Erosional edges of older units beneath the Mississippian are presently offset 120 km in a left-lateral sense along the uplift. Pre-Mississippian units located in the Hardeman Basin of southwestern Oklahoma originally aligned with those in the western Anadarko Basin of the Texas Panhandle. Restoration to the pre-faulting configuration also realigns offset Proterozoic basement terranes. The orientation of strike-slip and reverse faults and related folds indicate northeast-southwest directed compression during the Pennsylvanian.

[1]Study funded by the U.S. Department of Energy under contract no. DE-AC97-83WM46651.

HARBOR-SITE SEDIMENTARY RECORD OF OCCUPATIONAL HISTORY OF CARTHAGE, NORTH AFRICA | № 77185

BULLARD, Reuben G., Consultant, 5310 Madison Pike, Independence, KY, 41051, and University of Cincinnati

Utilization of the North African littoral is exemplified in the harbor constructions at Carthage on the southwestern side of the Gulf of Tunis. Early Punic exploitation of an optimal environment involved a backbar channel excavation to afford a haven for shipping.

Later Punic construction activities provided additional deeper water and more extensive docking facilities by implacing a massive quay wall to perimeter the merchant harbor. The founding course of ashlars was laid in semi-indurated Pleistocene clay-rich shell bed. Both open trench excavation and piston coring investigations have provided an instructive harbor sediment record. Initial construction activities, later dredging operations, and eventual Punic city-site destruction (146 B.C.) can be strongly inferred from sediment information. Roman reconstructions and modification of the harbor facilities undoubtedly concomitant with the re-building of the city are in evidence. Gradual Byzantine Period disuse together with the historical abandonment of the site during early Arabic (Moorish) times are documented in the harbor environment sedimentary strata.

Post-Punic Gulf of Tunis shoreline morphology is strongly affected by sediments generated in a deforested Medjerda River basin. Large portions of embayed coastal areas were cut off by spits and bars and in-filled. Carthage harbor approach directions were southerly and are now partially covered by longshore depositional patterns.

The ideal harbor conditions provided by the Carthage coastal environment were offset by the paucity of suitable constructional lithics in and near the land mass which became Carthage. Sources for construction for the harbor architecture were found as far away as the northern end of the Cap Bon peninsula. Geologic documentation of harbor history amply demonstrates this tension.

SIMULATION OF REGIONAL GROUND-WATER FLOW IN CARBONATE-ROCK AQUIFERS OF THE GREAT BASIN IN NEVADA, UTAH, AND ADJACENT STATES | № 75527

BURBEY, Thomas J., and PRUDIC, David E., U.S. Geological Survey, 705 N. Plaza St., Carson City, NV 89701

An extensive carbonate-rock aquifer system exists beneath approximately 90,000 square miles of the Great Basin in eastern Nevada western Utah, and parts of adjacent states.

A three-dimensional numerical model of the area between Death Valley and the Great Salt Lake was developed to help conceptualize the hydrogeology of this aquifer system and to determine the effects of geologic structures on ground-water flow within the system. The aquifer system was simulated with two layers in which the upper layer represents flow of intermediate depth--several thousand feet--through carbonate- and volcanic-rock mountain ranges and adjacent alluvial basins. The lower layer represents deeper regional flow primarily through carbonate rocks.

Known heads and estimates of discharges from springs and evapotranspiration were used to calibrate the transmissivities and leakance values for the model. Abrupt changes in transmissivity and head simulated in the model correspond to the locations of broad structural features including faults, major lineaments, and magnetic anomalies. The magnetic anomalies may represent igneous or basement rocks of low permeability that behave as barriers within the aquifer system.

Model results clearly portray the concept of local, intermediate, and regional flow within the aquifer system. About 80 hydrographic areas within the province may represent local flow; 17 individual regions were simulated in the upper model layer representing intermediate flow; and only 5 regions were simulated in the lower model layer representing regional flow. Flow budgets suggest several areas favorable for future exploration for ground-water supplies.

