

Quaternary Geologist & Geomorphologist

Newsletter of the Quaternary Geology and Geomorphology Division

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View north across US-50 in Kobeh Valley, Nevada. Pale-colored deposits in foreground and encircling Lone Mountain (left center) are lacustrine deposits of Lake Jonathan (named in honor of Jonathan Davis). At least three and possibly five lake units separated by unconformities and paleosols are exposed in this valley, including tephra layers indicating an age range of late Pliocene to earliest middle Pleistocene. This lake was the terminus for streams draining Monitor Valley and Antelope Valley until Kobeh Valley was breached shortly after 670 ka, when it became tributary to Diamond Valley and thence, during Lake Diamond highstands, to the South Fork Humboldt River. (Photo by Marith Reheis)

Reference: The 2007 Kirk Bryan Award winners: M.C. Reheis, A.M. Sarna Wojcicki, R.L. Reynolds, C.A. Repenning, and M.D. Mifflin, 2002, Pliocene to middle Pleistocene lakes in the western Great Basin – Ages and connections. *In*, Hershler, R., Currey, D., and Madsen, D., eds., *Great Basin Aquatic Systems History: Smithsonian Contributions to Earth Sciences no. 33*. Washington D.C., Smithsonian Institution Press, p. 53-108.

Quaternary Geology & Geomorphology Division Officers and Panel Members -- 2007

Officers – 6 Members, three of whom serve one-year terms: Chair, First Vice-Chair, and Second Vice-Chair; and three of whom serve two-year terms: Secretary, Treasurer, and Newsletter Editor/Webmaster.

Management Board – 8 Members: Division officers and the Chair of the preceding year; also includes the Historian as an *ex officio* member.

CHAIR:

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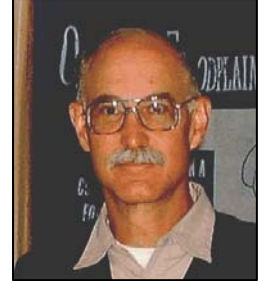
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GSA Councilor/QG&G Division Liaison:

(Appointed by the GSA President)

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ELECTION RESULTS

(154 of 1310 members voted – 11.8%)

Chair: Lisa L. Ely

First Vice-Chair: Marith C. Reheis

Second Vice-Chair: Paul Bierman

Treasurer: Scott Burns

Newsletter Editor/Web: Dennis Dahms

Panel Members for 2007-2009:

Frank Pazzaglia

Joel Pederson

Christine May

Message from the Chair

Quaternary enthusiasts:

Greetings after another fine summer of travel, field work, and fun on the mountains, plains, and coasts, or wherever your particular area of interest actually is. Now it is back to work in the office and lab for almost all of us, so the GSA meeting coming up in Denver will be the usual welcome relief from the humdrum daily grind as we gather to hear each other's papers and imbibe in our favorite beverages and foods of choice. And the annual, concurrent-with-the-meeting Kirk Bryan Field Trip continues to be a success, this time on Tuesday, 30 October, at 8 AM to fluvial sites along the Poudre River in the Front Range with John Pitlick and Ellen Wohl, so I urge you to get a ticket, if you haven't done so already. Topics to be covered during the field trip include (1) frequency of major flooding on Front Range rivers; (2) the role of episodic erosion in landscape evolution; (3) fluvial response to fire; and (4) sediment transport and morphodynamics of high-gradient river systems. Along with all the excellent topical sessions we have planned for you (look on the GSA website), on Sunday at noon a hot topic on Google Earth might be interesting to our Division members.

As your outgoing chair, one of my duties at this time is also to give you the latest info relevant to QG&G and to get you ready for the GSA meeting.

Also don't forget to tell your students to come to our business meeting, because our Treasurer, Scott Burns, is well known for getting the best and most liquid refreshment of any of our divisions, and the finger food is good, too! We expect a good turnout, and in keeping with our past chair, John Costa's hope, at 1310 members, we have now passed the Hydrogeology Division at its 1290 members, and might be closing in on Structural Geology and Tectonics, which has 1455 members, if we really get out and recruit the great students that are out there. But therein lies the rub, in our ranking of proportion of students, we rank only tenth out of 17 with our 26%, whereas Geobiology and Geomicrobiology has only 258 members but is 40% students; is this a wave of the future? Our future is in our students, so if you want to support QG&G, take care of your seedcorn.

Each year for the annual meeting the topical sessions are supposed to be organized mainly by the Division chairs, providing of course, that the chair is not out of touch in the field or at a meeting somewhere, as I was. Without the yeoman service of First Vice-Chair, Lisa Ely, while I was out of the country, our program would have been not nearly as good as it is – she knew how to do it efficiently, as the rest of us (me especially) were pulling up a bit short. One of the things we might think of doing to remediate such problems in the future is to have a special Technical Program Manager position, who works with the First Vice-Chair each year, starting at the time of the previous year's meeting, to formulate good ideas for the coming year's meeting. That way they are already ahead of the curve by several months from the time when the next year's meeting is formulated by everyone else. Other divisions also have interactive websites wherein the membership can put in proposal ideas before the GSA website opens up. I think that we need to do this. Another factor that we could use is to have some fairly standard annual session, or automatic-pilot sort of session to submit papers to, such as the idea for a 'New Developments (Hot Topics?) in The Quaternary,' and 'New Developments (Hot Topics?) in Geomorphology' that we plan on offering every year. I tried to do this at the last minute this year when I noticed that we didn't have as many sessions planned as we should have had by then. Jack Hess mentioned in his remarks to

