leases, and invoices; (3) professional and scientific applications in contouring, mapping, well posting, geologic and geophysical modeling, reservoir analysis, spreadsheet evaluations, and investment analysis; and (4) custom programming, that is, the program that provides a specific edge on the competition. Each category has its advantages and limitations, depending on the type of micro and the quality of the software. Additional categories will surface as the micro is accepted within the profession.

The microcomputer will undoubtedly become an integral part of our profession. The professional and personal adjustment to the micro will most certainly be bittersweet. As with all innovations, there are dangers of misconceptions and subsequent misuse of the micro. These dangers are not always apparent, and can deter its useful application. It is important to identify and understand the microcomputer, its uses, its strong points, and its limitations.

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Chemical Characteristics of Some Major Uranium Deposits in Western USA

Multi-element chemical analyses of several thousand samples were retrieved from the U.S. Geological Survey's computerized Rock Analysis Storage System and used to estimate the average abundances of various elements in each of several types of uranium deposits, in altered rocks associated with some of these deposits, and in unmineralized parts of the various host rocks. Deposits for which results are presented include the tabular deposits in the Morrison Formation, Ambrosia Lake district, New Mexico; secondary deposits in the Ambrosia Lake district; tabular deposits in the Morrison Formation of the Henry Mountains, Utah; tabular deposits in the Chinle Formation in Utah and Colorado; roll-type deposits in Tertiary rocks from the Texas Gulf district; roll-type deposits in the Tertiary basins of Wyoming; tabular deposits in the Entrada Sandstone in Colorado; and a vein-type deposit in crystalline rocks of the Front Range of Colorado. Statistical treatment of the data identified elements that were notably more or less abundant in the deposits and altered rocks than in the unmineralized parts of the host rocks. Comparisons of the mean abundances of elements in the deposits show that the chemical composition of roll-type deposits varies greatly even among deposits in the same district. By contrast, the chemical characteristics of tabular deposits display little variation; the Ambrosia Lake tabular deposits and those of the Henry Mountains district are particularly similar. The data place some constraints on the geochemical aspects of genetic models and suggest certain elements as potential prospecting guides.

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A Channelized, Sand-Rich, Deep-Sea Fan Deposit, Lower Atoka Formation (Pennsylvanian), Ouachita Mountains, Oklahoma and Arkansas

The lower member of the Pennsylvanian Atoka Formation exposed in the Ouachita Mountains of Oklahoma and Arkansas is part of a thick (more than 10,000 m or 32,800 ft) turbidite sequence deposited in a remnant ocean basin (the Ouachita geosyncline) during the Carboniferous. Paleocurrent data indicate a predominantly longitudinal sediment dispersal pattern westward down the basin axis.

Nine lithofacies are recognized: massive, amalgamated sandstones (A1), graded, matrix-supported sandy mudstones (A2), six different types of classic turbidites (C1, C2, C3, D1, D2, and D3), and chaotic deposits (F) including debris flows. These occur in two principal lithofacies associations, both representing deposition in an areally extensive, sand-rich, channelized deep-sea fan environment. Lithofacies association 1 consists of packages of lithofacies A1 (and to a lesser extent A2 and C3) 1-30 m (3-98 ft) thick, interbedded with intervals comprised of lithofacies A2, C1, C2, C3, D1, D2, and D3, in which the sandstone:shale ratio is generally high (amalgamated to 1:5). Thickening- and thinning-upward sequences are arranged symmetrically about the lithofacies A1 packages, producing stacked symmetrical sequences 1 to 20 m thick. Lithofacies association 2 consists of lithofacies C3, D1, D3, and minor amount of D2, arranged in symmetrical as well as individual thickening- and thinning-upward sequences 1-40 m (3-130 ft) thick. The sandstone:shale ratio is highly variable (amalgamated to 1:50). Although thickness trends in this lithofacies association can be highly complex, thinning-upward sequences (10-40 m or 33-130 ft thick) are prominent. Slumped chaotic deposits (lithofacies F) are intercalated throughout both lithofacies associations. Common crevasse splays that develop into new channel segments, and filling of distributary channels are the inferred processes involved in the development of the two lithofacies associations.

The absence of deposits of major depositional lobes and the extensive development (both vertically and laterally) of a channelized (distributary channel) fan environment suggest that current submarine-fan models are not generally applicable to this deposit.

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Using Magnetotellurics in Regional Hydrocarbon Exploration of Parana Basin, Brazil

The magnetotelluric (MT) geophysical method has been used effectively as a hydrocarbon exploration tool in the intracratonic Parana basin of South America. The Parana basin, an area of about 1,200,000 km^2 (463,322 mi^2), extends over portions of Brazil, Paraguay, Uruguay, Argentina, and Bolivia. It has been only sparsely explored by drilling, and only a few of the 100 or so complete wells have penetrated basement rocks. The basin is covered by the world's most extensive flood basalt complex, making geophysical exploration of the underlying Paleozoic sediments extremely difficult, although modern seismic techniques have begun to achieve good results. The thick surface basalts and buried diabase sills pose no problem for the MT method, because the natural electromagnetic fields utilized as the energy source pass easily through the basalt and underlying sediments to provide scattered signals containing critical information on thicknesses and resistivities of the geologic units.

The MT method has been utilized in a multidisciplinary exploration program recently completed in the Parana basin by the State of Sao Paulo. In the deeper portions of the Parana basin, MT interpretations show that basalts have thicknesses of up to 2 km (6,500 ft) and that basement may be as much as 6 km (19,700 ft) below the surface. In most of the basin, the basalts are covered by thin units of Upper Cretaceous to Holocene continental sediments and are underlain by 2-4 km (6,500-13,000 ft) of prospective Paleozoic sediments. In addition, interpretation of the MT sounding data with layered and fault-dike models outlines a linear uplift known as the Ponta Grossa arch.

Permian Irati sediments are an important source unit classified as mostly in the "oil window." Good electrical contrasts occur between the Permian sediments and older units, so that MT measurements can indicate the regional thickness of the Permian and younger sediments for use in interpretation of migration patterns and possible traps. In addition to providing this stratigraphic information, MT and aeromagnetic surveys have delineated the influence of the Sao Francisco craton in truncating uplift and tensional features of the Ponta Grossa arch.

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Laramide Sedimentation and Tectonic Development Along Southern Margin of Wind River Range, Wyoming

Surface observations along the southern margin of the Wind River Range indicate that motion on the Wind River and Continental faults controlled depositional patterns and lithologic character of early Eocene syntectonic sediments. The stratigraphic sequence consists of alluvial plain, lake margin, deltaic, and alluvial fan units. Subsequent movement on the Wind River fault warped this sequence into a monocline 2 mi (3.2 km) long. This structure dies out to the northwest and southeast along the Wind River fault and is overlain by undeformed middle Eocene sediments. Clast composition and paleocurrent studies of post-early Eocene conglomerates indicate that there were additional sources for coarse clastics formed by subsequent uplift in the Precambrian core of the range.

Tectonic implications of these interpretations are: (1) early motion on the Wind River fault controlled the margin of Eocene Lake Gosiute and generated a distal sediment source to the east; (2) last motion on the Wind River–Continental fault system was episodic and principally over by the end of early Eocene; (3) the Continental fault, now a post-Miocene col-