№ 74563

DEFORMATIONAL STRESS FIELDS OF CASPER MOUNTAIN, WYOMING

BURFORD, Arthur E., Univ. of Akron, Akron, OH 44325; GABLE, Dolores J., U.S. Geological Survey, Box 25046, Denver Federal Center MS 913, Denver, CO 80225

Casper Mountain is an east-west-trending Laramide feature located immediately west of the north termination of the Laramie Mountains in central Wyoming. Precambrian rocks are exposed as its core; off-dipping Paleozoic and Mesozoic strata characterize the flanks and ends. The north side is abruptly downthrown along a major east-west fault or faults. A complex of stress fields of Precambrian and younger ages is indicated by high-angle shears and shear zones, steep-dip foliations, and multiple joint systems.

One or more of the indicated Precambrian stress fields may be equivalent to that of the Cheyenne belt of the southern Laramie Mountains. In addition, at least two well-developed Laramide stress fields were active during the formation of the mountain structure. The principal maximum compressive stress of each was oriented north-south; the mean compressive axis of one was vertical whereas in the other the minimum compressive axis was vertical. Some structural features of Precambrian age, faulting in particular, appear to have influenced structures of younger ages. Prominent east-northeast-trending, high-angle faults lie approximately parallel to the Precambrian structural grain; they offset structural features of Laramide age and may be of late Laramide and/or post-Laramide age.

NEOGENE TECTONICS OF NORTHERN CENTRAL AMERICA PRIOR TO OFFSET ACROSS THE POLOCHIC FAULT | № 62183

BURKART, Burke, Dept. of Geology, University of Texas at Arlington, Arlington, TX 76019; SANCHEZ-BARREDA, Luis Antonio, Shell-Pecten International, P.O. Box 205, Houston, TX 77001; DEATON, B. C., Dept. of Physics, Texas Weslayan College, Fort Worth, TX 76105.

The reconstruction which removes 130 km of documented left slip across the Polochic fault of northern Guatemala and southern Chiapas juxtaposes the foundered block of the Gulf of Tehuantepec and extensional terrane of Guatemala, lining up prolongations of the Motagua and Jocotan faults with known structures along the coastal margin of the Chiapas massif and within the Gulf. Coast-parallel faults with sinistral displacement, located along the margins of the Chiapas depression, were also active during the Miocene time interval of southeasterly migration of the Gulf of Tehuantepec block. Thus a series of coast-parallel, left-lateral faults was active during the foundering of the Gulf of Tehuantepec, separating it from the North American plate. Extensional terrane is well expressed in Guatemala and Honduras south of the Jocotan boundary fault, beginning where the southeasterly-moving block encounters the abrupt bend in the boundary fault. This complex plate boundary became simpler when the left-lateral, east-west-trending Polochic fault sliced across the isthmus in late Miocene, offsetting Laramide structures and the arcuate Neogene plate boundary faults. During its time of major activity the Polochic served as the principal plate boundary fault, across which the major displacement occurred. Today the western part of the NOAM-CARIB plate boundary is diffuse. From western Guatemala and southern Chiapas, where buckling and locking of the Polochic fault has taken place, displacement is distributed among countless shears which extend in a belt from western Guatemala across the Chiapas massif to the western landframe of the Gulf of Tehuantepec.

PALEOECOLOGIC INTERPRETATION OF OSTRACODA FROM THE SKELLEY MEMBER CONEMAUGH GROUP (PENNSYLVANIAN), SOUTHEASTERN OHIO | № 77828

BURKE, Collette D., Geology Department, Box 27, Wichita State University, Wichita, Kansas 67208

The Skelley Member, consisting of a shale and overlying limestone, in Noble County, Ohio, occurs in the upper third of the Conemaugh Group (Pennsylvanian System). It displays an overall low diversity-high dominance assemblage of ostracodes. Modern assemblages displaying similar distribution frequently inhabit shallow, unstable aquatic environments. Variations in diversity and abundance are greatest in the lower portion of the unit, and decrease upwards. This could indicate an increase in environmental instability with time. Intermittent increase in terrigenous clastics is suggested by the presence of the opportunistic species Cavellina nebrascensis. The high percentage of fine sediment, mica content, and good fossil preservation indicate quiet-water deposition of the Skelley shale. The increased diversity of micro- and macrofauna, and the assemblage of corals, echinoderms, algae and ostracodes characertistic of the Skelley limestone indicate shallow, clear normal-marine water conditions. Fragmented fossils, sparry matrix, cross-bedding and scour marks indicate that the limestone may have been deposited under medium- to high-energy conditions. The dominant physical process displayed by this unit is current activity. This suggests that the Skelley limestone may represent the reworking of substrate material by organisms and/or water, or the transport and deposition of erosional products from another locale.