us at the Division Chairs meeting in the spring that we seemed to have a good new ideas about increasing our session numbers and emphases for the coming meeting. What really happened was that on the last day before the last submissions due date, I chanced to notice that we did not have very many sessions planned, that I had been told would have been put forward by various retiring QG&G board members. When I discovered that had not happened, I had to go into last-day overdrive and arm-twist a number of friends and acquaintances to contribute. This was not efficient, and it is clear we could make some changes to this process. Thus I propose that we change our bylaws and install a new Technical Program Manager Position as Hydrogeology has done. Furthermore I think that we also need to change our website to accommodate abstract session proposals and to allow management by the Technical Program Manager. If everyone thinks that this is a good idea and we can do it, a blast e-mail could be worked up to go out to our constituents that will alert everyone what to do, and they could then get to it earlier when it might be more convenient, rather than the usual last minute panics when we all have to formulate sessions or lose the opportunity for a year. What do you think?

Other Divisions have asked specifically about our new Kirk Bryan field trip idea concurrent with the meeting and the associated symposium. We were congratulated about this, and others have been looking into it for their own Divisions. I have asked Rick Giardino and Jack Vitek at Texas A&M to help get our new tradition of a mid-meeting field trip organized, probably along the Gulf Coast for the Houston meeting in 2008. Thus, we also need to be thinking at least two years out for these field trips, which means that next is Portland in 2009 (we need ideas for a field trip) and then Denver again in 2010 (Slumgullion? Niwot Ridge? Rocky Mountain National Park?) And because the Denver meeting site is utilized so often, we also need to plan ahead to ensure a diversity of sites to see (which fortunately is not too difficult in this area).

GSA seems to be in the process of reinventing itself, although the process may be rather long, tedious, and possibly painful as we wrestle with

the rather unusual distribution of division foci, for example, from fairly narrowly defined disciplines in some cases, to broad interdisciplinary activities, specific needs of certain societal segments, or certain methodological or geographical aspects in other cases. Many specific disciplines are not represented (petrology or geochemistry, etc.), and neither are several areas that can be clearly seen to have a productive future (quantitative modeling, or perhaps remote sensing and geographic information science). The upshot is that some new thinking appears to be required. Jack Hess has said, for instance, "What would we be doing if we were inventing GSA today, rather than the 120-odd years ago when it was founded?" If we are going to keep this organization as vital and nimble as it certainly once was, how are we going to do it? For example in this thinking, should QG&G consider taking some under-represented elements under its wing to nurture what could become stand-alone divisions later in their own right that would interest a number of people and help the overall growth of GSA (surface process modeling comes to mind, but there are other ideas)?

There are also other ideas under discussion that have been proposed to Council:

- (1) The amount of money available to Divisions to send board members to the winter Division Chairs meeting will be upped from \$200 to \$700, and the Chair and 1st Vice Chair both need to attend. In the event that members cannot attend, a dial-up connection to the meeting might be established.
- (2) Because of certain problems in the past, Divisions need to be **alerted** in a timely fashion when they have been selected for sponsorship of sessions and need to be able to either opt **in** for co-sponsorship of sessions or opt **out**. Possibly gratuitous opting in of sessions would not be encouraged.

There are a number of other ideas afoot in GSA headquarters to help our organization deal better with our unknown future that we can get into later. Let me know if you have ideas to improve things, and make sure that you come by to see our Division poster at the fall meeting.

Cheers, and see you there!

Jack Shroder, Chair, QG&G

QG&G DIVISION AWARDS – 2007

The following awards will be given by the QG&G Division of GSA on Tuesday, October 30, 2007, in Rooms 708-712 of the Denver Convention Center.

— Kirk Bryan Award —

Marith Cady Reheis (USGS), A.M. Sarna Wojcicki, R.L. Reynolds, C.A. Repenning, and M.D. Mifflin for: Reheis, et al., 2002, Pliocene to middle Pleistocene lakes in the western Great Basin – Ages and connections. *In*, Hershler, R., Currey, D., and Madsen, D., eds., Great Basin Aquatic Systems History: Smithsonian Contributions to Earth Sciences no. 33. Washington D.C., Smithsonian Institution Press, p. 53-108.

— Distinguished Career Award —

John Andrews, University of Colorado.

Donald J. Easterbrook

— Distinguished Scientist Award —

Peter Clark, Oregon State University

Farouk El-Baz Award

— for Desert Research —

Andrew Goudie, Oxford University

Gladys W. Cole Research Award

— for Research in Geomorphology —

Martha Cary ('Missy') Eppes, University of North Carolina at Charlotte, "The weathering of marble grus and corestones."

Student Research Awards

— Arthur D. Howard Research Award —

Caleb J. Schiff, M.S. student, Northern Arizona University, "Climate reconstruction from diatom oxygen isotopes, Prince William Sound, Alaska."

Honorable Mention: **Elizabeth K. Thomas**,

University at Buffalo-SUNY, "Global Warming in light of past millennia: A multiproxy lacustrine study of climate in northeastern Arctic Canada."

— J. Hoover Mackin Award —

Nicholas L. Balascio, University of Massachusetts, "Holocene tsunami deposits in coastal lakes of the Lofoten Islands, northwestern Norway."

