Geo-Scenes

Editor's Note: *This new section of the bulletin will periodically feature scenes of geological interest in Kansas and from anywhere else in the world, or for that matter, on other planets in our solar system. All readers are encouraged to submit such images along with short, explanatory captions as illustrated below. Send all submissions via electronic format (images as jpegs, and separately, text in Microsoft Word or WordPerfect format) to the technical editor, Sal Mazzullo, at either salvatore.mazzullo@wichita.edu or dolomite@cox.net.*

Burrow Porosity in Limestones

Limestones, which comprise hydrocarbon reservoirs throughout the world, typically have complex pore systems because of the common presence of more than one pore type in reservoirs. For example: (i) carbonate sands (grainstones) deposited in high-energy environments typically have particle-moldic porosity (e.g., oomolds, biomolds) as well as interparticle (intergranular) porosity; and (ii) carbonate muds, including phylloid algal reef limestones, often have vuggy pores and biomolds. Combinations of different pore types usually result in complex petrophyical properties of carbonate reservoirs. The most common pore types in limestones -- interparticle pores, particle-moldic pores, and some vugs -- are readily identifiable not only in outcrop samples and cores, but also in well cuttings samples, and they are routinely identified as such by wellsite geologists. Figure 1 shows another common pore type in limestones -- *burrow porosity*, which results from bioturbation during deposition. This example is from outcrops of the Winfied Limestone along the east side of US 77 just north of the town of Rock in Cowley County, Kansas. Note that the uppermost part of the Cresswell Member comprises essentially tight to very low-permeability limestones, whereas the immediately underlying zone is characterized by carbonate skeletal sands with interparticle pores and prominent, strongly vertically-oriented burrow porosity. Such burrow porosity obviously can be identified in outcrops and also in cores, but it is virtually impossible to identify in well cuttings as such.

Figure 1

Figure 2

Surface Structures

Mapping surface structures was a common, if not dominant, method of attempting to map subsurface structures in Kansas in the early to middle part of the 20th century; and many fields were found by this process. Figure 2 shows the north side of a relatively new (few years old) roadcut on 21st Street due east of the intersection of 21st St and Santa Fe Lake Road. The roadcut exposes gently-folded limestones in the Cresswell Member and immediately underlying calcareous shales and shaly limestones in the Grant Member, both in the Winfield Formation. Surface mapping in this area indicates that the gentle anticlines and synclines here plunge to the north, and subsurface mapping furthermore indicates that these surface structures reflect structure at depth.

Submitted by Sal Mazzullo