ARCHEAN FORELAND BASIN TECTONICS FROM THE WITWATERSRAND, SOUTH AFRICA | № 67100

BURKE, Kevin, Lunar & Planetary Institute, 3303 NASA Road One, Houston, TX 77058 and Geosciences, U. of Houston; KIDD, W.S.F., and KUSKY, T.M., Dept. of Geological Sciences, SUNY, 1400 Washington Ave., Albany, NY 12222

The Witwatersrand Basin of South Africa is the best-known of Archean sedimentary basins and contains some of the largest gold reserves in the

world. Sediments in the basin include a lower flysch-type sequence and an upper molassic facies, both of which contain abundant silicic volcanic detritus. The strata are thicker and more proximal on the northwestern side of the basin which is, at least locally, bound by thrust faults. These and other features indicate that the Witwatersrand strata were deposited in a foreland basin. A regional geologic synthesis suggests that this basin developed initially on the cratonward side of an Andean-type arc. Remarkably similar Phanerozoic basins may be found in the southern Andes above zones of shallow subduction. We suggest that the continental collision between the Kaapvaal and Zimbabwe Cratons at about 2.7 Ga caused further subsidence and deposition in the Witwatersrand Basin. Regional uplift during this later phase of development placed the basin on the cratonward edge of a collision-related plateau, now represented by the Limpopo Province. Striking similarities are seen between this phase of Witwatersrand Basin evolution and active basins located north of the Tibetan Plateau (eg. the Tarim and Tsaidam Basins). The geologic evidence is not so compatible with earlier suggestions that the Witwatersrand strata were deposited in a rift or half-graben.

HOW FAR HAVE WE COME IN CARIBBEAN STUDIES? | № 79022

BURKE, Kevin, Lunar & Planetary Institute, 3303 NASA Road One, Houston, Texas 77058 and Geosciences, U. of Houston.

Geological research in the Caribbean has achieved much. Stratigraphic characterization of lithounits is good, although correlation has proved difficult. Because much of the Cretaceous in both the N. and S. Caribbean is represented by parts of accretionary wedges from extinct arc-systems lithounit correlation is commonly impractical.

The complexity of Caribbean Cretaceous tectonics is compounded on both the N. and S. sides by the effects of enormous strike-slip fault systems. Although this phenomenon was early recognized on the north side by Hess and Maxwell interpretation of Caribbean evolution embodying this critical observation has awaited synthesis of data related to other phenomena including: 1. Collision of Africa and North America. 2. Formation of the Gulf of Mexico. 3. Continental rupture on the north coast of South America. 4. Motion of South America with respect to North America. 5. Formation of shallow Caribbean ocean floor as an oceanic plateau in the Pacific. 6. Evolution of bounding Cretaceous arc-systems as this oceanic plateau swept into the Atlantic from the Pacific. 7. Collision of these bounding arcs with: northern South America in the Late Cretaceous, Yucatan at the end of the Cretaceous and the Bahamas during the Medial and Late Eocene. 8. 1500 km of motion of the Caribbean with respect to North America since the Early Oligocene. 9. 2000 km of motion of the Caribbean with respect to South America over the same interval. 10. Arc histories of Central America and the Lesser Antilles and 11. Northward motion of the Maracaibo block and other responses to the collision of Panama with Colombia within the last 10 Ma.

There is no concensus about how the listed phenomena happened (or even whether some of them happened at all), but we are now at a time when testable hypotheses have been advanced about them. We have come a long way in Caribbean studies.

