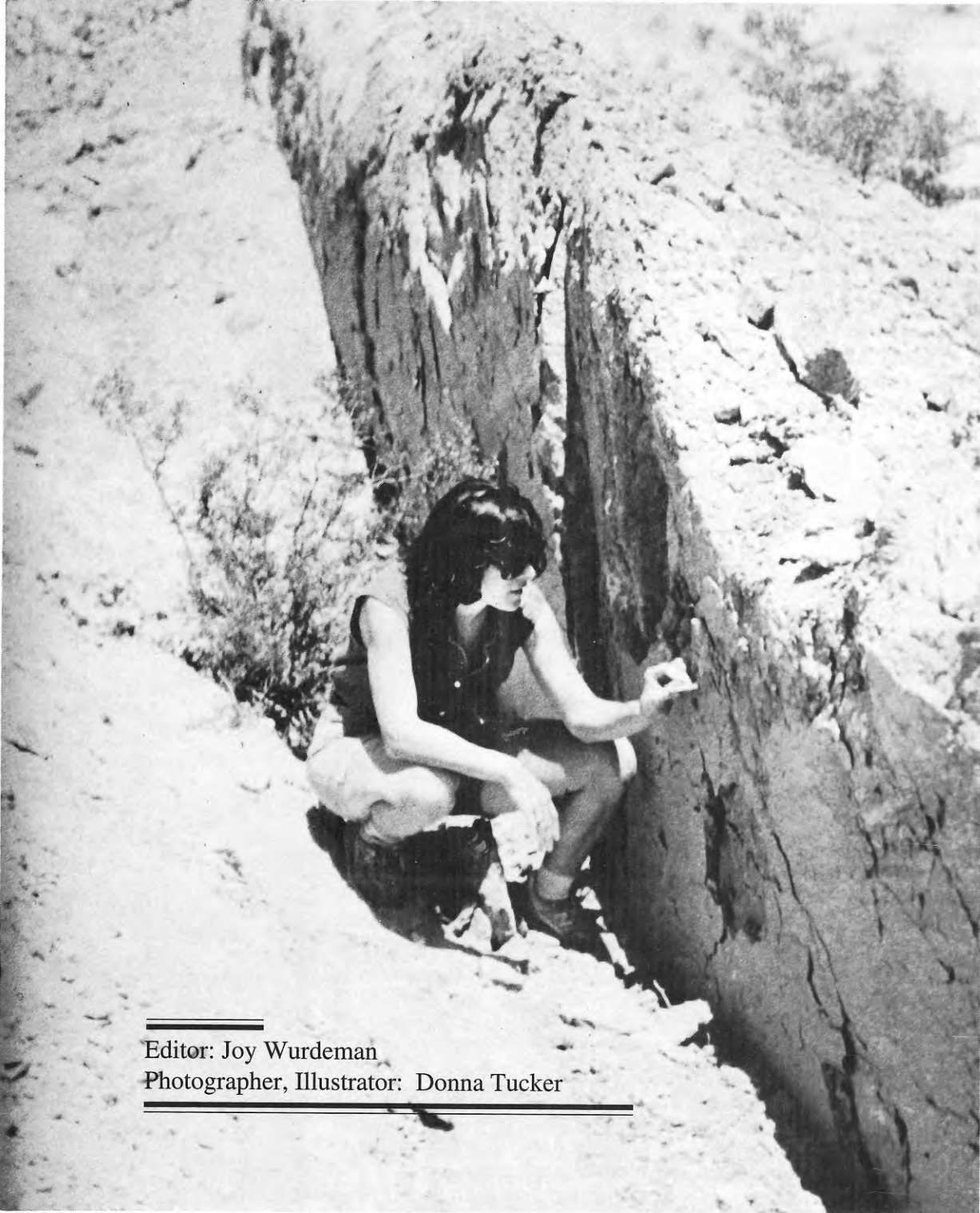


Alumni

NEWSLETTER

EARTH AND SPACE SCIENCES



Editor: Joy Wurdeman
Photographer, Illustrator: Donna Tucker

DECEMBER 1992

Published at UCLA

IN THIS ISSUE . . .

The New Field of Molecular Paleontology.....	1
Hunting for Early Animals and Isotopes in Australia.....	1
Summer Field 1992.....	2
Faculty and Staff News.....	3
Mongolia/Siberia Teleseismic Project.....	4
Field Trip to the South Cascades.....	5
Field Work in the Andes of Southern Chile.....	5
Update on the Galileo Mission.....	6
In Memoriam.....	7
Faculty Kudos.....	8
Donors.....	9
Degrees, Honors and Awards.....	10
Tectonic Evolution of Asia.....	11
The Mesozoic Convergent Margin of Central California.....	12
Alumni News.....	13

INSERT

Chairman's Letter
Lost Souls
Reply Form

THE NEW FIELD OF MOLECULAR PALEONTOLOGY

by Professor Charles Marshall

My research program is centered on the integration of paleontological, morphological and molecular data in solving paleobiological problems.



Charles Marshall and students visiting Tyrannasaurus Rex in his cage at the zoo.

integrated with morphological and paleontological data in the hope of identifying the most phylogenetically informative morphological characters for the group. I am also completing a study of the evolutionary relationships of the regular sea urchins most important to developmental biologists using sequences of an echinoderm specific nuclear gene called, esoterically, msp130.

Other molecular studies being undertaken include a mitochondrial DNA study of the spectacular evolutionary radiation of gastropods in Lake Tanganyika (by graduate student Kelly West), and the assessment of basal chordate relationships using 28S rRNA sequences (by another graduate student, Kevin Peterson). In collaboration with Drs. Runnegar (UCLA), Bengtson (Sweden), and Turbeville (Indiana University), the relationships of aplacophoran molluscs using 18S rRNA sequences is to be addressed. Runnegar and Bengtson hope that this data, in conjunction with analyses of the oldest shelly fossils, will help unravel some aspects of the Cambrian explosion of metazoans.

In my recently finished DNA sequencing facility in the Department I am analyzing the evolutionary relationships of clypeasteroid echinoids (sand dollars and sea biscuits) using DNA sequences from mitochondrial genes. This study will provide an independent test of my previous DNA-DNA hybridization phylogeny of the group and will be inte-

In a more theoretical study, graduate student Glenn Appelby from the Mathematics Department and I are generalizing the approach I developed for assessing the reliability of evolutionary trees derived from distance data to those derived from sequence data. This work is crucial to the integration of molecular and paleontologically based hypotheses of relationship. I am also completing a study with Elizabeth and Rudy Raff, Indiana University, on estimating the time period over which silenced genes may remain functional.

My second major area of research involves the application and developing of statistical approaches for quantifying the incompleteness of the fossil record. Currently graduate student Patricia Marshik and I are developing methods for accomplishing this for stratigraphic sections with non-random distributions of fossil horizons. These approaches are being applied, in concert with molecular and paleontological data, to the estimation of the divergence times between lineages of clypeasteroid echinoids. These methods are also being used for distinguishing between sudden and gradual disappearances and appearances in the fossil record.

HUNTING FOR EARLY ANIMALS AND ISOTOPES IN AUSTRALIA

by Professor Bruce Runnegar

After almost four billion years of earth history, animals appeared abruptly in the fossil record some 600 million years ago.



John Hedley using a GPS receiver at D-Tree Bore on a disused road 20 km south of "Thorntonia," north Queensland.

The biological and environmental effects of this "Cambrian explosion" of animal life are being studied by Bruce Runnegar's group in Earth and Space Sciences.



Adelaide's Channel 7 helicopter landing at a fossiliferous site in the central Flinders Ranges, South Australia.

Last Summer, John Hedley, Bruce Runnegar and Matt Saltzman from Earth and Space Sciences met colleagues from

America (Nicholas Christie-Blick, Columbia University), Australia (Jim Gehling, University of South Australia and UCLA), Sweden (Stefan Bengtson and Lars Holmer, Uppsala University) and the United Kingdom (Simon Conway Morris, Cambridge University) for fieldwork in the Flinders Ranges of South Australia. The UCLA team then moved on to central and northern Australia to sample limestones for isotope chemostratigraphy. Subsurface samples obtained from a fully cored borehole stored at the Geological Survey of Queensland's Core Library in Brisbane will complement outcrop specimens from the Mt Isa area of north Queensland. The purpose of this research by Matt Saltzman is to test the value of carbon, oxygen and strontium isotopic excursions for correlation and environmental interpretation by studying two well-correlated intervals of epicontinental carbonates from different biogeographic realms (Australia and North America).

The large size, low topography, and sparse population of northern Australia make it difficult to navigate in the bush (largely desert terrain covered with small, drought-tolerant trees). An Ensign hand-held GPS receiver solved the problem and even showed us how to get back to our vehicle!



Matt Saltzman examining cross-bedding in sandstones associated with the Ediacara fauna in the Mt. Scott Range, South Australia.

ranges and carry out rock specimens. This year, Adelaide's Channel 7 sent their helicopter up to film our work with the Ediacaran fossils, and then kindly flew a load of rocks several hundred kilometers back to Adelaide.

