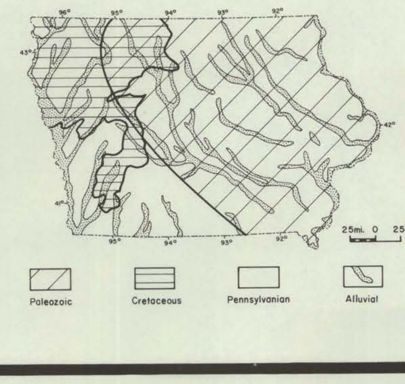
.... and Vargo, J. L., 1965, Aeromagnetic map of central Iowa: U.S.G.S. Geophysical Inv. Map GP-476.

Iowa Geol. Survey, 1965, Preliminary interpretation report, airborne magnetometer survey of northwestern Iowa: 19 p. and map.

........, 1968, Preliminary interpretation report airborne magnetometer survey of northeastern Iowa: 26 p. and map.

........, 1969, Preliminary interpretation report airborne magnetometer survey of east-central Iowa: 19 p. and map.

GROUND-WATER PROVINCES



PALEOZOIC GROUND-WATER PROVINCE

The upper carbonate aquifers commonly yield 50 to 300 gpm to individual wells; occasionally 300 to 500 gpm; and rarely 500 to 2000 gpm. The Cambrian-Ordovician aquifer commonly yields 500 to 1000 gpm and occasionally as much as 1500 gpm. The Dresbach aquifer in extreme east-central part generally yields 1000 to 3000 gpm.

CRETACEOUS GROUND-WATER PROVINCE

The Dakota aquifer commonly yields 50 to 100 gpm; occasionally as much as 700 gpm; and rarely 1000 to 1500 gpm.

PENNSYLVANIAN GROUND-WATER PROVINCE

The Pennsylvanian rocks generally yield only 10 to 20 gpm. Intermediate carbonate aquifers generally yield 50 gpm and rarely as much as 200 gpm. The deeply buried Cambro-Ordovician aquifer generally yields 100 to 200 gpm and rarely as much as 300 gpm.

ALLUVIAL AQUIFERS

Yields of 1000 to 2000 gpm per well are available from Mississippi and Missouri River valleys. Alluvium of larger interior streams commonly yields 200 to 300 gpm and occasionally 300 to 600 gpm; yields of 1000 to 2000 gpm are available locally where buried channel aquifers underlie alluvium.

Reference:

Steinhilber, W. L. and Horick, P. J., 1970, Ground water resources of Iowa; *in* Water resources of Iowa — a symposium: Iowa Acad. Sci., 1970, 49 p.

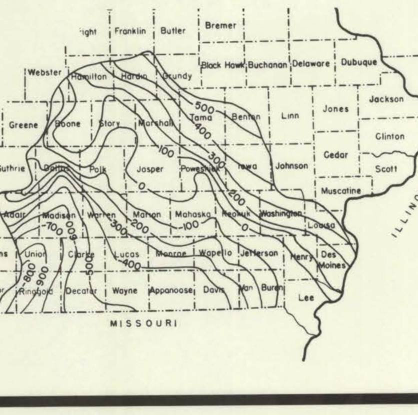
MISSISSIPPIAN GYPSUM

Contours at first occurrence of evaporite.

Reference:

Dorheim, F. H., 1966, Gypsum resources of Iowa: *in* A symposium on the geology of cement raw materials, Indiana Geol. Survey, p. 73-82.

DEVONIAN GYPSUM



Contours at first occurrence of evaporite.

Reference:

Dorheim, F. H., 1966, Gypsum resources of Iowa: *in* A symposium on the geology of cement raw materials, Indiana Geol. Survey, p. 73-82.

ACKNOWLEDGEMENTS

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