Eli Lazarus, Duke University, "A possible explanation for the locations and behavior of erosional hotspots on the northern Outer Banks, North Carolina."

— Robert K. Fahnestock Award —

Daniel D. Cadol, Colorado State University, "Wood loading in neotropical forested headwater streams."

GSA ANNUAL MEETING

October 28-31, 2007

Denver, CO

Awards Ceremony & Reception

Tues, Oct 30, 7-11 PM

Denver Convention Center, Rms 708-712

The room is set up for a powerpoint projector with computer, screen, microphone, etc. Scott Burns has ordered quality microbrews by the keg. We also have a water cooler for those who do not like beer. Also lots of food (the normal amount): wings of fire (chicken wings with different hot sauces); Southwest grilled vegetables that were a hit a few years ago; cheese display with bread and crackers; sliced fresh fruit display, and tortilla chips, salsa and guacamole.

Management Board Meeting

Sun, Oct 28, 7 PM

Hyatt Regency Hotel, Mineral Hall F

Scott reports that we will have assorted microbrews, juices, diet colas, and water available for free. He also has ordered the following food: garden vegetables with three dips, lavosh, breads, bagel chips, cheeses, crackers, chutney, candied nuts, dry fruits, chips, pretzels, tortilla chips and salsa. So – come see how QG&G political sausage is made, & eat free.

Sessions Sponsored by or of Special Interest to QG&G Members

Annual Kirk Bryan Field Trip: Fluvial-Hydraulic Processes in the Colorado Front Range.

- Tues., October 30
- John Pitlick (CU), Ellen Wohl (Colo. St.)

On this one-day field trip, attendees will discuss the flood hydrology and geomorphology of Front Range river systems. The main destination for the field trip is the canyon of the Poudre River, west of Fort Collins, Colorado. The trip will involve a 1-hour drive from Denver to Ft. Collins, then up the Poudre River canyon a short distance to the field site. Most of the day will be spent at one or two sites; the group will return to Denver by 6 p.m. Topics to be covered during the field trip will include (1) frequency of major flooding on Front Range rivers; (2) the role of episodic erosion in landscape evolution; (3) fluvial response to fire; and (4) sediment transport and morphodynamics of high-gradient river systems.

Presentations by QGG Award Recipients:

Don J. Easterbrook Distinguished Scientist Award

Peter U. Clark, "The Origin of Heinrich Events," in *Topical Session 24: New Developments in Glaciation*, 1:35 PM, Wednesday, Oct. 31.

Farouk El-Baz Award

Andrew S. Goudie, "Desert Dust—Sources and Trends," in *Geomorphology General Discipline Session*, 1:30 PM, Monday, Oct. 29.

Kirk Bryan Award

Marith Reheis, et al., "Older Pluvial Lakes in the Great Basin: Insights from a Decade of Field Work," in *Quaternary Geology General Discipline Session*, 8:00 AM, Wednesday, Oct. 31.

Discipline Sessions

1. Geomorphology General Discipline Oral

Session: Mon., Oct. 29, 1:30-5:30 PM

Includes 2007 Farouk El-Baz Award for Desert Research Lecture by Andrew S. Goudie:

"Desert Dust—Sources and Trends", 1:30 PM.

2. Geomorphology General Discipline Poster

Session: Sun., Oct. 28, 1:30-5:30 PM

3. Quaternary Geology General Discipline Oral

Session: Wed, Oct. 31, 8:00 AM-12:00 PM

Includes 2007 Kirk Bryan Award Lecture by Marith Reheis, et al., "Older Pluvial Lakes in the Great Basin: Insights from a Decade of Field Work", 8:00 AM.

4. Quaternary Geology General Discipline

Poster Session: Sun., Oct. 28, 8:00 AM-12:00 PM

Topical Sessions Sponsored by Quaternary Geology and Geomorphology Division

T3. Alluvial Cycles, Climate, and Human Prehistory

GSA Archaeological Geology Division; GSA Quaternary Geology and Geomorphology Division
Gary Huckleberry

This session will focus on research regarding the timing of late-Holocene valley entrenchment and filling in arid and semiarid landscapes, connections to climate change and local geomorphic controls, and correlations to prehistoric settlement changes. Oral.

Archaeological Geology; Geomorphology; Hydrogeology

T12. The Black Sea-Mediterranean Corridor: Paleoenvironmental and Geoarchaeological Context for the Past 30 k.y.

GSA Archaeological Geology Division; GSA Sedimentary Geology Division; GSA Quaternary Geology and Geomorphology Division; GSA International Division; Avalon Institute of Applied Science

Valentina Yanko-Hombach, Ilya Buynevich, Olena V. Smyntyna

The session presents a cross-disciplinary examination of paleoenvironmental cataclysms in the Black Sea-Mediterranean Corridor over the past 30 k.y. and their influence on landscape dynamics and human adaptive strategies in semi-isolated basins. Oral.

Environmental Geoscience; Quaternary Geology; Archaeological Geology

T17. Management and Restoration of Fluvial Systems with Broad Historical Changes and Human Impacts

GSA Quaternary Geology and Geomorphology Division; GSA Geology and Society Division

L. Allan James, Sara L. Rathburn, G. Richard Whitticar

This session addresses river changes over intermediate time scales involving agricultural clearance, urbanization, or engineering works and practical implications to river management and restoration. Emphasis is on recognizing, understanding, and mitigating anthropogenic hydrogeomorphic changes. Oral.