It is not clear whether the Ediacaran fossils were preserved in sediments deposited in shallow or deep water. The traditional interpretation places them in an intertidal environment but that view has been challenged in different ways by Jim Gehling and Nick Christie-Blick. The answer ultimately lies in detailed environmental analyses of the enclosing sediments, Ph.D. research that is being carried out by both John Hedley and Jim Gehling. More work is planned for 1993.

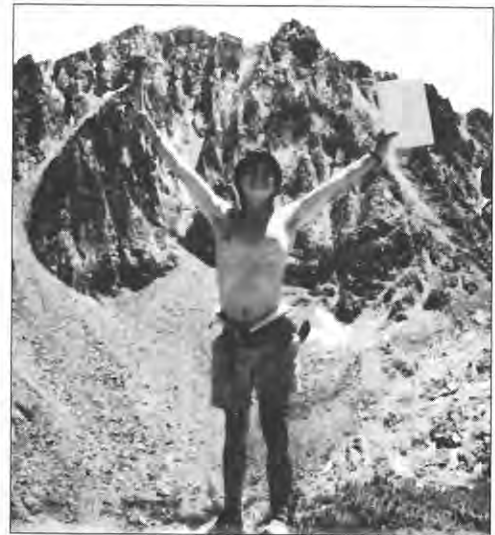
A major thrust of the work in South Australia involves documenting sites containing the famous late Proterozoic Ediacara fauna. The easiest way to get to some of the sites is by helicopter, so we have been using a Hughes 300C to explore the

For two months this past summer a group of geology and geo-engineering students worked and lived at 11,000 feet in the High Sierra. Many of us were reluctant to live in the mountains because we weren't sure what to expect, but the discoveries that we made up there will be remembered for the rest of our lives. Dr. Ted Reed led us into the John Muir Wilderness and taught us to open our minds to our surroundings.

The area which we investigated is an ongoing research project of the ESS Department. Much of our work dealt with figuring out the complex geologic history of intrusive, metamorphic and faulting events. The field area contains highgrade metamorphic rocks which are both sedimentary and metaplutonic. The metamorphics have been intruded by multiple Cretaceous plutons. The metamorphic units display a well-developed shear fabric and may represent an older intrusive series. Currently two graduate students, George Hathaway and Kim Holland, are working in this area.

On a regional scale, the research we and others are involved in will add to a better understanding of Cordilleran geology, and specifically the geologic history of the Sierra Nevada.

The Summer Field Program gives the students the opportunity to formulate and test our own theories concerning geologic problems in the field on a local and regional scale.



A jubilant Mike Murphy

ON THE COVER: Fault scarp from Landers magnitude 7.5 earthquake, 28 June 1992. Photo courtesy of James E. Tucker, B.S. '90. Scale is provided by staff member Donna Tucker.



Former staff member and paleontologist Takeo Susuki was recently honored in an article in the Los Angeles *Tozai Times*.

Susuki lectured at UCLA while collecting and studying fossils and minerals in the field. He was a service battery first sergeant in the 522nd Field Artillery Battalion and fought in Italy, France and Germany during World War II. Now the only clues to his military past are photos and the license plate frame of his motor home which bears his former regiment's slogan, "Go for Broke."

After the war, Susuki returned to California and attended Long Beach City College on the GI Bill. He then transferred to UCLA to study geology, got his bachelor's in 1949 and a master's in 1951. He later received a doctorate from Tohoku University in Sendai, Japan. After he earned his master's degree, he looked for a geologist position at American oil companies, but encountered postwar discrimination, despite his patriotic record. He eventually found work as a museum scientist at UCLA cataloging the university's collection of invertebrate fossils. This work forced him to spend the majority of his time in the field. When he did get to do states to Michigan, although his main focus was Vancouver Island in British Columbia and the Santa Monica Mountains. He is credited with discovering more fossil species in any other paleontologist. Former professor Clem Nelson provided much of the groundwork for the study of the Santa Monica Mountains and on Vancouver Island. A major contribution teaching students the art of fossil that not many people know how to do." Takeo also illustration techniques.

Aside from his academic life, Takeo spent his summer prospecting for jade on government land claims that he owned in Jeffrey City, Wyoming. He brought his entire family to the site and used bulldozers and dynamite to extract the jade.

Takeo's home is crowded with mineral samples and papers from his career at UCLA. His specialty is working on a major scientific paper on mollusca from the Topanga formation in the Santa Monica Mountains. He retired from UCLA in 1988 to care for his wife, Marian, who suffered a stroke after heart bypass surgery. She is also on dialysis because her kidneys have failed. In addition, Nick, their oldest son, died of leukemia in June of last year. Takeo says his outlook can be summed up by the Japanese phrase, "*shikata ga nai*," which means that things can't be helped.

One of the most satisfying parts of Susuki's career was his work as a liaison between Japanese paleontologists and the American paleontological community. He used his bilingual ability to bridge the language gap between visiting Japanese and members of American paleontological organizations.



Takeo Susuki

He then transferred to UCLA to study paleontology in 1951. He later re-Japan. After he earned his master's oil companies, but encountered He eventually found work as a mu-collection of invertebrate fossils. in the lab. When he did get to do states to Michigan, although his and the Santa Monica Mountains. the Santa Monica Mountains than states that Takeo's research pro-Tertiary Period fossil record in the Clem asserts, "And I think he made photography, which is something taught graduate courses in graphic

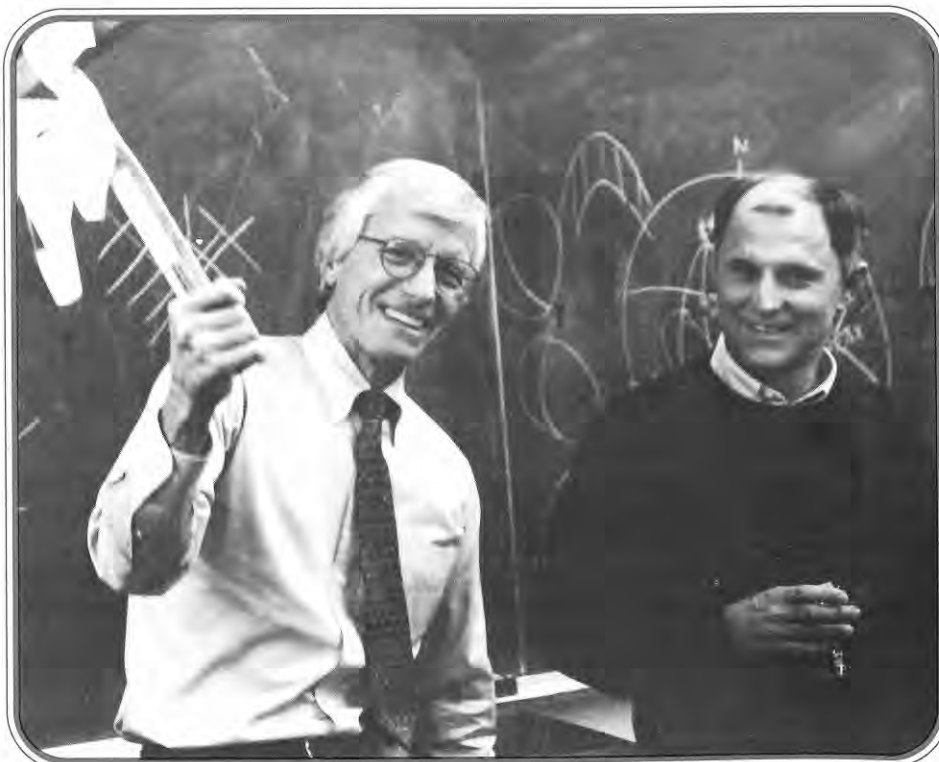
mers prospecting for jade on gov-Wyoming. He brought his entire extract the jade.

boxes of research materials and invertebrate paleontology and he is the Topanga formation in the Santa care for his wife, Marian, who suf-a dialysis machine because her kid-

RETIREMENTS

At Art Montana's celebration at the L.A. Tennis Center in March, Bob Jones presented him with a reflector telescope bought with contributions from many well-wishers. Art is now using it on his ranch in New Mexico, where he has increased his involvement in environmental and animal rights issues.

Harriett Arnoff and John Gardner, at 15 and 21 years, respectively, were honored at the annual staff/faculty dinner, held this year at the Black Forest Inn in Santa Monica. Harriett is enjoying her free time and planning to take some classes, with Spanish among them, as she intends to take a trip to Spain. John's life doesn't seem to have changed; he continues to work part time at JPL and part time here.



Art holds high his ESS commemorative rock hammer

MONGOLIA/SIBERIA TELESEISMIC PROJECT

by Mark Benthien

This last summer I participated in a UCLA teleseismic tomography project spanning Siberia and Mongolia. We operated 26 stations in a linear array covering 1300 kilometers from north of Lake Baikal to the Gobi Desert in southern Mongolia. The purpose of the experiment was to study the mantle-lithosphere boundary across the Baikal Rift, the fourth rift system which Prof. Paul Davis has studied. I am an under-

Ulaanbaatar, and the remainder are mostly farmers and ranchers. Although they live a nomadic life, they are likely to have a TV, truck, or other "modern" conveniences. I remember one night I was in a Gair drinking boiled milk, watching a portable TV run off a truck battery, while a sheep was being butchered on the opposite side of the room. I was constantly amazed by the combination of old and new, traditional and western ways of life.