EXPERIMENTAL STUDY OF THE INTERACTIONS OF NUCLEAR WASTE WITH POTENTIAL WASTE PACKAGE COMPONENTS FROM HANFORD SITE, WA. | № 76787

BURNELL, James R., MYERS, Jonathan, Rockwell Hanford Operations, P. O. Box 800, Richland, WA 99352, COLES, David G., Pacific Northwest Laboratory, P. O. Box 999, Richland, WA 99352

The Basalt Waste Isolation Project has begun a program to investigate the interactions of actual spent fuel with groundwater, both alone and in the presence of site-specific waste package components (basalt, steel) in evaluating the Columbia River basalt of the Pasco Basin, WA, as a possible high-level nuclear waste repository site.

The experiments are run in Dickson autoclaves for up to six months; fluid is extracted at intervals during each run to analyze concentrations of species in solution. This allows us to monitor the dissolution of the components and their interactions, which commonly result in the formation of secondary minerals. It is anticipated that these secondary minerals will incorporate radionuclides, thus restricting their mobility and limiting their release from the waste package.

Some major components reach steady-state concentrations (Na 250-300 mg/l; Ca 2-3 mg/l; Fe 0.2 mg/l); Al reaches a peak and then drops off to one mg/l, implying the precipitation of an Al-bearing phase at 200-600 hours.

Some radionuclides show markedly lower concentrations in basalt-bearing runs. For example, Cs consistently attains a concentration of 8.9×10^{-2} mg/l with basalt while remaining steady at 5.7×10^{-1} in spent fuel-only runs. Sr concentrations reach 7.8×10^{-4} mg/l without basalt, remaining an order of magnitude lower with basalt present.

Actinides also show lower concentrations with basalt. U concentration drops to 0.002 mg/l after 2000 hours with basalt present (0.05 mg/l without basalt). Pu reaches a maximum of 1.9×10^{-5} with basalt, 5.8×10^{-5} without basalt. These concentrations all lie well below the limits required to meet federal release criteria.

SPECIATION IN GRANITIC MELTS | № 63243

BURNHAM, C. Wayne, and NEKVASIL, Hanna, Dept. of Geosciences, Penn State Univ., University Park, PA 16802

Refinement of the cryoscopic equations for the major granitic melt components, $NaAlSi_3O_8$(ab), $CaAl_2Si_2O_8$(an), $KAlSi_3O_8$(or), and Si_4O_8(qz), has led to the recognition of several major speciation reactions in anhydrous and hydrous melts of the system Ab-An-Or-Qz-H_2O. These reactions involve either dissociation of the feldspar-like components, as in incongruent melting, or interaction between them and qz. In all cases of interaction, one of the speciation products has the stoichiometry of dpy (dehydroxylated pyrophyllite) or py (pyrophyllite) ($Al_{1.455}Si_{2.91}O_8 + 0.73H_2O$), in which Al is presumed to be in either fivefold (dpy) or sixfold (py) coordination. The py component also is a major product of speciation by intraction between sil ($Al_{3.2}Si_{1.6}O_8$) and qz in peraluminous melts of the system Ab-Or-Qz-Sil-H_2O; as a consequence, the quartz liquidus field boundary is shifted to lower temperatures and toward qz. There is no evidence in peraluminous haplogranite melts for the existence of a muscovite-like species.

Application of the refined thermodynamic model to the system Ab-Qz-Eu ($Li_2Al_2Si_2O_8$) - H_2O at 2.0 kbar predicts the occurrence of a eu and qz-consuming reaction that produces a petalite-like species ($Li_{0.8}Al_{0.8}Si_{3.2}O_8$, pe) and a consequent dramatic shift in liquidus field boundaries. Higher pressures favor conversion of pe to qz + sp. In the spodumene-like species, sp ($Li_{1.33}Al_{1.33}Si_{2.67}O_8$), Al presumably is six-cordinated. Further application to F- and B-bearing haplogranite systems indicate that these volatiles complex mainly with Na to form cryolite-like and sodium tetraborate-like melt species, respectively, with consequent contraction of albite, and expansion of quartz, liquidus fields.

