center lobby of subsurface interpretation, each of our two professions has built an extensive network of specialized branch structures between which there are few connecting hallways. We have in the oil industry, however, just one large building and if the geophysicists set fire to their end, your end will burn, and vice versa. If one group makes improvement in its part of the structure, the equity of the other group is equally enhanced, but no great stride forward will be possible until the whole structure is modernized.

The greatest weakness in our common structure is our lack of control of the basic plan. We geologists and geophysicists have been so engrossed in scientific endeavor, in gloating over our successes, or in crying over our failures, that we have abandoned exploration planning. We have shoved aside this responsibility and left it to the accountants, the bankers, the mathematicians, the graduates of the School of Business Administration, or to conclusions drawn from data fed to electronic computers. Consequently we should not be surprised to find exploration programs defined now in terms of dollars instead of ideas, budget allocations determined by the size of the district office staff instead of program merit, and that a "deal" submitted by an outsider is more attractive to management than our own program because the outsider's deal can be fitted neatly into a fixed quarterly budget.

If we want a better building, then we must help design it. We may even be surprised to find that management will welcome our help.

TRETTIN, H. P., Geological Survey of Canada, Calgary, Alberta, Canada

Silurian and Devonian Arenites of the Franklinian Eugeosyncline

The Franklinian eugeosyncline, mobile from the late Precambrian or Cambrian to the late Devonian or early Mississippian, is exposed mainly in northernmost Axel Heiberg and Ellesmere Islands. The Silurian and Devonian arenites consist of the following genetic groups:

1) Lower Silurian calcareous lithic arenite: post-tectonic marine shelf deposits produced by Ordovician(?) uplift of metamorphosed limestone off northern Ellesmere Island.

2a) Late Middle and early Upper Silurian lithic and volcanic, partly graded arenites: early syntectonic deposits, related to Caledonian movements, composed of sediments as in (1) with contemporaneous keratophyric pyroclastics.

2b) Upper Silurian and Devonian quartz-chert arenites: marine and nonmarine syntectonic and post-tectonic sediments, produced by Caledonian uplift of quartzose sandstone, chert, etc., with some contemporaneous pyroclastics in the upper part.

3) Devonian graded volcanic arenites: early syntectonic turbidites related to a major late Devonian orogeny derived from Silurian keratophyric rocks, to contemporaneous volcanism, or both.

Most of the inferred source rocks seem to have recognizable equivalents in the pre-Devonian (mainly pre-Ordovician) eugeosynclinal succession. The Silurian and Devonian arenites, then, originated partly by contemporaneous pyroclastic volcanism but mainly by uplift, erosion, and rapid redeposition of strata deposited earlier in the mobile belt itself. Turbidity current deposition seems to be confined to syntectonic phases. Sandstones with more than 10% of clay matrix are relatively sparse.

VAN HOUTEN, F. B., Princeton University, Princeton, N. J.

Origin of Sodium-Rich Triassic Lacustrine Deposits, New Jersey and Pennsylvania

Successive Stockton arkose, Lockatong argillite, and Brunswick mudstone, nonmarine basin deposits, contain abundant sodium derived from Na-feldspar-rich source rocks that lay to the east.

Lockatong lacustrine deposits (3,750 feet thick), in cycles averaging 15 feet thick, accumulated at a rate of about 0.2 mm. a year. Detrital cycles consist mainly of mudstone containing abundant Na-feldspar, illite (and muscovite) and chlorite, and calcite, but very little quartz or K-feldspar. They are composed of abundant Na_2O (4.0%), K_2O (5.2%), and MgO (3.8%), and only about 49 per cent SiO_2. They accumulated in an open lake with estimated low salinity, Eh 0 to -2.5, and pH 7 to 8.

Chemical cycles consist mainly of colloidal-chemical mudstone containing abundant analcime, Na-feldspar, dolomite and calcite, and illite and chlorite; quartz is absent and K-feldspar is very rare. The rock is composed of K_2O (3.3%), abundant MgO (4.0%), very abundant Na_2O (6.4%), and only 49 per cent SiO_2. Cr, V, Ni, and Co approach or exceed concentrations in marine mud. These cycles accumulated when the lake was closed; gray deposits in an environment of estimated moderate salinity, Eh -1 to -3, and pH 7.5 to 8.5, and grayish-red deposits in an environment of somewhat higher salinity, Eh -0.5 to 1.5, and pH 7.0–8.5.

Lockatong detrital and chemical cycles shared a common physical (lacustrine) environment. But detrital cycles and fine-grained Stockton fluvial facies shared a rather similar geochemical environment, as did chemical cycles and lowermost Brunswick mudflat facies.

WALKER, ROGER G., Oxford, England (NATO Research Fellow, Johns Hopkins University, Baltimore, Maryland)

Submarine Fan Deposits and the Transition From Turbidite to Shallow Water Sediments in the Upper Carboniferous of Northern England

The Shale Grit and Grindslow Shales lie between the Mam Tor Sandstones (turbidites) and the Kinderscout Grit (nearshore or coastal plain sediments). These Upper Carboniferous formations crop out in the central Pennine Basin of northern England. The Shale Grit contains two main sandstone facies: (1) interbedded parallel sided sandstones and mudstones interpreted as turbidites and (2) thick (5 to 100 feet) sandstones without mudstone partings interpreted as very proximal turbidites. Individual thick beds characteristically show signs of a multiple origin. There are also three mudstone facies, silty mudstones, pebbly mudstones, and thinly laminated black mudstones. The Grindslow Shales contain sandy mudstones, burrowed silty mudstones, parallel bedded silty sandstones and carbonaceous sandstones. There are also some horizons of normal and proximal turbidites, especially near the base of the formation.

The sequence of the Shale Grit facies indicates that distal turbidites are more abundant below, and proximal turbidites are more abundant in the upper part of the formation. In the Grindslow Shales the facies become sandier upward, with horizontal burrows restricted to the uppermost part of the formation. The two forma-