In the past couple of years many reforms have taken hold; elections are being held (they elected communists), private enterprise is being developed, and tourism promoted. In fact, a Holiday Inn will soon be opening. The Mongolians are now reclaiming their heritage, and at times despise the Russians; many times I would be treated poorly until it was known that I was not Russian. In place of the Russian influence American and European ways are being copied. There is a TV channel (via satellite and then re-broadcast) which has American shows at night, such as news, cartoons, documentaries and MTV.

We stayed in a relatively comfortable apartment with Russians who were our support crew. This team consisted of a chief, who was also our cook, a Russian-English translator, and two drivers. At first, the summer seemed to be an unpleasant one, as I had not yet discovered where I could buy, with dollars, the food such as peanut butter that would supplement what we were already eating (lamb soup, fried lamb, boiled lamb...). Eventually I would also go to the Mongolian markets to buy vegetables and other food. Everything was, of course, extremely cheap, due to the exchange rate for the dollar. Dinner at the best hotel restaurant would be about two dollars. On the negative side, we often would not have hot water, or water at all, for up to a week at a time. Constant electricity was a luxury, and the lack of it a serious problem since we were running a SUN computer which does not handle power failure very well.

Frequently we left to service the stations without enough food or gas, hoping that we would be able to find what we needed. On one trip we ran out of both bread and meat. We then bought an entire sheep in exchange for gasoline, since gasoline is worth more than currency to ranchers who are 250 kilo-

meters from the nearest gas station. We then had enough food, but not enough gasoline for both vehicles to return to the city. The jeep drove back to town and two days later returned with another truck with extra gas. There are no paved roads outside of the capital except to the north, and we were in the south. Another time that we needed gas we went to a village to buy about 40 liters. There was a village holiday of some sort, which was not surprising since every day in Mongolia seemed to be a national holiday, an excuse for everyone to put things off until the next day and get very, very drunk. This was when Paul Davis was with us, along with Yuli Zorin, the head of the Russian side of the project, and Janet Johnston from the American Air Force (which had sponsored this project). Prof. Zorin approached the Village Chief, an intelligent man who spoke excellent Russian, and asked for the gas. Meanwhile, about 25 young boys and men on horseback began to cluster around us. We obviously were a novelty in this area of the world. Soon these boys began to throw small rocks at us. When the rocks began to get bigger, we decided to leave. We did get the gas, though. Another problem we faced when we serviced our stations was finding them. The roads, as I mentioned, are not paved, and therefore there are many different dirt roads that split into many directions, and there are no signs to tell the way. The southern section was very barren, so remembering landmarks became very im-

portant. What made us successful before we had learned the way was modern technology. We had a portable Global Positioning System receiver which we used to tell our direction and position, a device which uses satellites and without which we would have often been completely lost.

At the end of the summer I met members of the American Peace Corps. There are now about 50 volunteers there, in the second year of the Corps in Mongolia. They are teaching English and business. I gained a lot of respect for them through this meeting. Half of them were just about to leave for a year-long stay in remote towns, not in groups but alone. They will have quite a year, just as I had quite a summer.



Grad student Liu Hong servicing seismic station in Taiga forest, Siberia

graduate geophysics major, and I have been an assistant to Prof. Davis and his graduate students for almost two years now.

I arrived in Irkutsk, Siberia at the beginning of the summer. After two weeks in Irkutsk, I spent the next two months in Mongolia: installing stations, monitoring them every two to three weeks, and looking at the data being recorded to see if everything was going well. Others from UCLA came and went throughout the summer (none more than once!), but I had the dubious honor of staying there permanently. Phil Slack began the installation of the Mongolian stations in mid-June, and Shangxing Gao and I installed the remainder of the 10 stations. These stations spanned a distance of about 600 kilometers. Prof. Davis spent about two weeks with us in August. Don Daniels replaced me when I returned to school in September.

Mongolia is an intriguing country. Until 1921 it was relatively unchanged from the times of Genghis Khan. In 1921, however, there was a communist revolution led by Sukbaatar, with the help of Lenin and the Soviets. The Soviets yielded tremendous influence in Mongolia, raising the standards of living and education but eradicating much of the ancient culture. The result is a capital city, Ulaanbaatar, that mimics Moscow (broad avenues, large center square in front of the Parliament building, efficient transportation), and yet there are still cows that wander through the city, Buddhist temples, which are mostly tourist museums, and many people still live in the portable, round tents (Gairs) that are the norm in areas away from the capital. One fourth of the people of Mongolia live in



Our guide in Mongolia

FIELD TRIP TO THE SOUTH CASCADES

by Professor Jon Davidson

In August, an informal field trip was run to the south Cascades. Staff, faculty, graduate and undergraduate students took part. The trip began with a long drive from UCLA to Mt Shasta in northern California. After examining the volcanic rocks and



On the summit of Wizard island in Crater Lake. Lao Rock in the background on the crater rim.

southward to Lassen Volcanic National Park, arriving late in the afternoon in an ominous pall of smoke from the huge forest fires to the northwest. At Manzanita Campground we met up with Mike Clynne of the United States Geological Survey, who has spent more than 10 years mapping in the area and working on the volcanic rocks. Mike led us on an informed tour of the older parts of the volcanic center, Bumpass Hell and the summit of Lassen Peak. We examined the products of the 1915 eruption and studied the sequence of events recorded in eyewitness accounts and spectacular early photographs. Samples of the 1915 lava were collected for isotopic analyses as part of Caryn Kennedy's ESS 199 senior research thesis. Heading south from Lassen, we enjoyed the hospitality of the

spectacular debris avalanche at Shasta, we made our way north to Crater Lake in Oregon. Two days in Crater Lake National Park included a detailed geological tour around the rim and a boat tour with a climb to the top of Wizard Island inside the Crater. The party camped inside the National Park, braving both cool night temperatures and bears - which left paw prints on the roof of a UCLA van one night.

The fieldtrip then turned

Ellisor family at Fresno (thanks to Rachel Ellisor, who has now begun graduate studies at the University of Texas in Arlington). The following day, we visited complex intrusive relations at Courtwright Reservoir - California's first Geological State Park, before heading back to UCLA.



Bumpass Hell, Lassen Volcanic National Park.

FIELDWORK IN THE ANDES OF SOUTHERN CHILE

by Professor Jon Davidson

I spent the month of February in Southern Chile with post doc Steve Nelson. We are part of a multi-institution collaborative project funded by the National Science Foundation to investigate the life history of an arc volcano. Tatara-San Pedro volcano is located

in the Chilean Andes south of Santiago at latitude 36°S. It is a superbly exposed Quaternary volcano. Deep glaciation has cut canyons into the volcanic rocks, exposing thousands of feet of volcanic rock sequences, and cutting down into the underlying Tertiary volcanic rocks and plutons.

The objective is to sample many complete sections of lava flows in canyons

around the volcano and analyze them for petrography and geochemistry. A subset was sampled for paleomagnetic analysis, and where possible mineral separates will be used to obtain $^{39}\text{Ar}/^{40}\text{Ar}$ age dates to enable us to establish a well-constrained volcanic



Typical canyon exposures. The light colored granite is intrusive into dark volcanoclastic rocks in the foreground. Farther back up the canyon, volcanic rocks from the Quaternary Tatara-San Pedro volcano unconformably overlie the pluton

stratigraphy. We hope finally to be able to construct a three-dimensional model of the volcano through time, keyed with the compositions of each eruptive event. Davidson and Nelson's job in the project is to examine the underlying basement rocks, to establish how magma chemistry of the arc lavas has changed with time through the late Tertiary-Quaternary, and to evaluate whether the basement lithologies have served as contaminants in the evolution of Tatara San Pedro magmas.

The region is remote, and access has been made difficult by major flooding in 1990 which destroyed many of the trails. Horses and mules were used to supply camps, cross fast-moving mountain streams and for some of the longer journeys in the field. Other than the logistics of moving people and supplies, field work in this part of Chile is excellent. Exposures are extensive and vegetation sparse. Warm sunny days are followed by cold nights, and elevations range between 4,000 and 11,000

Jon Davidson points out field relationships above the Rio Colorado Valley to post doc Steve Nelson



feet. Well over 400 samples were collected -- 70 by the UCLA team, and the analytical program is now under way. A summary of the study was recently published in EOS. The project team plans to meet at the December AGU meeting in San Francisco, and will present preliminary data at that time.

