

Department of Earth and Space Sciences – 1977-78 Newsletter



THE COVER

"Everyone must know the feeling of triumph and pride which a grand view...communicates to the mind. In these little frequented (regions) there is also joined to it some vanity, that you are...the first man who ever...admired this view."

— Charles Darwin, 1845

Professor Tom Ronan (left) and cohorts under the twelve-foot-thick Ross Ice Shelf, Antarctica. Companion John Oliver (center) from Scripps Institute of Oceanography dropped his regulator to smile for the camera in the icy water (very painful, Tom adds).

ACKNOWLEDGEMENTS

The editors of this year's Newsletter are once again Professor Susan Werner Kieffer and Vicki Doyle-Jones, Scientific Illustrator. This will be Sue's last effort as Newsletter Editor, however, because she and her husband, Hugh, are leaving for a two-year research leave at the U.S. Geological Survey in Flagstaff, Arizona. Vicki, Professor K. D. Watson, and some anonymous friends will be digging up news for the next year or two. Vicki, Rosie Jergovic, Gail Marshall, and Spring Verity all had a hand in the typing. Illustrations on Pages 26 and 49 are copies from Geol. Soc. America Professional Paper 220, Geology and Geography of the Zion Park Region, Utah, and Arizona, by Herbert E. Gregory. The drawing of the Adele Penguins on Page 6 is a copy from a photograph Tom Ronan took of visitors at his Antarctic campsites. The irate seal (Page 15) was another camp visitor who was protesting Tom's invasion of "his" (the seal's) dive hole in the slush ice (the hole was actually made by Tom and his research team, but the seal soon claimed it as seal territory. Weddell seals are the only seal known to defend underwater territories based on dive holes, centers for feeding, breeding, and socializing. Tom feels that the researchers opened up new "niches" with each hole they blasted in the ice. Adding to the general difficulties of life at the Pole, the seals found that the huts where the team worked were warm, friendly places, ideal for trysting with lady seals. The men spent a good deal of time chasing amorous seals out of their (the researchers') territory.). Steve Lipshie provided the photograph for the drawing of one of the Inyo Craters on Page 11; and Julie Guenther, Scientific Illustrator, relocated the "lost" faculty in her cartoon on Page 26.

Once again we are indebted to Chevron Oil Field Research Corporation, La Habra, California, for their support and efforts reproducing our Newsletters. Without them there would not have been a Newsletter for the past eleven years.



DEPARTMENT OF EARTH AND SPACE SCIENCES
3806 GEOLOGY BUILDING
LOS ANGELES, CALIFORNIA 90024

(Formerly Department of Geology and Department
of Geophysics and Space Physics)

4 May 1978

Dear Alumni:

During the past year the Department of Earth and Space Sciences has started a number of programs related to the merger of the Department of Geology, Department of Geophysics and Space Physics, and the Program in Geochemistry that was formalized on January 1, 1977. Besides the Careers Day Program and an Earth and Space Sciences Conference during the year—programs that emphasized traditional interdisciplinary approaches and the future of the science—the following courses were offered or finalized: (1) a course in organic geochemistry taught by Professors Kaplan, Reed, and Schopf; (2) a course related to the tectonic evolution of California; (3) a course in palynology (D. Oltz); (4) a course in geophysical exploration taught by one of our space scientists, Professor McPherron; (5) a new course in remote sensing taught by a planetary scientist, Professor Hugh Kieffer; (6) a course on coal by Professor Orson Anderson; and (7) a course called "Evolution: Solar System, Earth and Life."

We have tried to bring students and faculty together in various ways, one of which was to provide a pleasant gathering place called the Common Room. This room is now furnished, decorated, and equipped with maps and a globe for ready use during discussions of such topics as plate tectonics. Some of you helped provide funds to furnish this room, and your help is greatly appreciated.

We have given the undergraduate students the option of taking a field course in geophysical exploration in lieu of the third quarter of geological field work prior to summer field. It is hoped that more of our students will take advantage of this option in the future. However, it seems that even geology students are hidebound traditionalists, and most of the undergraduates have opted to take three quarters of the geological field class rather than the geophysics option. As you recall from one of my earlier letters, all geology majors are now required to take a lecture course in geophysical exploration. Clearly, this important tool must be utilized more in the future by geologists; and we will continue to encourage our students to have at least a taste of the geophysics menu the Department offers.