IRON COORDINATION SYMMETRIES IN SILICATES: CORRELATIONS FROM MOSSBAUER PARAMETERS OF Fe^{2+} AND Fe^{3+} IN IDENTICAL SITES | № 66202

BURNS, Roger G., BURNS, Virginia Mee, DYAR, Melinda Darby, RYAN, Virginia L., and SOLBERG, Teresa, Dept. of Earth, Atmos., and Planet. Scs., Mass. Inst. of Tech. , Cambridge, MA 02139

Mossbauer spectroscopy, heralded as a prime technique for characterizing Fe cation valencies and site occupancies in mixed-valence silicates, has been compromised in recent studies, particularly of silicate glasses and mica-group minerals. Problems lie not so much in the quality of the Mossbauer data, but in computer fitting of the spectral profiles; ferric peaks overlap severely with low velocity peaks of Fe^{2+} quadrupole doublets, with the result that coordination numbers of Fe^{3+} ions in silicate structures often have been misidentified. We have measured Mossbauer spectra of several Fe-bearing minerals containing 4-, 5-, and 6-coordinated Fe^{2+} and Fe^{3+} ions in the same sites, or at worst in the same structures, and have derived correlation curves in which Mossbauer parameters (e.g., isomer shift δ) of Fe^{2+} are plotted against those of Fe^{3+}. The trends, particularly the $\delta(Fe^{2+})$ versus $\delta(Fe^{3+})$ plots, enable site occupancies of Fe^{2+} and Fe^{3+} ions to be deduced for controversial minerals. For ferric iron, upper and lower limits of $\delta(Fe^{3+}tet)$ and $\delta(Fe^{3+}oct)$ are 0.24 mm/sec (e.g., aenigmatite) and 0.30 mm/sec (e.g., sapphirine), respectively. Values for Fe^{3+} (5-coord) straddle these limits. Ambiguities of fitting babingtonite, yoderite, andalusite, grandidierite, and ludwigite Mossbauer spectra are now resolved. Other highlights include: $Fe^{3+}oct$, and not $Fe^{3+}tet$, occurs in sapphirine and clintonite; $Fe^{3+}tet$ occurs in aenigmatite, ferriannite, and some annites; $Fe^{2+}oct$ and $Fe^{3+}oct$ in both cis-M2 and trans-M1 sites of biotites are confirmed; and Fe^{3+}8-fold does not occur in silicate glasses.

TEACHING A SUCCESSFUL COURSE IN COMPUTER APPLICATIONS IN GEOLOGY | № 77942

BURNS, Scott F., Dept. of Geosciences, Louisiana Tech University, Ruston, Louisiana 71272

A highly successful semester course in the use of computers in geology is now in its third year of being offered at Louisiana Tech University. The objective of the course is not programming, but the use of many software packages already available on the market to solve geological problems. Prerequisites for the course are a course in basic statistics and a programming course in FORTRAN. Students are encouraged to take the course in either their sophomore or junior years so the material can be applied to upper division courses.

The first third of the course introduces the students to a word processing program, a spreadsheet program, and a database management system on the microcomputers. Commercial databases in petroleum geology are also covered.

The second third of the course is spent in subsurface map production using both the mainframe and microcomputers. Students produce structural contour maps, facies maps, isopach maps, trend-surface residual maps, and isopach residual maps. From these they predict where to drill for oil. Error analysis of the computer generated maps is also discussed.

The last third of the course stresses the applications of SAS statistical packages on the mainframe computer. Students learn to evaluate geological problems and plot the data using the following tests: distribution statistics, T-Test, linear and multiple regressions, analysis of variance, and cluster analysis.

PRECAMBRIAN GEOLOGY II
South Hall B, Convention Center, 1:00 p.m.

William S.F. Kidd and Warren C. Day, Presiding

1 **John C. Green*, Val C. Chandler:** DIABASE DIKES OF THE MIDCONTINENT RIFT IN MINNESOTA: A RECORD OF KEWEENAWAN MAGMATISM AND TECTONIC DEVELOPMENT [64738] .... 1:00 P

2 **M.E. Bickford*, W.R. Van Schmus:** RESETTING OF WHOLE ROCK AND MINERAL Rb-Sr AGES BY SUBSEQUENT PROTEROZOIC OROGENIES [76907] ..... 1:15 P