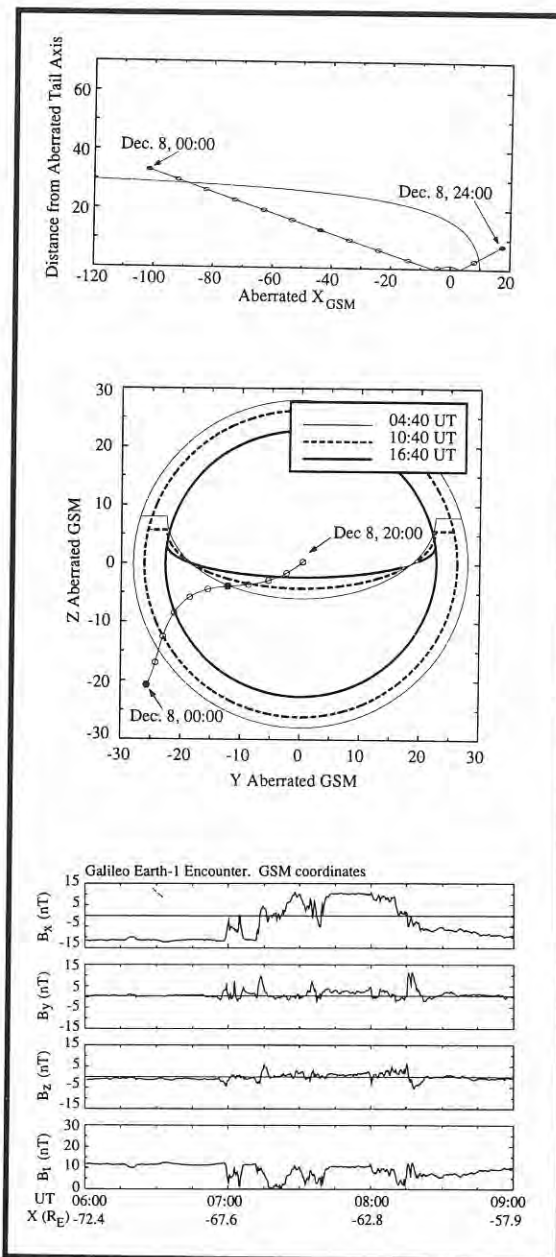
UPDATE ON THE GALILEO MISSION

by Professor Margaret Kivelson

Readers of this newsletter have for some years been following the adventures and misadventures of the Galileo spacecraft which carries a UCLA magnetometer among other instruments. Following its launch in October 1989, the spacecraft flew by Venus (February 1990), Earth (December 1990), and the asteroid Gaspra (October 1991). This article is being written as Galileo approaches the Earth for its second flyby which will take place on December 8, 1992. This will provide the final boost needed to take the spacecraft out to Jupiter where it will be inserted into a capture orbit in December 1995. En route to Jupiter, the spacecraft will fly by the asteroid Ida.

The spacecraft is large and complex and has been functioning almost flawlessly. The *almost* alludes to the much-publicized problem with the spacecraft's high gain antenna that is needed for communication at high data rates over long distances. During deployment, the antenna jammed in a partially open configuration. The Jet Propulsion Laboratory has placed high priority on understanding the nature of the problem. They believe that three of the ribs are being held by some misaligned pins. At the moment, they are optimistic that the warming of the antenna during the December-January return to the vicinity of Earth will reduce the forces holding the stuck ribs and that the antenna will open. What if this does not happen? Fortunately, a low gain antenna on the spacecraft can communicate to earth from the distance of Jupiter, albeit at a much reduced data rate. The scientists and the JPL instrument teams are developing strategies for using the onboard computers to compress the data in order to optimize the effectiveness of information transmittal. As well, the onboard tape recorder will be used to store high time resolution data for transmission at low rates over extended times. With these possibilities, the magnetometer team expects to be able to achieve many of their scientific objectives even without the high gain antenna.

In aspects of the mission other than the antenna, nature has smiled on our endeavors. The flyby of Venus fortuitously grazed the bow shock during an interval of rather steady solar wind conditions. The data enabled us to identify aspects of the shock structure that had not previously been recognized and formed the basis of a paper published in *Science*. During the first flyby of Earth, opportune shifts in the solar wind flow direction enabled the spacecraft to probe the current sheet in the trans-lunar magnetotail during an interval of geomagnetic activity well-documented by ground observatories. Our initial report, which will appear in the *Journal of Geophysical Research* early next year, casts a new light on aspects of the tail's response to geomagnetic activity. We eagerly await the new data from the second Earth flyby (during which time we will also receive the data from the Gasara flyby). We hope to be able to report on more good results in next year's newsletter.



(a) The trajectory of Galileo as it approached the Earth from the magnetotail. A model magnetopause is also sketched. (b) The changing shape of the neutral sheet and the cross section of the magnetopause in Galileo's vicinity at three different times (c) The data obtained by the magnetometer when several flux ropes passed by Galileo. Notice the strong B_y component and the bipolar B_z component when two of the flux ropes were encountered.

Eugene B. Waggoner, 78, internationally recognized engineering geologist, died November 30, 1991, of viral pneumonia in Napa, California.

Mr. Waggoner, who made his home in Vallejo, CA, was former CEO of Woodward-Clyde Consultants, an international corporation with offices in 65 cities worldwide. He was past president of the American Consulting Engineers Council, the largest and most prestigious professional organization of private practice engineers. In 1987, he was honored by election to the National Academy of Engineering. On October 6, 1992, the U.S. National Committee on Tunneling Technology dedicated a lecture, "The Future of Tunneling in North America," to his memory. The dedication from the program for this lecture states that "Gene Waggoner will be remembered by the underground design and construction community not only as an internationally recognized expert in engineering geology, but more importantly as a cheerful, caring, and helpful human being. Gene was a leader with a common touch. He was a member of the National Academy of Engineering. He served on both the U.S. National Committee on Tunneling Technology and the Geotechnical Board of the National Research Council."

Born in Kansas City, MO in 1913, Mr. Waggoner received his bachelor's and master's degrees from UCLA. He began his professional career as a petroleum geologist during the heightened need for oil during World War



II. After the war, he spent nearly a decade in government service for the Bureau of Reclamation, moving into private practice in Denver in 1954. During this time his concern for better relationships between parties involved in major construction projects led to the innovation of pre-bid geologic evaluations for contractors.

He served as consulting geologist on many large engineering projects: the Superconducting Super Collider, the Washington, D.C., Metro subway system, the St. Lawrence Seaway project, the Glen Canyon

Dam, the Flaming Gorge Dam, and numerous other tunnels, power plants, and dams. He served as a special consultant to the International Water and Boundary Commission, U.S. and Mexico, and also to the United Nations and the U.S. State Department. Internationally, he consulted for major hydroelectric and irrigation projects throughout Asia, Australia, Africa, the Middle East, and South America—in all, 130 major projects in 54 countries.

Following retirement from Woodward-Clyde in 1973, Mr. Waggoner continued his active career as a self-employed consultant. His most recent projects included reservoir and tunnel work for the Los Angeles Metropolitan Water District, tunnel cuts for the Getty Fine Arts Center, and the Richmond Tunnel for the San Francisco Waste Water System.

Mr. Waggoner's reputation among attorneys is legendary. It was in expert testimony that he fully developed his consummate skill of translating complex geologic conditions into everyday language. He also was an accomplished amateur lapidary, avid golfer, storyteller, and a 32nd Degree Mason. He is survived by Wini, his wife of 53 years; a son, Alan, of Pittsburgh, PA; two daughters, Diana Davies of Dixon, CA, and Teri Nebeker of Sacramento, CA, and six grandchildren.

Contributions may be made to the Eugene B. Waggoner Scholarship Fund #2-49-119, and sent to Earth & Space Sciences (address on last page of insert).

EUGENE B. WAGGONER SCHOLARSHIP FUND

- Mr. & Mrs. Gerald L. Baker
- Mr. & Mrs. John A. Barneich
- Mr. & Mrs. William A. Bischoff
- Buchanan Fields Women's Golf Association
- Mr. & Mrs. Alistaire B. Callender
- Carnegie Mellon University (15 Staff)
- Consulting Engineer Council of Colorado
- Juan Craig
- Mr. & Mrs. James H. Dauber
- Willaim J. Deutsch
- Mr. & Mrs. H.L. Dietze
- Peter M. Douglass
- Arthur H. Dvinoff
- DPIC Companies
- Mr. & Mrs. Randall J. Essex
- Mr. & Mrs. Eric L. Flicker
- Christopher F. Erskine
- Carol L. Forrest
- Mr. & Mrs. Richard L. Fuller
- Mr. & Mrs. David R. Gaboury
- Edward M. Gabrielson
- John P. Gnaedinger
- Mr. & Mrs. William O. Goodrich
- Mr. & Mrs. John F. Grosch III
- Mr & Mrs. David J. Gross
- Mr. & Mrs. Steven C. Haley
- Mr. & Mrs. George E. Hervert
- Mr. & Mrs. Robert B. Hickman
- Mr. & Mrs. Wesley G. Holtz
- Mr. & Mrs. Harry M. Horn
- Mr. & Mrs. Kenneth H. Kastman
- Joseph R. Kula
- Richard Ladd
- Frederick & Catherine Lanni
- Raymond Lundgren
- Lelio H. Mejia
- Mr. & Mrs. J. Levering Merritt Jr.
- Mr. & Mrs. Malcolm R. Meurer
- Richard A. Millet
- Mr. & Mrs. Douglas C. Moorhouse
- Kenneth H. Nass
- Tom D. O'Rourke
- Mr. & Mrs. Ashok S. Patwardhan
- Mrs. & Mrs. Jeay-Yves Perez
- M.C. & Bernice Rand
- Dennis E. Reece
- Mr. & Mrs. Richard J. Robbins
- Robert Kirby & Guilaine Roussel
- Mr. & Mrs. Dennis Rubin
- George D. Ruttinger
- Mr. & Mrs. Frank W. Sallee
- Mr. & Mrs. Reuben Samuels
- Marsha A. & Phillip R. Schwartze
- Mr. & Mrs. William L. Shannon
- Mr. & Mrs. Ronald E. Smith
- Mr. & Mrs. P.E. Sperry
- TERRA Insurance Co. (David L.J. Coduto, Pres.)
- Mr. & Mrs. Stanley T. Thorfinnson
- Deane U. Urbank

Iona G. Waggoner
Winifred Waggoner
Frank Waller
Mr. & Mrs. Robert K. Wilson
Noel Wong
Woodward-Clyde Group, Inc.