Geomorphology; Engineering Geology;
Environmental Geoscience

T18. Hydrogeomorphic Responses of Convulsive Events

GSA Quaternary Geology and Geomorphology Division; GSA Engineering Geology Division; GSA Sedimentary Geology Division

J.J. Major, Christopher S. Magirl

Earthquakes, landslides, large storms, hurricanes, volcanic eruptions, wildfires and other “convulsive” events can provoke significant hydrogeomorphic responses. This session seeks theoretical, empirical, and field contributions that examine all scales of hydrogeomorphic responses to such events. Oral.

Geomorphology; Engineering Geology;
Sediments, Clastic

T19. Geomorphology and Ecology: Interactions and Feedbacks

GSA Quaternary Geology and Geomorphology Division

Martha Cary Eppes

Exploration of a rapidly expanding interdisciplinary field of study which examines the complex relationships between process geomorphology, ecology and biology. Oral.

Geomorphology; Environmental Geoscience

T21. Episodic Landscape Change

GSA Quaternary Geology and Geomorphology Division

Ellen E. Wohl, John Pitlick

Episodic landscape change is longer periods of relative stability punctuated by shorter periods of change. This session explores how episodic landscape change scales in relation to such variables as tectonic regime, hydroclimatology, and drainage area. Oral.

Geomorphology; Quaternary Geology;
Environmental Geoscience

T22. Evidence of Climatic and Tectonic Change Recorded in Alluvial Fans

GSA Quaternary Geology and Geomorphology

Division

Jennifer L. Pierce, Tammy Rittenour

Alluvial fans are sensitive recorders of climatic and tectonic change. This session encourages research that uses alluvial fans to understand and quantify roles of climate and tectonics in controlling rates and processes of landscape evolution. Oral.

Geomorphology; Quaternary Geology;
Neotectonics/Paleoseismology

T23. Using Geochronology to Build Better Records and Solve Geomorphic and Paleoclimate Questions—Recent Advances and Findings

GSA Quaternary Geology and Geomorphology Division

Joel Pederson, Tammy Rittenour

Recent advances in geochronology provide better age control and tools for answering geomorphic and paleoclimate questions. This broad session provides a forum for reporting new applications and recent studies using geochronology as a primary tool. Oral.

Geomorphology; Quaternary Geology;
Neotectonics/Paleoseismology

T24. New Developments in Glaciation

GSA Quaternary Geology and Geomorphology Division

John Ford Shroder, Luke Copland

Includes Don. J. Easterbrook Distinguished Scientist Award Lecture, “Origin of Heinrich Events”, Peter U. Clark, 1:35 PM..

Changes in present-day glacierization and comparison with past glaciation in light of the dramatic climatic variation that have been observed in recent decades. Oral.

Geomorphology; Remote Sensing/Geographic Info System; Hydrogeology

T26. Field-Based Quantitative Studies of Chemical and Physical Weathering

GSA Quaternary Geology and Geomorphology Division

Jason R. Price, Todd Grote

This session will focus on innovative approaches to quantifying chemical and physical weathering at profile- through global-scales. Methods may include, but are not limited to, use of trace elements, isotopes, and cosmogenic nuclides. Oral.

Geomorphology; Quaternary Geology;
Geochemistry

T40. The Role of Sediments in Hydrology and Hydrogeology: Streams, Springs, Karst Systems, and Hyporheic Zones (Posters)

GSA Hydrogeology Division; GSA Quaternary Geology and Geomorphology Division

Eric W. Peterson, Toby Dogwiler

An interdisciplinary session designed to examine the role of sediment in stream morphology (karst and non karst system), stream hydraulics, and hyporheic processes. Posters.

Hydrogeology; Geomorphology; Quaternary Geology

T56. Recent Advances in Numerical Dating Techniques in Arid and Semiarid Environments

GSA Quaternary Geology and Geomorphology Division

Lewis A. Owen

Multiple new dating techniques applied and compared with each other in dryland environments offer new insights to landscape evolution and important paleoenvironmental changes that are essential to understand in these times of global change. Oral.

Quaternary Geology; Geochemistry; Geomorphology

T58. Long Records of Paleoclimate in the Southern Deserts of North America

GSA Quaternary Geology and Geomorphology Division; GSA Limnogeology Division

Marith Reheis, D.M. Miller, Charles G. Oviatt

Interdisciplinary approaches to long glacial-interglacial records of climate change in the southern deserts of the U.S. and Mexico, including lacustrine, eolian, cave, wetland and marine systems, and middens. Oral.

Quaternary Geology; Paleoclimatology/Paleoceanography; Limnogeology

T60. Esker Systems: Processes, Deposits, and Models for Aquifer Development

GSA Quaternary Geology and Geomorphology Division; GSA Sedimentary Geology Division

Don Cummings, Hazen A. J. Russell

Eskers function as aquifers in glaciated terrains. Sedimentary models used to predict their hydrogeological character are poorly developed. To address this, we encourage contributions from a range of fields, including

glacial hydrology, sedimentology/stratigraphy and hydrogeology. Oral.

