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ILLINOIS STATE GEOLOGICAL SURVEY
Champaign, Illinois 61820

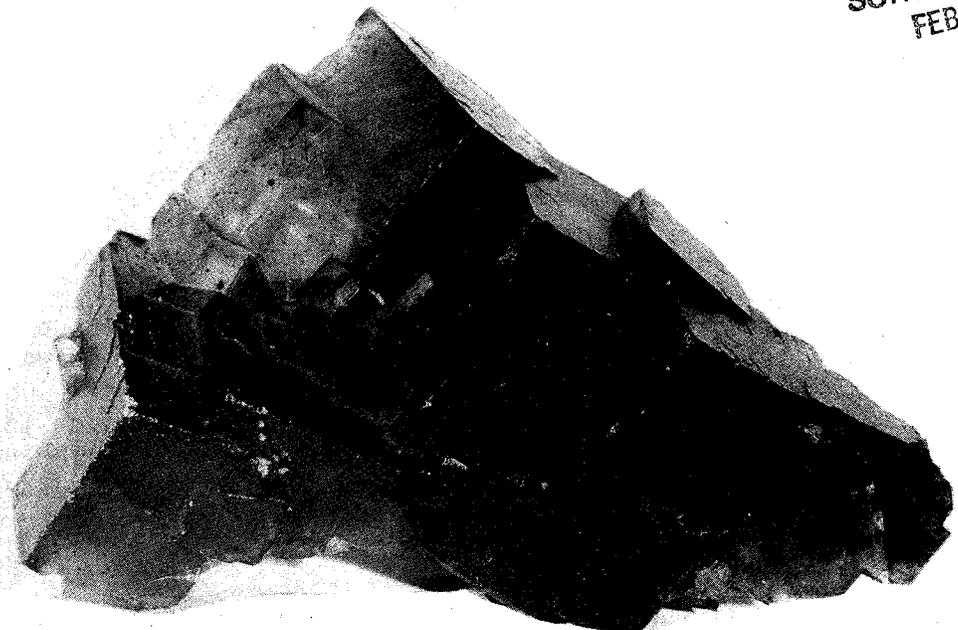
GEOGRAM 9
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FLUORITE: ILLINOIS STATE MINERAL

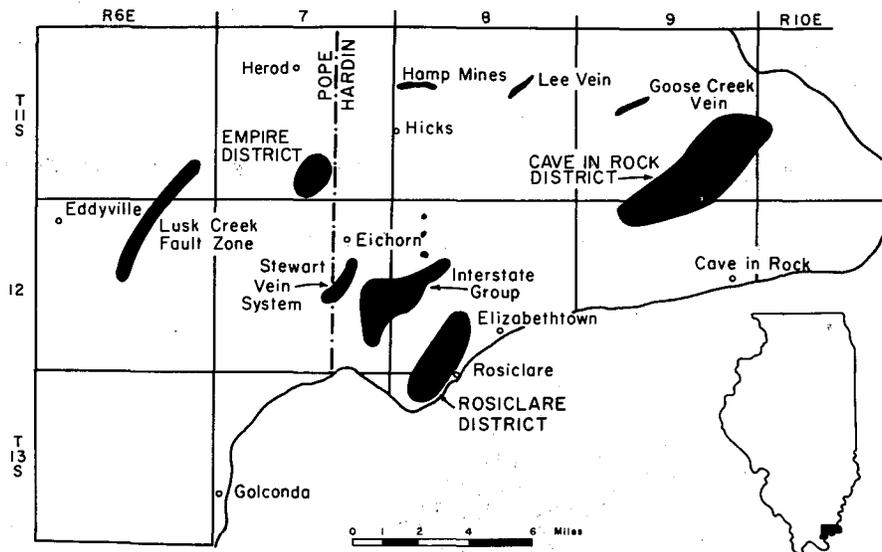
David L. Reinertsen

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Fluorite, or fluorspar as miners and geologists call it, is a calcium fluoride (CaF_2) mineral. This transparent to translucent, glassy-appearing mineral is usually found as irregular masses in vein and bedding-replacement deposits in Pope and Hardin Counties in southeastern Illinois. At times, however, beautiful cubic crystals (such as those pictured) are found. The color of fluorite is variable—commonly gray or yellowish-white, but sometimes purple, yellow, blue, pure white, colorless, or green. Some varieties of fluorite glow in invisible ultraviolet light, from which the term "fluorescence" is derived. Fluorite is sometimes called a gemstone because of the high light reflectance from its crystal faces and the high polish that can be given to these faces and the cleavage surfaces. But its brittleness and relative softness make fluorite unsuitable for ring settings; brooches and pendants must be handled very carefully so that the specimens in their settings are not scratched or fractured.

Bedrock strata deposited during the Mississippian Period of geologic time (about 330 million years ago) contain the fluorspar deposits of extreme southeastern Illinois. Complex faulting of this region about 270 million years ago produced the open fractures along which fluorspar later was deposited. The time of fluorspar deposition and the exact origin of the mineralizing solutions that formed the vein and bedded ores are unknown. Presumably, the ores were deposited by hot, fluorine-bearing, aqueous solutions rising from deep within the earth's crust. Rocks of Mississippian age found in prospect drill holes elsewhere in southern Illinois contain occasional thin streaks of fluorite, but no other evidence indicates economically important deposits outside of the southeastern Illinois fluorspar district.



Principal fluorspar mining districts in the extreme southern Illinois region.

Although early Illinois Indians made artifacts from fluorspar, the first recorded use of fluorspar was in 1823, when material from Shawneetown was used to manufacture hydrofluoric acid. The discovery of fluorspar and galena near Rosiclare in 1842 resulted in the first known mining operation in the Illinois fluorspar district. Galena, the ore of lead, was the principal mineral sought and recovered, and the fluorspar was generally discarded as waste because of its limited market. Shipments of fluorspar from the district did not begin until the early 1870s.

The state legislature designated fluorite as the state mineral of Illinois in 1965. Although other industrial minerals in Illinois have a higher annual production value than fluorite, these minerals are mined throughout the United States. Fluorite, on the other hand, is found in only a few localities in our country; consequently, the mining of fluorite has become a multimillion dollar per year industry in Illinois. Illinois became the leading producer of fluorspar in the country in 1942, and for many years has accounted for more than 50 percent of the total United States production. However, because of competition from foreign fluorspar producers, profit from the Illinois mines frequently results from the sale of recovered associated minerals such as sphalerite (zinc ore), barite, and silver.

Today, high priority uses of fluorspar include the manufacture of steel, metal alloys, glass, enamel glazes, and use in water fluoridation. The chemical industry is the largest consumer of fluorspar, mostly for the manufacture of hydrofluoric acid. This acid is used in the production of aluminum, gasoline, nuclear power, chemicals, rocket fuels, metal plating, uranium, drugs, and organic and inorganic fluorides. Inorganic fluorides are used in toothpastes, special fluxes, optical lenses, and concrete hardeners; organic fluorides, for the production of plastics, refrigerants, non-stick coatings, herbicides, fire extinguishers, lubricants, stain repellents, anesthetics, degreasing agents, medicinals, astronautical equipment, cleaning solvents, cooling liquids, dyes, space guidance systems, and foaming agents.

Fluorspar has a challenging future for new and varied industrial uses. The Illinois State Geological Survey pursues an active program of fluorine research that is directed toward better utilization of this mineral.