James Robert Townsend, (1912-1990) was born in Los Angeles, California on October 12, 1912, the second child of James Robert and Mary Beulah Townsend. He was christened James Robert Townsend, Junior, and was called "Junior" until high school, when, at his request, he became Bob Townsend.

At the age of nine, he was tested, identified, and selected as one of the thousand children in the Terman Study. This study has continued to the present. At UCLA he earned bachelor's and master's degrees in Geology. For one year he was a member of the faculty at Occidental College.

He became a Registered Geologist and a Certified Engineering Geologist in California. He worked on the Cajalco Dam and the San Jacinto Tunnel during the original construction of the Colorado River Aqueduct of the Metropolitan Water District. Except for a tour of duty at the Panama Canal and another in Pakistan, he was with the Los Angeles Engineering District as a geologist. In Karachi, Pakistan, some of his field work took him into the Himalayas.

He retired from the Corps of Engineers, United States Army, after more than thirty years of service. After retirement he was a consultant for High Altitude Water Sources. In his capacity as Consulting Engineering Geologist, he worked in Squaw Valley and Tahoe.

He was active in the Earth Science Department at UCLA and in the Branner Club, a geological organization which meets at the California Institute of Technology. He is a Fellow of the Geological Society of America, and a member of the Association of Engineering Geologists.

His longest association was with Trailfinders, a youth organization which he joined at the age of twelve. His interests in this group continued throughout his adult life. In June 1986, on the way to an annual Trailfinders meeting at Idyllwild, he was injured in an automobile accident, which may have been partially responsible for his recent decline in health.

He was a man who had a special talent as a longtime friend. During his late teens he became a member of the Gamble Club, named for Mr. and Mrs. George Gamble. These friendships have continued for over fifty years — once a friend of Bob Townsend,

always a friend. He was an active member of the Los Angeles Breakfast Club for ten years.

His hobbies were photography and travel — "taking pictures and taking trips." A very important influence in his life was the Mount Hollywood Congregational Church where he and his family have been members for over half a century.



He was a loving husband to Annabel Jean Fischer Townsend, and a devoted father to Jeannette Kathryn Townsend and Marilyn Anne Townsend. He is also survived by two sisters, Juliana Townsend Gensley, and Marie Belle Townsend Moore, and his brother-in-law, Donald Fischer, who was like a real brother to him.

FACULTY KUDOS

On September 24, 1992, *UCLA Today* reported that eight faculty members at UCLA, the largest number of any university campus in the nation, received 1992 Young Investigator Awards.

The awards are presented by the National Science Foundation "to highlight and enhance the research and foster teaching careers of outstanding beginning faculty." Winners receive up to \$62,500 annually; a combination of federal and private funds can increase the funding to a maximum of \$100,000 for five years.

"The awards are a tribute to the superb caliber of all of our faculty, as well as to the commitment of every academic unit at UCLA to recruiting scholars of international renown near the beginning of their academic careers," said Chancellor Charles E. Young. "The faculty who have won these awards are part of a corps of young scholars who will take the lead role in the continuing growth of the intellectual achievement of the campus into the next century."

Winning from the ESS Department is Charles Marshall, assistant professor of paleontology, who is creating a new branch of paleontology by using techniques from molecular biology such as DNA sequencing to reconstruct evolutionary relationships between species and compare genetic codes of species to solve problems in Paleobiology.



This article appeared in *UCLA Today* on October 8, 1992:

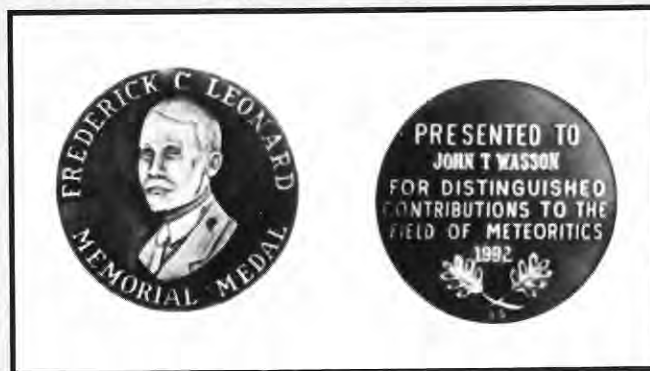
J. William Schopf, professor of paleobiology in the Department of Earth and Space Sciences and director of the UCLA Center for the Study of Evolution and the Origin of Life, has received the 1992 Gold Shield Faculty Prize for Academic Excellence.

Schopf is the world's leading expert on the origin and evolution of life in the Precambrian era, the earliest period of geological history. His identification of 3.3-billion-year-old plant microorganism fossils, suggesting that life has existed for 90 percent of the Earth's history, is considered one of the most important scientific achievements of recent times.

In addition to conducting research, Schopf is an innovative instructor who continues to teach undergraduate courses. He personally tutors any student who gets less than a "C" grade on his or her midterm exam. Schopf also hosts the Wednesday Evening Evolution Group, acknowledged worldwide as one of the finest forums for discussing evolution.

The Center for the Study of Evolution and the Origin of Life, which operates under the auspices of UCLA's Institute of Geophysics and Planetary Physics, was conceived and founded by Schopf to promote education and research exploring the development and formation of life on Earth as well as the Earth's physical structure.

The \$28,000 prize is awarded every two years to a UCLA faculty member in recognition of "extraordinary achievement" in teaching, university service and research or other creative activity. Gold Shield is an alumnae organization whose members are chosen on the basis of university service and outstanding professional and community achievements.



Leonard was the founder and chair of the UCLA Astronomy Department and co-founder of the Meteoritical Society

ALUMNI FOUNDATION FUND

BENEFACTORS

Philip Behrman
Joan Delany
Joe Nahama

CONTRIBUTORS

Charles W. Blount
Thomas Fairchild
Donald Hagen
Diane and Tom Hunter
Kenneth H. Lister
Lidia Lustig
Scott Warner

FRIENDS

Donna Anderson
W.A. Dollase
Roger Hoeger
Richard Hopper
Phillip S. Kistler
Michael Rabinowitz
Harold F. Weber
G.D. Webster

\$500 or above = Benefactor
\$100-499 = Friend
\$≥99 = Contributor

CGS SCHOLARSHIP

At the May 12, 1992 meeting of the Coast Geological Society in Ventura, UCLA ESS Department graduating senior Debora Demoff was presented a \$500 scholarship in recognition of her scholastic achievements by CGS president. Joan Barminski.

Debbie transferred to UCLA in the Fall Quarter of 1990 after attending Moorpark College. Following completion of summer field geology, she will enter a graduate program in the geosciences at the University of California, Davis.

SUMMER FIELD SCHOLARSHIPS

The ESS 121AB Summer Field Geology class has been awarded a group Summer Field Scholarship in the amount of \$3000 to help cover their field expenses. Donations for this award come from three funds which help support summer field activities:

THE SABINS/CHEVRON FUND

Dr. Floyd Sabins with a matching contribution by Chevron Oil Field Research Co.

CLEM NELSON SUMMER FIELD SCHOLARSHIP FUND

Glenn A. Brown
Richard Escandon
Jeffrey Farrar
Dave Grover
Bob Hollingsworth
Chuck Lehotsky
Richard Lung
Steve Watry
Grover Hollingsworth & Associates

WALTER HARRIS MEMORIAL SCHOLARSHIP FUND

Mrs. Charlotte Harris Johnston

The award was presented to Rachel Ellisor and John Merrill as representatives of the 1992 Summer Field Course, at the annual Graduation and Awards Ceremony on June 14, 1992 .

OUR THANKS TO THESE MAJOR DONORS

KEN WATSON FELLOWSHIP

Mary Watson

CARLSBERG FELLOWSHIP

Richard Carlsberg

FACULTY RESEARCH SUPPORT

Amoco Production Company

DEGREES AWARDED

Bachelor of Science

Debora Jean Demoff	Geology
Rachel A. Ellisor	Geology
Elizabeth Jane Forshee	Engineering Geology
Gerald Scott Goodman	Engineering Geology
David Marshall Hirsch	Geology
Kimberly Susan Holland	Geology
John Michael Holodnik	Geology
Fabio Massimo Minervini	Geology
Daniel Allen Swensson	Engineering Geology



Graduates, June 1992

Master of Science

Michael Howard Farris	Geophysics and Space Physics
Riley Darren Jay	Geophysics and Space Physics
Adam Winslow Norris	Geology
Frank Calles Ramos	Geology
Dennis Van Swol	Geophysics and Space Physics
Wojtek A. Wodzicki	Geology

Doctor of Philosophy

Henry Ozoemena Ajie	Geochemistry
Tzerhong Chen	Geology
John Neil Christensen	Geology
Kathleen Ann Devaney	Geology
William A. Heins	Geology
Keith James Jagiello	Geology
Guan Le	Geophysics and Space Physics
Stephen Tracy Nelson	Geology
Pu Song	Geophysics and Space Physics
Eric Donald Wendlandt	Geology
Xue-Min Yang	Geophysics and Space Physics
Tielong Zhang	Geophysics and Space Physics

HONORS AND AWARDS

UNDERGRADUATE

JOHN W. & FRANCES R. HANDIN SCHOLARSHIPS

Wayne Chiu
Julie Norris
Laura Webb

LIEN SCHOLARSHIP

David Sarkisian

GRADUATE

THE AMOCO AWARD FOR EXCELLENCE IN TEACHING

Michael Campbell
Jeffrey Geslin

PAULEY FELLOWSHIP

Peter Craig

ALUMNI FELLOWSHIP

David Rothstein

WILBUR SHERMAN FELLOWSHIP

Michael Campbell

CSEOL FELLOWSHIPS

Kevin Peterson
Matthew Saltzman
Kelly West

CALSPACE FELLOWSHIPS

Gerard Blanchard
Gretchen Lindsay
William Moore



As we promised last year, Benefactors are immortalized on the Commons Room wall. Chair Paul poses with the plaque.