3 **Richard I. Grauch*, John N. Aleinikoff:** MULTIPLE THERMAL EVENTS IN THE GRENVILLIAN OROGENIC CYCLE: GEOCHRONOLOGIC EVIDENCE FROM THE NORTHERN READING PRONG, NEW YORK-NEW JERSEY [63509] .... 1:30 P

4 **M.M. Cheatham, W.J. Olszewski, Jr., H.E. Gaudette*:** THE CHAIN LAKES MASSIF, WEST CENTRAL MAINE; NORTHERN APPALACHIAN BASEMENT OR SUSPECT TERRANE? [75572] ..... 1:45 P

5 **David B. Ward*, Jeffrey A. Grambling:** DATING A PROTEROZOIC METAMORPHIC EVENT USING Rb-Sr GEOCHRONOLOGY: AN EXAMPLE FROM NORTHERN NEW MEXICO [78372] ..... 2:00 P

6 **H.K. Brueckner*, K.C. Hardcastle, R.F. Hanson, T.J. Wilson:** A Rb-Sr AGE FROM THE CHOMA-KALOMO BATHOLITH, EVIDENCE FOR THE IRUMIDE BELT IN SOUTHERN ZAMBIA, AFRICA [64310] ..... 2:15 P

7 **R.E. Hanson*, T.J. Wilson, M.S. Wardlaw:** STRUCTURE, AGE, AND REGIONAL SIGNIFICANCE OF SYNTECTONIC AUGEN GNEISSES IN THE PAN-AFRICAN ZAMBEZI BELT, SOUTH-CENTRAL ZAMBIA [74092] ..... 2:30 P

8 **A.K. Gibbs*, K.R. Wirth:** LITHOSTRATIGRAPHY OF THE GRAO PARA GROUP, SERRA DOS CARAJAS, BRAZIL [57967] ..... 2:45 P

9 **Wm. J. Olszewski, Jr.*, A.K. Gibbs, K.R. Wirth:** Rb-Sr AND Sm-Nd WHOLE ROCK ANALYSES OF BASALTS OF THE GRAO PARA GROUP, SERRA DOS CARAJAS, BRAZIL [76007] ..... 3:00 P

COFFEE BREAK ..... 3:15 P

TECTONICS V: PRECAMBRIAN TECTONICS

10 **Kevin Burke, W.S.F. Kidd, T.M. Kusky*:** ARCHEAN FORELAND BASIN TECTONICS FROM THE WITWATERSRAND, SOUTH AFRICA [67100] ..... 3:30 P

11 **Kenneth A. Eriksson, William S.F. Kidd*:** SEDIMENTOLOGIC AND TECTONIC ASPECTS OF THE ARCHEAN LIMPOPO BELT [72650] ..... 3:45 P

12 **George M. Fairer*:** EVOLUTION OF THE ASIR TERRANE AND PHANEROZOIC RIFTING IN SOUTHWESTERN SAUDI ARABIA [73996] ..... 4:00 P

13 **John N. Aleinikoff*, John C. Reed, Jr., John S. Pallister:** TECTONIC IMPLICATIONS FROM U-Pb DATING OF DETRITAL ZIRCONS FROM THE EARLY PROTEROZIC TERRANE OF THE CENTRAL ROCKY MOUNTAINS [73479] ..... 4:15 P

14 **P.K. Sims*, Z.E. Peterman:** EARLY PROTEROZOIC TECTONICS IN THE NORTH-CENTRAL UNITED STATES [73481] ..... 4:30 P

15 **David B. Bieler*, David C. Schuster:** JUXTAPOSED MELANGES: THE RESULT OF POLYPHASE TECTONISM IN A FOREARC TERRANE [58132] ..... 4:45 P

SEDIMENTARY GEOLOGY III
8EF Orange Blossom, Convention Center, 1:00 p.m.