Sediments, Clastic; Geomorphology; Marine/Coastal Science

T73. New Developments in Mass-Movement Research

GSA Quaternary Geology and Geomorphology Division

John Ford Shroder

Mass-movement denudation processes provide one of the chief mobilizers of the sediment cascade, as well as being a major natural hazard in need of greater exposition. Oral.

Geomorphology; Engineering Geology; Quaternary Geology

T139. The Future of Geoscience Field Courses

GSA Structural Geology and Tectonics Division; GSA Geoscience Education Division; National Association of Geoscience Teachers, GSA Geophysics Division, GSA Quaternary Geology and Geomorphology Division

Steven J. Whitmeyer, L. Scott Eaton, Charles Onasch, Lee J. Suttner

This session will focus on future directions of geoscience field camps. Principal themes will include traditional goals of teaching field geology and mapping, recent technological advances, and modern topics like geomorphology, geophysics, and environmental assessment. Oral.

Structural Geology; Geoscience Education; Geomorphology

T146. Geologic Mapping: Innovations and Interoperability (Posters)

GSA Engineering Geology Division; GSA Geology and Society Division; GSA Hydrogeology Division; GSA Quaternary Geology and Geomorphology Division; Association of American State Geologists

Harvey Thorleifson, David Soller, Richard Berg, Peter Lyttle

This session will highlight innovations in geological mapping by showing new mapping, strategies for managing data, new methods for publication and Web accessibility, applications, and how digital procedures have advanced the effectiveness of mapping worldwide Posters.

**From our Shameless Commerce Division
(apologies to Tom and Ray):**

Now available from the Kansas Geological Survey:
Guidebook for Field Trips
**18th Biennial Meeting of the American
Quaternary Association (R. D. Mandel, ed.)**
KGS Technical Series #21

Contents include:

- Last Glacial Loess Sedimentary System of Eastern Nebraska and Western Iowa, by *J. A. Mason et al.*
- Late Quaternary Biogeography and Paleoecology along the Prairie-Forest Border
 - Part 1: Konza Prairie—Fire, Bison, and Vegetation on the Konza Prairie, by *G. Towne*;
Biogeochemical Signatures within Soils of the Konza Tallgrass Prairie LTER Site, by *W. C. Johnson et al.*
 - Part 2: The South Fork of the Big Nemaha River, Southeastern Nebraska Late Quaternary Paleoecology of the Eastern Great Plains, by *R. G. Baker et al.*
- Multiple Pre-Illinoian Till and Associated Sediments and Paleosols, Northeastern Kansas and Central Missouri
 - Part 1: Kansas, by *W. Dort, Jr.*
 - Part 2: Missouri—Description of Glacigenic Sediments in North-central Missouri, by *C. W. Rovey II and J. P. Tandarich*; Lithostratigraphy of Glacigenic Sediments in North-central Missouri, by *C. W. Rovey II and J. P. Tandarich*;
Paleomagnetism of Sediments Associated with the Atlanta Formation, North-central Missouri, USA, by *C. W. Rovey II et al.*
- Late Quaternary Alluvial Stratigraphy and Geoarcheology in the Central Great Plains
 - The Claussen Site (14WB322), by *R. D. Mandel et al.*
 - The Simshauser Site (14KY102) and Mattox Draw, by *R. D. Mandel and J. L. Hofman*
 - The Winger Site, by *R. D. Mandel and J. L. Hofman*
 - The Waugh Site (34HP42), Northwestern Oklahoma, by *J. L. Hofman*
 - The Cooper Site: Multiple Folsom Bison Kills in Northwest Oklahoma, by *B. J. Carter and L. C. Bement*
 - The Jake Bluff Site: Clovis Bison Hunting Adaptations at the Brink of Mammoth Extinction on the Southern Plains of North America, by *L. C. Bement and B. J. Carter*

Available from: Kansas Geological Survey, 1930 Constant Avenue, Lawrence KS 66047-3724, or call (785) 864-2157. \$30 (plus \$5 p/h and sales tax for KS residents).

Looking for Grad Students !!

I am looking for Quaternary-educated students to work with me (either as GTA or GRA) on Late Quaternary climate changes in east Asia (northern China and Mongolia) and central Asia (NW China and Kazakhstan). I have 1-2 RA positions available and 2-3 TA positions potentially available for Quaternary graduate students.

Contact: Zhaodong (Jordan) Feng, Ph.D.
Associate Professor
Geology, Baylor University

Roger Barron Morrison (1914-2006)

Quaternary Geology Scientist, Colleague,
and Close Friend.
By M.D. Mifflin

I feel exceptionally privileged to offer an overview of Roger Barron Morrison's contributions to the sciences of the Quaternary, and some idea of the man, from the perspective of a close friend and colleague for over forty years. Roger, normally an extremely private man, in relaxed moments over many years told me bits and pieces of his experiences. From memory with the help of his resume, I offer the following:

Roger was born in Madison, Wisconsin, the son of a Professor of Animal Science, one of two original editors that published what became, with many updated revisions, the bible on animal nutrition for the next 60 or so years. The Morrison family became rather wealthy from this independent source of income, and Roger's father rose through the ranks of academia to become the Dean of the College of Animal Science at Cornell University.