The plate tectonic theory has provided a simple kinematic model to interpret the evolution of the Earth's lithosphere. This theory is particularly successful in unravelling the formation of oceanic crust whose age extends back no more than about 200 Ma, making it a poor record of the evolution of our planet. The continents, on the other hand, with their memory of geological history extending almost as far back as 4 Ga, have long been considered the best chroniclers of the Earth's past. Because of its long evolutionary history, however, the geological record of the continents commonly is either incomplete or exhibits extreme geometric complexities and

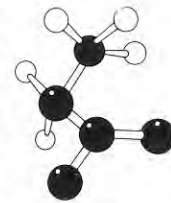
Pamir with the average elevation > 5000 m), is a fundamental phenomenon of continental deformation. Investigation of deformation in Asia allows us to establish new kinematic models that predict the spatial and temporal evolution of continental deformation in response to continent-continent collision.

Important questions related to the tectonic development of the Asian continent are: (1) when and how were the Paleo- and Neo-Tethys between the Gondwanaland and Laurasia closed? (2) what are the sedimentological, biological, paleoclimatological, and thermochronological responses during Mesozoic and Cenozoic orogenies that have

Shang-You Nie at the University of Chicago, and Chinese geologists at Beijing University and Academic Sinica in Beijing, China, we have developed a series of palinspastic-reconstruction models for the development of the Asian continent from the late Paleozoic to the present.

These models account for the collision of the North and South China Blocks and the formation of the eastern margin of Asia, the development of the Tian Shan fault system and its relationship to the Chaman fault system in western Pakistan and eastern Afghanistan, and the structural and thermochronological evolution of the southern Tibetan plateau. The models have been tested against geologic observations and have been proved to be useful in predicting complex relationships among sedimentation, metamorphism, and structural development during the formation of the Asian continent.

As a continuation of our recent expedition to the Tibetan plateau led by Professor Mark Harrison, a UCLA team led by Professor An Yin will be working on the northwestern rim of the Tibetan plateau and southern Tian Shan in the next two years. The project, supported by the National Science Foundation, will integrate structural, sedimentological, thermochronological, magnetostratigraphic, and isotopic studies to address the important problems listed above. In particular, it will answer the question of when and how deformation due to the India-Asia collision transmitted to the northern Tibetan plateau and the southern Tian Shan region.



Tian Shan in Chinese means Heavenly Mountains. Heavenly Lake, on the crest of high Tian Shan, here shown in early Spring with snow-capped peaks in background. Photos by An Yin.

compositional heterogeneities. This has hindered our understanding of continental evolution and thus the history of the Earth. Because it is the youngest continent on the Earth, its assemblage occurring mostly over the last 300 million years, Asia provides an unusual opportunity to study processes related to the growth of continents and the evolution of the Earth. The relatively young age of continental formation and the presence of vast desert terranes in Asia provide us with a well-preserved geological record that can help us to elucidate the history and processes of the continents and the evolution of the Earth. In addition to tracing back the long Earth's history, the Asian continent is also an ideal site for possible revision of plate tectonic theory that assumes rigid plates and predicts well the deformation of the oceanic lithosphere. Contrary to the plate tectonic theory, diffuse intraplate deformation, exemplified over a vast region of Asia by the formation of high mountain belts (e.g., the Himalayas, the Tian Shan, the Altyn Taigh Shan, etc.) and plateaux (e.g., the Tibetan and

amalgamated small continental and oceanic blocks into the present Asian continent? (3) what was the timing and evolutionary pattern of intracontinental deformation in Asia during the India-Asia collision in the past 45 million years? and (4) what is the role of continental collision in modifying the internal geologic framework of a continent produced during earlier orogenic events and the external configuration of a continent produced during continental breakup? With these questions in mind, the Structural Geology and Tectonics Group at UCLA has started a comprehensive geologic investigation of Asian geology. Together with Professors Mark Harrison and Ray Ingersoll at UCLA, Dr.



Deformed quartz veins in a 2-km thick, vertical right-lateral shear zone in the central Tian Shan region. The shear zone, striking N60°W, was discovered in the Spring of 1992 by An Yin and his Chinese colleagues at Beijing University. The age of the shear zone is Late Carboniferous-Early Permian, constrained by the Ar-Ar method performed in Professor Mark Harrison's lab by Jeff Phillipone. Its development is tentatively interpreted to have been related to partial closure of Paleo-Tethys. The picture is taken vertically downward with its upper side pointing to the east.

THE MESOZOIC CONVERGENT MARGIN OF CENTRAL CALIFORNIA ——— by Professor Ray Ingersoll

On 17-20 September 1992, 26 students, staff, faculty and friends of the Department of Earth and Space Sciences went on a field trip across central California. Professor Ray Ingersoll and seven graduate and undergraduate students led the trip; all participants received a 53-page guidebook (ESSSO Guidebook 14) containing an overview, description of stops, and roadlogs.

Northern and central California provide the best opportunity in the world to transect an ancient convergent continental margin. All components of the ancient margin are accessible on land; also they have been studied thoroughly enough that the basic timing and setting of each component are well known.



During Day 1, we began at the trench, where subduction of oceanic lithosphere resulted in the accretionary construction of the Franciscan Complex. This phase of subduction initiated during the Late Jurassic following the Nevadan orogeny, which probably

resulted from the collision of an exotic intraoceanic arc with the continental-margin arc which had existed along the California margin since the Triassic. The Franciscan trench formed in a previously backarc setting, resulting in trapping of the Coast Range ophiolite in the newly formed forearc following the Nevadan orogeny. The Great Valley forearc basin formed on top of the Coast Range ophiolite, initially at abyssal to lower bathyal depths, and eventually near sea level as the basin filled. We saw the complex relations among the Franciscan Complex, the Coast Range ophiolite and the

metamorphic belt led us into the great Cretaceous batholith, which intrudes all of the older rocks.



The Gang

Day 3 started in Yosemite Valley, which was carved into Cretaceous granitoids by Pleistocene glaciers. The Sierra Nevada batholith resulted from intrusion of intermediate magmas, whose ultimate sources originated near the top of the oceanic lithosphere, which was subducting at the Franciscan trench. At the end of the day, we saw some of the wall rocks, consisting primarily of Paleozoic metasediments and Mesozoic metavolcanics.

We continued to examine wall rocks and batholithic rocks on Day 4. Also, on the return to UCLA south along the Owens Valley, we saw many volcanic and extensional-tectonic features of the late Cenozoic Basin and Range province.

Our group enjoyed each others' company, the weather, the scenery and the geology. Each of the three nights was spent in very different surroundings (west side of the San Joaquin Valley, Yosemite Valley and eastern Sierra Nevada). The first and fourth days included many highway hours, but it was worth it!

A highlight of the trip was a rendezvous with Clem Nelson (Professor Emeritus from UC Bishop) at Knopf's Knob west of Bishop.

The guidebook is available for \$10 (checks payable to UC Regents).



Grad student Kevin Grazier hanging out in Yosemite

Great Valley Group on the afternoon of Day 1.

We started Day 2 with deep-marine conglomerates, deposited in submarine-fan channels. These conglomerates are interesting both because they present problems concerning transport and deposition of conglomerates in very deep water, and because they provide a direct record of Cretaceous volcanism in the Sierra Nevada arc, which provided most of the clasts. Following a visit to the conglomerates, we crossed the San Joaquin Valley and entered the Foothill metamorphic belt along the west side of the Sierra Nevada. These highly deformed rocks record the suturing and shearing of arcs during the Late Jurassic Nevadan orogeny. The Nevadan orogeny overprints several complex events, whose record is hidden in the Paleozoic Shoo Fly Complex, and the Paleozoic and Mesozoic Calaveras Complex. Our transect of the

Byron Berger (M.S. 1975), a geologist for USGS, is currently doing research on geology and geochemistry of epithermal Au-Ag deposits; relation of detachment faulting and mineralization in Republic graben, WA; relation of volcanology and tectonics to geothermal processes in northern Tuscarora Mts., NV; hydrothermal alteration at the Muruntau gold deposit, Uzbekistan.