W. F. Tanner and Paul A. Baker, Presiding

1 **Ellen A. Cowan*, James D. Duncker, Ross D. Powell:** PROCESSES OF DEPOSITION OF INTERLAMINATED SAND-AND-MUD AT A TEMPERATE TIDEWTER GLACIER [64840] ..... 1:00 P

2 **William F. Tanner*:** HYDRODYNAMIC MEASURES AND GRAIN SIZE ANALYSIS [69505] ..... 1:15 P

3 **Robert Ehrlich, Margaret R. Eggers*, Emery D. Goodman:** QUARTZ SIZE/SHAPE RELATIONSHIPS: VARIABLE SIZE/SHAPE RELATIONSHIPS OF DETRITAL QUARTZ REFLECT DIFFERENCES IN SOURCE/TRANSPORT PARAMETERS [76627] ..... 1:30 P

4 **Paul D. Komar*:** GRAVEL THRESHOLD, SELECTIVE ENTRAINMENT AND FLOW COMPETENCE [76195] ..... 1:45 P

5 **Anthony R. Prave*:** CAN HUMMOCKY CROSS STRATIFICATION BE FORMED BELOW EFFECTIVE WAVE BASE? [72802] ..... 2:00 P

6 **C. Paola*, M.A. Reinhart, S.M. Wiele:** UPPER-FLAT-BED PARALLEL LAMINATION DEPOSITED IN A SMALL FLUME: PRELIMINARY RESULTS [73809] ..... 2:15 P

7 **John M. Lambie*, John B. Southard:** AN EXPERIMENTAL STUDY OF THE STABILITY OF OSCILLATORY-FLOW BED PHASES [66092] ..... 2:30 P

8 **Charles E. Savrda*, David J. Bottjer:** BIOGENIC SEDIMENTARY STRUCTURES AS INDICATORS OF PALEO-BOTTOM-WATER REDOX CONDITIONS [78663] ..... 2:45 P

9 **M. Carmela Cuomo*, Donald C. Rhoads:** BIOGENIC SEDIMENTARY FABRICS ASSOCIATED WITH PIONEERING POLYCHAETE ASSEMBLAGES [68361] ..... 3:00 P

10 **R.C. Marty*, R.B. Dunbar, P. Baker:** NEOGENE BIOGENIC SEDIMENTS OF ONSHORE PERU: PART I, SEDIMENTOLOGY AND STRATIGRAPHY [73035] ..... 3:15 P

11 **Paul A. Baker*, Robert B. Dunbar, Richard C. Marty:** NEOGENE BIOGENIC SEDIMENTS OF ONSHORE PERU: PART 2. GEOCHEMISTRY AND DIAGENESIS [66133] ..... 3:30 P

12 **Brooks B. Ellwood*, William L. Balsam:** ANOMALOUS MAGNETIZATION IN THE AUSTIN CHALK: IMPLICATIONS FOR MAGNETIC STUDIES IN ROCKS AND SEDIMENTS [62096] ..... 3:45 P

VOLCANOLOGY: CHEMICAL AND PHYSICAL PROCESSES
8AB Orange Blossom, Convention Center, 1:00 p.m.

Stephen A. Nelson and W. K. Hart, Presiding

1 **P.v.d. Bogaard*, H.-U. Schmincke:** DYNAMICS OF THE PLINIAN ERUPTIVE PHASE OF LAACHER SEE VOLCANO (EIFEL, WEST GERMANY) [67304] ..... 1:00 P

2 **Daniel R. Shawe*:** ASH-FLOW ERUPTIVE MEGABRECCIAS IN THE SOUTHERN TOQUIMA RANGE, NYE COUNTY, NEVADA [74284] ..... 1:15 P

3 **Michael J. Kunk*, John F. Sutter, Charles W. Naeser:** HIGH-PRECISION 40Ar/39Ar AGES OF SANIDINE, BIOTITE, HORNBLENDE, AND PLAGIOCLASE FROM THE FISH CANYON TUFF, SAN JUAN VOLCANIC FIELD, SOUTH-CENTRAL COLORADO [71754] ..... 1:30 P

4 **Laura L. Kedzie, John F. Sutter*, C.E. Chapin:** HIGH-PRECISION 40Ar/39Ar AGES OF WIDESPREAD OLIGOCENE ASH-FLOW TUFF SHEETS NEAR SOCORRO, NEW MEXICO [71775] ..... 1:45 P