Roger earned a BS in Geology and an MA (1934) in Economic Geology by age 20 at Cornell. In the 1934-1935 academic year, he began work on a Ph.D. in Economic Geology, University of California, Berkeley, then transferred to Stanford (1935-1938) and completed all requirements, but never completed revising his dissertation (Structural and Mineralogical Evolution of Ore Deposits in the Bald Mountain – Elkhorn Ridge area, Baker and Grant Counties, Oregon) "because of illness and WWII duties." The illness was brucellosis, and he was pretty much incapacitated for more than a year. He had picked it up from drinking raw milk during field work. He initially chose economic geology – one of the lead geoscience specialties of that era—because of his father's interests. His father invested in mining ventures. Roger described his first paid professional assignment

(on his summer break) at Olinghouse, a gold property his father was considering near Wadsworth, Nevada. Roger spent the summer of 1934 reviewing the mine (located within sight of the Wadsworth Amphitheater stratigraphic section of the Lake Lahontan, the most complete exposure of the Eetza Alloformation known). He managed to uncover evidence that it had been “salted”, and was essentially mined out. Roger would have been 20 years old that summer, and 60 years later when I heard the account he was still pleased that he saved his father from a carefully planned scam.

In 1935 Roger published his first professional paper based on his Master’s thesis – on the occurrence and origin of celestite and fluorite at Clay Center, Ohio, in the *American Mineralogist*. In 1940, as second author (with Joe Poland) “An electrical resistivity apparatus for testing well waters” was published in the *American Geophysical Union Transactions*, a basic design that is still marketed. Roger had begun his career with the U.S. Geological Survey in 1939, and his first open-file report was on groundwater resources, Big Sandy Valley, Mojave Co., Arizona. From 1942 to 1947, Roger was with the Military Geology Branch, USGS, and basically prepared military intelligence maps and reports dealing with geomorphology, materials, and water supply for areas in Europe, South America, and Asia. He prepared military training manuals on water-supply development. At times, he worked directly with operations commanders on key intelligence questions: river bank conditions for crossing the Rhine, and beach conditions for the invasion of the Philippines. In Roger’s subsequent work, no matter the topic, he was expert in establishing comprehensive literature searches and often incorporated earlier findings into his writings. This talent is well illustrated in the sections he authored in the DNAG volume K-2, *Quaternary Nonglacial Geology: Conterminous U.S.* I also admired his clear and concise writing style; he was always close to getting it right on the first draft when we worked together on reports.

Roger’s interest in Quaternary geology was likely stimulated by the military intelligence work (European geologic literature) and the period of groundwater studies in the basins of Arizona and New Mexico before WWII. He got his opportunity in 1949 to pursue this interest when he was named Chief of the Fallon, Nevada, Project, a study of Tertiary and Quaternary stratigraphy in four 15-minute quadrangles in the Carson Desert of Nevada, the largest sub-basin of Lake Lahontan. The occurrence of several water wells yielding natural gas had caused much speculation and provided the incentive for the study. I never thought to ask Roger how he landed the project, but I suspect it might have been up for grabs because of its flat, desolate nature.

It did not take long after beginning this project for Roger, often with coauthors, to begin publishing on Quaternary topics. In 1952 he submitted two abstracts (*GSA Bulletin*) on the stratigraphy of Lake Lahontan, and the late Quaternary climatic history of the northern Great Basin. With Gerry Richmond and Howard Bissell as co-authors, another *GSA Bulletin* abstract was offered that year on correlations of Late Quaternary deposits in the La Sal Mountains and the Lahontan and Bonneville basins based on interglacial soils. In 1957 two more publications came out with additional co-authors, James Gilluly and Charles Hunt. From that period on Roger was publishing frequently on Lake Lahontan, Lake Bonneville, and regional correlations of Quaternary deposits based on geosols (the topic of another Morrison Ph.D. dissertation, this one at the University of Nevada, Reno (UNR). This time around, he was granted the Ph.D. in 1964, and it was the first issued in any field by this institution. Roger’s mentor at UNR was George Burke Maxey. Dr. Maxey (my boss at the Desert Research Institute, a research branch of UNR) formerly taught at the University of Illinois, and was a close friend of John Frye, widely recognized for his work on glacial tills and associated stratigraphy in the Midwest. Roger and John Frye published (1964) on a proposed correlation of Middle and Late Quaternary sequences, beginning in the Lake Lahontan basin, to Lake Bonneville, to the Wasatch Range, to the Southern Great Plains and western Midwest sequences. Roger was publishing with the elite in the US geologic profession, cooperative efforts triggered by his detailed stratigraphic work in the Lahontan basin and the use of geosols for long distant correlations of widely varying Quaternary deposits and climates.

It was during this period (1963-1965) that I met and worked with Roger for the first time. He was extremely busy with the combination of finishing up his dissertation, USGS work on Lake Bonneville’s stratigraphy, preparing the paper co-authored with John Frye, and putting the finishing editorial touches on his U.S. Geological Survey Professional Paper 401 on Lake Lahontan (1964). In addition, he was a co-organizer, with Clyde Wahrhaftig, for the Northern Great Basin and California Field Excursion of the 1965 Congress of INQUA. He was more than spread thin, and during a GSA meeting in the Fall of 1963 at Reno, he asked me if I would help him by giving backup support to Margaret (Peg) Wheat while she measured and described some key Lake Lahontan stratigraphic sections that winter and spring. The request came as a surprise—he barely knew who I was—but I quickly agreed.