Elwood B. "Woody" Bredell, Jr. (B.A. 1957) and **Marjorie K. "Kay" Bredell** (B.A., Biology, 1959), have 3 children. He is president and owner of Intercoastal Energy Corp., developing an oil field in Kimball County, Nebraska, and a gas field in Crawford County, PA.

Kevin P. Corbett (Ph.D. 1989), still working for Marathon Oil in Littleton, CO, has published on a wide range of topics, including the Austin Chalk, the Last Chance Thrust Range and Hg-S mineralization at Crater, CA.

George H. Davis (M.A. 1940) is Senior Consultant (Hydrogeology) at Woodward-Clyde Consultants in Gaithersburg, MD. He sent us this photo of the UCLA Geology Club field trip to Carrizo Plain (1946-47). Of the group, six, Hamilton, Stager, Davis, Neuerburg, Wagner and Weir all had long careers with the USGS.



Joan M. Delany (Ph.D. 1981) sends the news that she and her husband **Phillip G. Behrman** (B.S. '73) have lived in Houston for the past five years, where he was relocated when BP Exploration (formerly SOHIO) closed the San Francisco office. Joan continued working at Lawrence Livermore National Laboratory until the fall of 1990. She worked at the lab one week per month and the rest of the time did research via modem from Houston. She was in the Geochemical Modeling Group and also worked closely with a group at the National Bureau of Standards. Joan did a lot of traveling (15-20 weeks a year), but really enjoyed it. She reports that most of the Nevada nuclear waste research activities have suffered under program and management changes and are winding down.

For the last few years Joan has been a Senior Research Scientist in the Chemistry Department of Rice University. She works on her own contracts and is currently involved in a project

studying the chemistry of cement phases, funded by Westinghouse Savannah River.

Last spring she enjoyed an environmental law class at Rice, having become increasingly interested in environmental problems after living in the most polluted county in the nation. The girls are eight years old and lots of fun. Her husband is still surviving and learning in exploration.

Anthony D. DelGenio (M.S. 1975, Ph.D. 1978), Physical Scientist, NASA/GISS, works on the dynamics of slowly rotating planets and cloud feedback on greenhouse-gas-induced climate change. In the past year, he has been selected as a Team Member on the Cassini Saturn/Titan Orbiter Imaging Science Subsystem and the Tropical Rainfall Measuring Mission.

He writes that "last year I also officially advanced to old age as my first graduate student (I am also a Columbia Adjunct) received her Ph.D.; she (her name is Rang Fu) is now a post doc at UCLA (Department of Atmospheric Sciences), and we are currently trying to challenge the 'thermostat' hypothesis that convective clouds limit warming of the tropical Pacific during El Niño."

Thomas G. Drake (Ph.D. 1988) writes that "Life is pretty decent down here at Scripps beach, though the typical workweek has long hours.

"I wanted to add a note to the news about the Gigaflop award — the only reason I got the award is that **Dave Shirley**, another UCLA grad, (Ph.D. '86) in geochemistry and now a premier systems guru for Cray Research, Inc., in Albuquerque, assisted me in transforming my clunker program into a speed demon. Another UCLA grad, **Brian Dodd** (B.S. '84) in applied geophysics, who also works for Cray, received a Gigaflop award at the same conference for a program called FIG-NEWTUN (Fast Interactive Graphics and the Numerical Electronic Wind Tunnel)."

Thomas Rich Fairchild (Ph.D. 1975) is still in Sao Paulo, Brazil, with his wife Yassuko. At the University, he is known as "Professor Doutor."

David Gardner (B.S. 1971, M.S. 1973), President and Principal Hydrogeologist of Staal, Gardner & Dunne, Inc., geotechnical, hydrogeological and environmental consultants in Ventura, sends the news that the company has joined the Fugro-McClelland group, an international consulting firm with 2,300 professionals who specialize in earth and environmental sciences and engineering. The headquarters are in The Netherlands, and projects are executed by operating subsidiaries located throughout the world.

Staal, Gardner & Dunne, Inc., was founded in Ventura in 1985, grew to approximately 50 employees, and is based in the company's newly constructed headquarters office on Olivias Park Drive.

Don Hagen (B.A. 1953, M.A. 1957) is still enjoying retirement at his lakeside retreat.

Henry I. Halpern (Ph.D. 1981) joined Saudi Aramco in Dhahran as a Geochemist on March 9. While he was looking forward to relocating, he hopes the domestic oil industry recovers.

James R. Herring (B.S. 1968) stated "I have experienced much strangeness in Tick Canyon, but I was distressed to read, in Clarence Hall's article in the Fall/Winter 1991 Alumni Newsletter, the explanation of some of the strangeness. Has the altitude gotten to Clarence? Is the Newsletter embracing journalistic standards established by Kitty Kelly? Does this mean that the next issue will contain a confirmation sighting by John Christie of the Loch Ness Monster?" [Oh dear; now you've blown the surprise I had planned for the next issue - Ed.]

Jim is now the Commodity Geologist for Phosphate for the USGS. It's a neat blend of relevant commodity work involving this societally important agricultural component, and it also presents many opportunities for fascinating geochemical studies of the phosphorus and carbon cycles.



Richard H. Hopper (B.A. 1935, M.A. 1936) wrote "At Caltech, where I work as Instructor in Field Geology, my doctoral thesis was on the California desert area between the Sierra Nevada and Death Valley, inspired by trips to that area while at UCLA (under Alfred R. Whitman and Robert W. Webb). I submitted an abbreviated version of the thesis to the Geological Society of America in 1939, but it was not published, because of World War II, until 1947. A copy is enclosed.

"In 1938 I was hired by Chevron to go to the Dutch East Indies (now Indonesia), and I spent the next 23 years there - including the war. Exploring for oil in Indonesia was a lot different from doing geological work in the California desert. Sumatra and Borneo are all thick soil and jungle. One of the methods we used to get "outcrops" was to dig pits about 30 feet deep, then lower geologists into the pits on ropes. Another way of learning about the geology was to drill holes with 'hand counterflush' rigs powered entirely by human muscle; no engines of any kind. We could drill to depths of 1500 feet with these rigs, continuously coring. It took about two months to drill a hole to that depth, with three 8-hour shifts working day and night. This kind of drilling would only work, of course, in the kind of clayey shale and sandstone that is in the basins of Indonesia.

"Later, of course, the reflection seismograph came in, and that revolutionized the exploration for oil in Indonesia. Enclosed also are two of my articles on exploration in Indonesia, published in the magazine of the Caltex Petroleum Corporation

"When I was finally transferred back to the USA in 1961, it was to New York, where the

Chevron-Texaco (Caltex) headquarters for Indonesia was located. I then retired in 1979 at age 65, and by then my children (by an Australian wife I was married to in 1944) were adults and



living in the New York-Connecticut area. Thus I never returned to California. I understand the place has changed a lot in the last 54 years!

Kenneth H. Lister (B.S. 1987, M.S. 1970), Ph.D. 1974, University of Kansas, is Project Manager at SCS Engineers in Long Beach. He recently became a California Certified Engineering Geologist and gave two papers on the subjects of solid and hazardous waste disposal.

Lidia Lustig (M.S. 1971) works as an Engineering Geologist for the Los Angeles County Department of Public Works in Alhambra.

Thomas L. MacLeod (B.A. 1949) is retired from Lockheed International Programs.

Kata McCarville (B.S. 1978) is Assistant Director of the Computing Center at the Colorado School of Mines in Golden, CO, where she reports that they're concentrating on building interdependent computing systems that will make geoscientists happy and productive. Emphasis is placed on supporting interdisciplinary research and instruction. Recently, some computing facilities have even been designed for

the comfort of the people—not the machines!

As more geologists get access to networked computers, she finds many old friends and acquaintances are now reachable through electronic mail. She'd be happy to help keep a list of UCLA folk who can be reached in this way. Her Internet address is kmccarvi@mines.colorado.edu.

Kata still does play with rocks sometimes. To prove it, she's enclosed a photo of herself and her new(ish) baby girl, Kelia Taylor, on a field trip with the Denver Museum of Natural History, examining the Cretaceous-Tertiary boundary claystone in a roadcut along Interstate 25 near the Colorado-Mexico border. "At 4 months, Kelia was the youngest participant on the field trip. The more astute among you may notice that Kelia's initials are K-T!"

She knows the whereabouts of a number of other alumni. "Steve Muir (B.S. '76) is still practicing 'geowhissics' in California, and may be doing some work in the former Soviet Union. Greg Fletcher (B.S. '78), poor soul, is working in Houston, as is Bob Tucker (M.S. '80). Mark Robinson (B.S. '78) is in Midland, Texas. Frank Horowitz (B.S. '78) is down under, working for CSIRO-geomechanics. He says he tries to fit arbitrarily complicated geological structures with fractals. His boss there is another UCLA grad, Alison Ord (Ph.D. '81). Frank's married

(to yet another geologist) and has a young son. Susan Shoemaker (B.S. '81) married Bill Knaup, a fellow geologist at Mobil in Dallas. They were married in Santa Fe, New Mexico, in November 1991. In fact, they were married on my first anniversary by the same judge who married me and my husband!"



Victor F. Medina (B.S. 1987) is now a Ph.D. student in the USC Environmental Engineering program. He received his M.S. in Environmen-

tal Engineering and a Department of Education Fellowship in 1990. He writes that *Joe Nahama* (B.S. '87) received his M.S. in Petroleum Engineering from Colorado School of Mines.

