This has not only sharpened the ability of using logs for formation evaluation (determining porosity fluid saturation and pay thickness) but also has increased the possibility of obtaining accurate lithologic information from logs. A wealth of valuable geological information is available to the geologist who demands more from logs than depth control and correlation information.

Formation evaluation from logs has been very much refined and improved during the last years. A series of new instruments, laterologs and induction logs, measure rock resistivities and conductivities at different distances from the borehole. This variety of radius of investigation allows running the log combination most adequate for the best results in a given problem. These different tool combinations have made interpretation of the results more accurate but, at the same time, more complex.

Acoustic logging has caused quite a revolution in formation evaluation in recent years. The first available instrument (sonic log or continuous velocity log) just measures travel times, first arrivals of the sonic pulse. This log has become an excellent porosity tool because there are definite relationships between acoustic velocity and porosity. However the velocity log utilizes only a very small portion of the available information. During the last few years there has been a great deal of interest in utilizing the information contained on the whole acoustic wave train. Thus, the amplitude log was developed to determine cement bonding. Later developments include the recording of arrival times and amplitudes not only of the compressive wave but of the shear wave. Indications are that a complete study of the wave train will give better information on porosities, lithologies and fracturing of the rocks surveyed. Some companies, like Welex and Birdwell, are attempting to present the wave train in variable density form—the microseismogram.

Advances in logging technology permit the determination of gross lithology by combining various logging surveys. Thus the lithology can be descriminated by using logging combinations such as density-sonic, density-neutron, and sonic-neutron. Several papers have been published showing that there are enough differences between the responses of the main types of sedimentary rocks to these tools to enable us to differentiate them.

Radiation logging also has shown promising advances. The trend is to record either desired portions or the whole spectrum of gamma rays produced by bombardment of the formation with neutrons. The standard tool still uses low-energy neutrons, but several prototypes have been constructed for high-energy neutron tools. Spectral logging is a future hope for obtaining accurate lithologic information from logs.

From the remarks made above it is clear that log interpretation has become a highly technical activity, an obvious area for automation. Industry has been very interested in the possibility of recording logs digitally on magnetic tape and processing them in electronic computers. This trend opens new possibilities for improving log interpretation and creates a new challenge for the log analyst. New tools, new parameters to measure, refined log interpretation methods, and modern data processing techniques are the present and future aspects of log analysis. Geologists should keep abreast of these developments—after all, logs are the only continuous records of a well. Advances in logging technology are making it possible to obtain from logs important geologic information.

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Wichita

"A Study of the Aldrich and Arnold Oil Producing Trends of Northwestern Ness County, Kansas"

This report covers an area in west central Kansas of 252 square miles from which cumulative production in mid 1963 totalled over seven million barrels of oil. There are at present over 120 producing oil wells in twelve pools. During 1962 and 1963 there has been considerable interest and activity in the area flanking the Central Kansas Uplift to the west, and this report gives a detailed look at a portion of this area which has been producing for over three decades.

Principal production is from Mississippian dolomites of the lower Meramec Stage on structural closure, with minor oil production from basal Pennsylvanian limestones. Maps presented include structure contours on Cretaceous, Permian, Pennsylvanian, and Mississippian datums, as well as two isopach maps; all are contoured on ten foot intervals for easy comparison. An electric log cross section is included.

Emphasis is on the maps and cross section, but also discussed are reservoir character, reserves, lithology, development history, probable ages of structural growth and oil migration, and exploration methods.