At the time, I didn’t know any of the above, or question how it was that he came to ask me for help—in retrospect, it was likely Burke Maxey who

recommended me to Roger. Burke knew that I was interested in Quaternary geology and that I had already attempted to break out and map some of Roger's stratigraphic units at the eastern margin of the Carson Desert (unsuccessfully). I was ready to learn something from the "master" as Burke referred to Roger's position in the Quaternary sciences.

Over the next year and a half, I worked with Roger and Peg Wheat on the two localities where the stratigraphic relationships of early lake cycles were exposed, plus saw many other localities of the younger lake cycles with key relationships, benefiting from the last 15 years of Roger's efforts. And so began two working relationships (and friendships) that would endure until their deaths decades later.

Roger and I got off to a good understanding at a major highway cut through the root zone of a Lake Lahontan pointbar. It offers a 3-D exposure of Sehoov gravels overlying the subaerial Wyemaha alluvium and eolian sand, with the well-developed Churchill Geosol preserved in some areas, and the underlying Eetza bar gravels also exposed. It was the last field day to finalize the 1965 INQUA fieldtrip road log and send it off to the printer. We had run out of daylight, and were making up the descriptions with the aid of headlights. In frustration with the poor, indirect light, I muttered aloud the question of what the B horizon colors might prove to be in natural daylight, as Roger stood by taking notes. Roger said nothing for a long pause – then something to the effect, "You know, this highway is too dangerous for 50 people to be crossing the highway and wandering around. We will make it a slowdown locality." By this time, I was well aware of Roger's quest for accuracy and detail in anticipation of several European experts on geosols participating in the field trip. I began to laugh, as only a few minutes before this was to be a half hour stop. Roger also began to chuckle, as he knew that I knew he didn't want to be beat up over some poor guesses on colors, and he had just made an executive decision to avoid such problems. We selected the color matches (?) together and headed for the closest town, Lovelock, and food at the only place still open, a small, rather seedy casino. Roger promptly ordered the finest wine on the well-worn wine list, and after the traditional taste, refused it as spoiled! The young waiter, trained to offer the first taste, had no idea of what to do if the most expensive bottle in the house was refused. Roger, suspecting that all the good wines on the list had been stored upright for years, then ordered the house wine. Roger, the master of the Quaternary, and Roger, the Character, all in one day!

Seemingly minor because it's old hat now, but perhaps one of the more important contributions that Roger's early work established was the 3-D mapping approach

to facies changes and age relationships in the lacustral and interbedded subaerial bolson deposits, with lateral mapping of varying marker horizons—geosols and tephra, and also diagnostic lithologic characteristics would sometimes prove useful. What appears to be look-alike fine-grained deposits in disjunct exposures begin to have real character, with predictable facies changes. This detailed 3-D mapping strategy later helped Roger's disciples, including Jay Quade and myself, to sort out lacustrine deposits from "lake beds" of a different origin. Experienced (and highly respected) field geologists had mapped "lake beds" in nearly all southern basins of the Great Basin to that period; many of these beds are now understood to be paleo-groundwater discharge deposits.

After looking back at some of Roger's early publications, I decided to review the three chapters that he contributed to the DNAG Volume K-2 published in 1991. I became hooked and finished reading the entire volume (about a week later). Roger's fingerprints are present throughout the volume, and it's an exceptional compilation from both the topical and regional chapter perspectives. This may not have been Roger's last hurrah, but in my view, it's his best. It incorporates excellent summaries of his major contributions, and he is in excellent company with 100 other authors both detailing and summarizing regional relationships and providing comprehensive discussions of supporting sciences. As editor and contributor, he established his own memorial and his place in the Quaternary sciences. Each of us may have differing views of the contributions he has made, but this volume lays out the full spectrum for consideration. I found it fascinating how extensive his field work and knowledge was of many regions. Not only did Roger make the volume happen (see the Foreword), but he guided it into a major scientific contribution. The structuring of the chapters allowed all of the many authors to offer their best analyses and reviews.

One of the interesting aspects I never gave much thought to until this review was the apparent splash of Roger's Lake Lahontan-Lake Bonneville work and inter-regional correlations generated in the 1950's and 1960's. In the context of the stage of development of Quaternary sciences at this period, these detailed records were somewhat analogous to the impacts of subsequent detailed long Quaternary records—such as the ocean core analyses and ice core records—offering much greater detail and new insights into varying climates than had been documented before. Also, the inter-regional correlations using geosols came at a time when none of the currently adopted constraining dating techniques had been fully developed or applied. Suddenly, here were two records (Bonneville and Lahontan) with complete records of pluvial lake cycles

and stages accompanied by major soil-forming interludes. Other regions had geosols and continental deposits, but not the essentially continuous sedimentation records to establish more confidence in the comprehensive nature of the records. The new records were a major breakthrough at the time.