Carl Mendelson (Ph.D. 1981), Associate Professor of Geology at Beloit College, writes that he and wife *Carol Mankiewicz* (M.S. '80) are currently studying the micropaleontology of the Burgess Shale, British Columbia. They were leading a field trip to Nelsonland: Owens Valley and Death Valley in late May 1992, hoping to stay a few days at the White Mountain Research Station near Bishop.

Arthur Mirsky (B.A. 1950) received his M.S. from the University of Arizona, Tucson, in 1955 and his Ph.D. from Ohio State University in 1960. He is presently Professor and Chairman of the Department of Geology at Indiana-Purdue, where he has been Chair for 24 years. He planned to step down in August 1992. He writes that *Gary Rosenberg* is one of the faculty there and that Geology has moved into a new science-engineering building with, of course, more space.

George Nibler (B.S. 1988), M.S., Stanford, 1991, is a geochemist with MK Environmental Services, Boise.

James C. "Jim" Powers (B.A. 1978) received his M.S. in Petroleum Engineering from USC in 1988 and was promoted to Major in the U.S. Army Reserve Corps of Engineers on September 14, 1990. He is currently managing information for the Vandenberg Air Force Base Installation Restoration Program through his position with Pasadena Environmental Programs of Jacobs Engineering Corporation. He wonders if domestic oil will ever revive.

Bob Presley (Ph.D. 1969), Oceanography Department, Texas A&M, is continuing to do mostly marine pollution studies for NOAA, MMS, USFWS, EPA and other sponsors.

Richard J. Proctor (M.A. 1958) recently stepped down as president of AIPG. He is working through 1992 with Barney Pipkin (USC) as co-editor of a new book, *Engineering Geology in Southern California*. It was published by Star and available at the AEG Annual Meeting in October 1992, on the Queen Mary, Long Beach. With more than 60 contributors, the tome provides information on such diverse subjects as Stringfellow acid pits, Big Rock landslides and litigation, beach erosion, seismic hazards, L.A. Metro subway construction, dams built on faults, Fairfax gas explosions, ground water, and legal aspects of consulting.

He sent us the following news release: "Richard J. Proctor has been elected as Honorary Member of the American Institute of Professional Geologists. Mr. Proctor is a consultant in engineering geology, practicing in landslides and earthquake hazards, tunnels and dams, and expert testimony in court. He was a member of the Board of Geotechnical Consultants for the Los Angeles Metro Rail subway and the Los Angeles City sewer tunnel that was recently completed beneath Los Angeles Inter-

national Airport. Mr. Proctor was formerly Head of the Geology Branch of the Metropolitan Water District of Southern California, and was a Visiting Associate Professor of Geology at Caltech. He has an office in Pasadena with the consulting firm of Wagner-Hohns-Inglis, Inc. Mr. Proctor will be only the tenth person to be so honored by the Institute. He will receive his award in a formal presentation at Lake Tahoe in September [1992]."

Michael Rabinowitz (Ph.D. 1974) spent four wonderful years as Visiting Associate Professor at National Taiwan University (Public Health) with his wife Diane (a Cal graduate) and son Noah. He is now looking at the fate of lead in soil.

Michael enclosed a reprint of an interesting article he co-wrote, "Children's Classroom Behavior and Lead in Taiwan."

Ralph G. Rockwell (B.A. 1951) retired in 1988 as a geologist with International Well-Logging Honor Rancho Field, Senior Engineer, Rockwell International. He received a patent from Rockwell in 1963 -- helped put the Apollo on the moon. He sent us the following story about his friend **Bill McLachlan**.

"Bill was a marvelous student at UCLA. His grade-point average was exemplary. Bill was a Lieutenant in the U.S. Marine Corps during World War II. He earned the Silver Star for bravery as a dive bomber pilot.

"When the geology class of 1951 was about to embark on our six-week final field course at Mount Hope mine in Eureka, NV, Bill was recalled to active duty in the Marines as a pilot covering low-level flying in support of the Marines at the Chosan Reservoir in North Korea. One day a whole company of Marines were surrounded by North Korean and Chinese regular troops.

"Bill directed his attack at the enemy, and although taking tremendous ground fire, he managed to protect the company of American troops until they were able to get out in a retrograde movement. (US Marines never say retreat!) Bill McLachlan was awarded his second Silver Star for gallantry in action.

"I wish with all my heart that this story could have had a happy ending, but when Bill was pulled out of action and stationed in Hawaii on a very routine training mission, his plane had a flameout and crashed into the ocean. He did not survive.

"Bill was awarded a degree in Geology prior to his return to active duty during the Korean War, and I wish to thank the professors for granting my buddy a career never begun."

Rockie also sends his special thanks to Dr. D.I. Axelrod for allowing him to achieve all the goals of his life and for being a marvelous teacher and motivator.

Richard C. Slade (B.A. 1966) is Principal Hydrogeologist with Richard C. Slade and Associates Consulting Groundwater Geologists. They decided to buy a building to have a permanent home, and moved in December 1991 into one of the suites in the new location. They have 4 professional hydrogeologists and maintain a small branch office in St. Helena, Napa Valley.

Jay L. Smith (B.A. 1959), since 1978 has been President of J. L. Smith Company, Inc., consultants in engineering geology and associated disciplines. His recent involvements include review of the U.S. Dept. of Energy site characterization studies of Yucca Mountain, NV; forensic investigations of subsidence, landsliding, flooding, erosion, sinkhole collapse, and miscellaneous construction-defect cases. His most recent publications are "A case history of successful nuclear power plant licensing," coauthored with E. Van Brunt, Jr., and "Needed geologic rulemarking for high-level waste repositories."

He sends news that one daughter received her B.S. in geology last year, and another produced grandchild no. 1.

Mark J. Sutherland (M.S. 1990), Assistant Professor, Instructional Alternatives, College of Dupage, Glen Ellyn, IL, is currently teaching earth science and geology video courses and field studies courses that have taken him to Cincinnati, Ohio, Southeastern Missouri, the Chicago Lakeshore, and the San Juan Mountains of Colorado.

His wife Laurie is teaching English at the College of Dupage, and two-year-old Greg is doing *everything* he possibly can!



"Walking like Egyptians!" Steve Nelson, Mike Campbell, Mark Sutherland and Rob West in the Poleta Folds, 1987.

James Robert Townsend (B.A. 1933, M.A. 1940). Mrs. Townsend writes, "After an extended illness, he passed away in late 1990. At UCLA he was active in the Geology Department. For over thirty years, he worked on projects for Flood Control, Dam Sites and Harbors in Arizona, Nevada and California." (see p. 8)

Eugene B. Waggoner (B.A. 1937, M.A. 1939), one of the world's leading experts in engineering geology, died on November 30, 1991, as reported by his friend Ronald E. Smith, Vice President of Woodward-Clyde Consultants. (see p. 7)

Scott D. Warner (B.S. 1983), after a short stint working in Great Britain in 1991, is now with Geomatrix Consultants in San Francisco as a Hydrogeologist. Most of his work is in con-

taminant hydrology and hydrogeologic characterization. For fun, he rows with "Don Row and the Rowmantics," a whale boat rowing team on S.F. Bay.

Scott received his M.S. in Geology from Indiana University in 1986. He had previously worked for Golder Associates in Seattle.

David A. Weintraub (M.S. 1982, Ph.D. 1989) is Assistant Professor in the Department of Physics and Astronomy at Vanderbilt University. His interest in the origin of our solar system has expanded to broader questions concerning the potential existence of other solar systems in our galaxy. Much of his observational work is in the infrared and focuses on evidence for disks surrounding young stars containing "dust grains" - particles rich in silicon carbon and other metals which are the progenitors of Earth-like planets.

James R. Zimelman (M.S. 1978) has since 1988 been a Planetary Geologist in the Center for Earth and Planetary Studies at the National Air and Space Museum of the Smithsonian Institution. He received his B.A. in Physics and Mathematics, Northwest Nazarene College, 1976, and his Ph.D. in Geology at Arizona State University in 1984. He is currently involved in

geologic mapping of Mars and sand transport in the Mojave Desert.

Joseph Ziony (Ph.D. 1966) Wrote to Gerhard and Irmgard Oertel last December that he and his wife had achieved a long-time goal to live in San Francisco. On October 15, 1991, after helping select his replacement, Joe resigned from his position with the California Department of Conservation in Sacramento. He and Denise plan to catch up with long-deferred family interests and do some travelling.

They leased a rather compact townhouse in a condominium development, Opera Plaza, located at the Civic Center. They are enjoying sampling the various restaurants, shops, theaters, the symphony, and even the opera that are at their doorsteps. This year will be an experiment to decide whether to settle permanently in the city. So far both of them are thoroughly excited by the experience.

For those of you who still have last year's *Newsletter*, the cover photo has an error in the caption. The person identified as Harry Allen is actually Sam Stewart; Harry Allen is between Jim O'Flynn and Colver Briggs.

For those of you who still have last year's *Newsletter*, the cover photo has an error in the caption. The person identified as Harry Allen is actually Sam Stewart; Harry Allen is between Jim O'Flynn and Colver Briggs.