5 **Lisa A. Gilbert*, K.A. Foland:** EXCESS 40Ar IN MINERALS OF A SHALLOW PLUTON, THE MOUNT ST. HILAIRE COMPLEX, QUEBEC [73364] ..... 2:00 P

6 **T.P. Flood*, B.C. Schuraytz, T.A. Vogel, L.W. Younker:** CYCLIC EVOLUTION OF A MAGMATIC SYSTEM: THE PAINTBRUSH TUFF, SW NEVADA VOLCANIC FIELD [77355] ..... 2:15 P

7 **JoAnn Hegre*, Stephen A. Nelson:** GEOLOGY OF VOLCAN LAS NAVAJAS, A PLEISTOCENE TRACHYTE/PERALKALINE RHYOLITE VOLCANIC CENTER IN NAYARIT, MEXICO [55755] ..... 2:30 P

8 **Stephen A. Nelson*, JoAnn Hegre:** COMENDITIC AND PANTELLERITIC ASH-FLOW TUFFS FROM VOLCAN LAS NAVAJAS, NAYARIT, MEXICO [55752] ..... 2:45 P

9 **Lori A. DeRemer*, Stephen A. Nelson:** GEOLOGIC AND CHEMICAL EVOLUTION OF VOLCAN TEPETILTIC, NAYARIT, MEXICO [64641] ..... 3:00 P

10 **Marc J. Defant*, Paul C. Ragland, A.L. Odom:** PETROGENESIS OF WESTERN PHILIPPINE ISLAND ARC MAGMAS: POTENTIAL ORIGIN OF THE POTASSIUM-DEPTH RELATIONSHIP [68038] ..... 3:15 P

11 **Craig A. Chesner*:** HIGHLY EVOLVED RHYOLITIC GLASS COMPOSITIONS FROM THE TOBA CALDERA, SUMATRA [63565] ..... 3:30 P

12 **Kathleen R. Schwindinger*, Alfred T. Anderson, Jr.:** DIFFERENTIATION IN THE CUMULATES FROM A MAUNA LOA, HAWAII MAGMA CHAMBER [79554] ..... 3:45 P

13 **R.L. Badger*, A.K. Sinha:** THE CATOCTIN VOLCANIC PROVINCE: THE BEARING OF STRATIGRAPHY AND GEOCHEMISTRY ON PETROGENESIS [63163] ..... 4:00 P

ABSTRACTS WITH PROGRAMS, VOL. 17, NO. 7, 1985 ANNUAL MEETING

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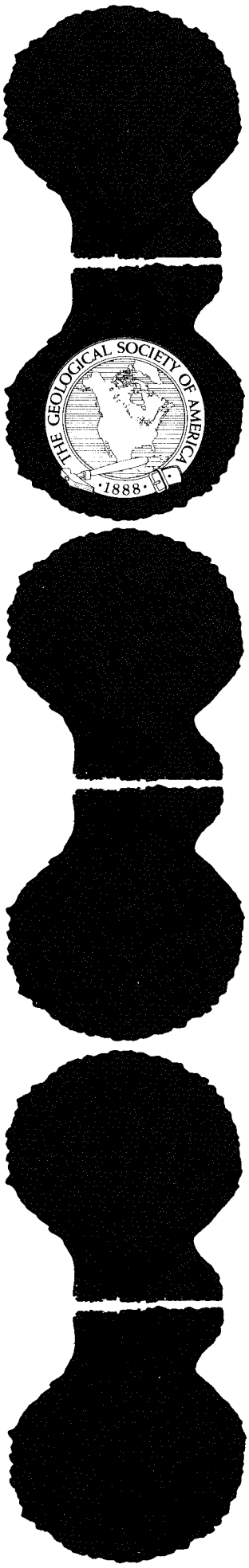

ABSTRACTS with PROGRAMS 1985

98th Annual Meeting

The Geological Society of America

The Paleontological Society (77th)
The Mineralogical Society of America (66th)
The Society of Economic Geologists (65th)
Cushman Foundation (36th)
Geochemical Society (30th)
National Association of Geology Teachers (26th)
Geoscience Information Society (20th)

OCTOBER 28–31, 1985 ORLANDO, FLORIDA
ORANGE COUNTY CONVENTION/CIVIC CENTER