Roger ranked the Lahontan, Bonneville, and Tecopa basin Quaternary studies as his most important contributions. He believed these basins offered the longest, most complete and most detailed paleoclimatic records in continental settings. He often referred to his efforts in the Tecopa basin as his “last hurrah” and he was clearly the most excited researcher I’ve known when it became clear that funding to support his fieldwork in this basin was forthcoming through State of Nevada technical oversight program for the proposed Yucca Mountain high-level waste repository. In his 70’s when the field support became available (Roger was my choice for this important study of the paleoclimates in this hydrographic basin) he was confronted with a dilemma shortly thereafter: he wasn’t convinced he could manage both the Tecopa study and editorial efforts on the DNAG volume at the same time. He asked me what I thought (pointing out his age) and I urged him to take on the editorship. No memorial to Roger would be complete without elaborating on his other claim to fame, Roger the Character. In 1963 I was briefed by two colleagues before I met Roger in person. Burke Maxey (also considered by many as a character) pointed out that if I was interested in Quaternary geology—“he was the master”. Another colleague, however, while acknowledging Roger’s impressive Lake Lahontan work, couldn’t wait to tell me about Roger, the Character. Roger’s standard field attire in warm weather up to about that time (Roger began to cover up shortly before I met him due to a bout with skin cancer) was essentially nothing but a cowboy hat, boots, and the minimum (controversy continues as to exactly what) in terms of modesty. This attire, when added to Roger’s favorite mode of transportation for fieldwork in the desert bolsons—a horse—created quite a sight. One can imagine the effect of a seemingly naked cowboy riding around the desert, brown as a berry, going nowhere, as he rode up and down the dry washes. Roger used a horse (he owned a series) because he would systematically examine every wash bank or topographic feature that offered the possibility of an exposure, however limited, plus the horse offered efficient access to key localities often widely spaced in the typically soft ground terrain. In this way he could review possible stratigraphic relationships over very large areas in a reconnaissance sense, and then begin more detailed studies of the key localities.

One account (provided initially by my new colleague, but verified later by participants) captures some of the behavior patterns that set Roger apart. On the day of moving to a new field camp location in the eastern Carson Desert (SE corner of Eightmile Flat), Peg Wheat, his field assistant, was left to set up camp, while Roger took off by horseback for reconnaissance in the new area (Roger rarely wasted any time available for field work). It seems that around midday, Roger was close to Salt Wells, a former Pony Express stop and at that time the location of an isolated bar-restaurant on US Highway 50, near the northwest corner of Eightmile Flat. Roger stopped in to order two cases of fine French wine (Roger, regardless of location or conditions, liked his creature comforts, one of which was a glass or two of top quality wine for dinner). He also expected good service (also regardless of location or conditions). Apparently, out of nowhere, he marched through the door and up to the bar in his warm weather field attire. Without preliminaries, he asked if he could order the two cases of wine (the husband and wife owners had never seen anything quite like this and at first suspected a prank). The order, however, if real, would make them a good profit. They agreed, but suggested he check back after they could find out from their distributor the price and time of delivery. This satisfied Roger as reasonable, and he walked out the door, got on the horse, and rode southeast out across Eightmile Flat, a direction to absolutely nowhere (except the new field camp). All of this, including the transportation mode and the direction, was observed with total amazement by the owners. He was their first almost naked cowboy, and his order (high-end French wine by the case?) was beyond anything the locals could cook up. There was a happy ending, as Peg Wheat was assigned to check back, knew the couple, and assured them that Roger was real and good for cost of the wine. Roger got his supply of camp wine without missing a beat in his field work, the husband-wife owners had a bar story that was hard to make better by exaggeration, and some 50 years later it gives the reader some insight as to why many thought Roger was a character. From Roger’s standpoint it was just good logistics. Or was it?

During the past 20 some years, I interacted with Roger frequently. We traveled together, several trips in rough foreign settings, and his demeanor never changed—he expected good service and quality wine and food—and again, the circumstances didn’t matter (while at times just getting by was my objective). During these years Roger’s appearance was such that he was sometimes mistaken for Willie Nelson (especially in foreign settings). He got a kick out of this, and once he confided that during his undergraduate years at Cornell he had become very active in theatre—even considering it as a career! Until he told me this, I had

assumed he was oblivious to what was “normal” behavior. Was it possible that Roger the Character was, at least in part, staged?

Roger’s primary focus in life was his professional work, which largely dealt with Quaternary research whenever possible. From the time I met him, until the last two months of his life at the age of 92, he was actively engaged and remarkably productive. He met and married Harriet, his wife, in 1941 who was, at that time, a geologist employed by an oil company. She had just been evacuated to the US after being stationed in the Philippines. Harriet was his loving helpmate and companion—she looked after Roger in all matters domestic, as well as helped him with his work (see the DNAG volume K-2 Forward). Roger spoke of Harriet and his family often (three sons and daughters-in-law, and associated grandchildren) and he ranked his family very high in his priorities. However, other than Harriet, who knew him very well, the rest of his family may not have known the complete Roger—if one did not work with him and share in his primary interests and goals,

he was opaque; he rarely revealed his feelings and passions (unless he disagreed with you on something he considered important!)

He had strong feelings about some conservation issues—and what he perceived as bad government drove him wild. He felt this way about the proposed high-level nuclear waste repository at Yucca Mountain (a “dry” design in highly fractured welded tuffs in the vadose zone didn’t seem that dry during pluvial climates to Roger, or to me, for that matter). Another major issue led Roger into forming, with several others, the Colorado Chapter of the Sierra Club when the Bureau of Reclamation planned to dam all the major canyons of the Colorado River (they added the Marble Canyon Dam, but not the next one as planned).

Anybody who has attempted research has their secret list of heroes in science; I’m fortunate to have known two as colleagues and friends – Roger was one of them.

GSA Quaternary Geology and Geomorphology Division Newsletter

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