Rather than my usual appeal to you for funds to finance various and sundry student programs, I will simply thank many of you for your support during the last four years. We are particularly indebted to Shell Oil for its long-term support, as well as to Chevron Oil Field Research, Cities Service, Exxon, Getty Oil, Standard Oil and Texaco. These companies have provided the Department with various types of aid that have helped us attract and support outstanding undergraduate and graduate students. The Department has exceptional programs in the fields of organic and inorganic geochemistry, plate tectonics and structural geology, field geology, planetary sciences and space sciences, paleobiology, and mineral resources, but these programs would be

blunted without excellent students. Thus, funds from industry, interviews and job offers from industry, and alumni support help make UCLA one of the top-ranked departments in the world.

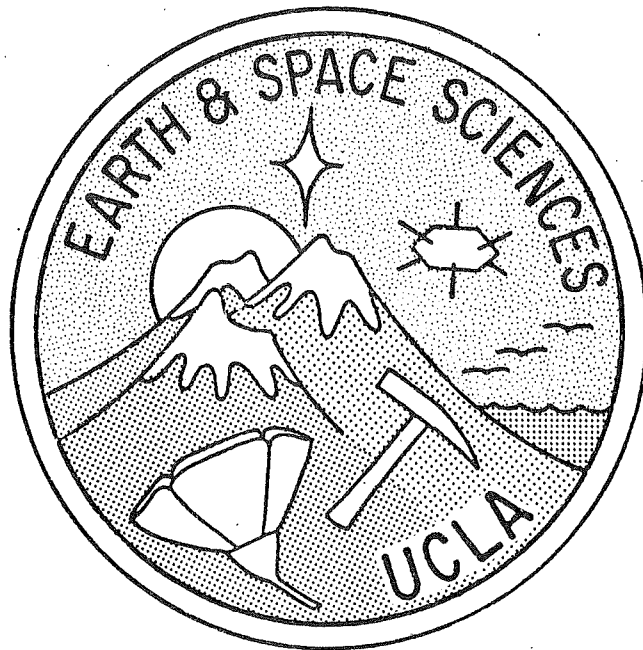
This will be my last letter to you, as a new Chairman will soon be named. Many of you have provided me with advice and encouragement during the last four years, and I thank you for it. I have not been able to meet as many of you as I would have liked, but I hope that I have been able to tell at least a few of you of the growth of your Department and its hopes for the future. If you were here at UCLA now, I think that many of you would be surprised at how good our students are, how dedicated and professional both undergraduates and graduates are, how diversified the Department is, how accutely aware the faculty is regarding the training of students for present and future employment opportunities, and what an illustrious faculty we have. In short, if you were here, I think that you would be very proud of your alma mater and the people who make it great—namely, the students, faculty and a fine supporting nonacademic staff.

Sincerely,

Clarence A. Hall Jr.

Clarence A. Hall Jr., Chairman

CAH:vbj



1977 - 1978



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Exxon USA Foundation

(unrestricted, to UCLA Foundation, Geology)

Shell Oil

(unrestricted, used for fellowships and general student support)

Chevron Oil Field Research Company

(newsletter publication; loan of geophysical equipment)

Standard Oil

(scholarship in petroleum geology)

Getty Oil

(unrestricted funds and two undergraduate scholarships)

NAGT-Cities Service

(1977 and 1978 summer field scholarships)

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(unrestricted, used for graduate student field expenses)

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THE YEAR IN REVIEW



The year at UCLA began with our campus receiving more applications than could be accommodated. Approximately 1,110 applicants among Letters and Science and Engineering freshmen were notified that they could not be considered for admission to UCLA for the fall quarter. The 1977 fall enrollment was reduced somewhat, to 31,618 students, to compensate for excess enrollments in prior years. The year ended with conferrment of 7,611 degrees at commencement on June 18. Chancellor Young presided at the ceremonies conferring 4,389 Bachelor's, 1,883 Master's, and 1,339 other advanced degrees.

A UC task force has made recommendation for changes in undergraduate admissions standards and practices. Pending approval by the Academic Senate and the Regents, the major changes will be: (1) a fourth year of high school English should be required with one full year of English composition taken during the junior or senior year. The change was recommended largely in an effort to improve basic skills of entering students; (2) high schools should be required to certify that the applicant is able to read at or above the twelfth grade level (no such certification is now required); (3) applicants should be required to present the University with their scores on English and math achievement tests given by the College Entrance Examination Board (CEEB). The scores would be used for diagnostic purposes, counseling and course placement, but not to establish eligibility for admission. The task force recommended that the GPA's with a strengthened course pattern constitute the major admissions requirement for freshmen; and (4) the minimum required high school GPA in courses registered for admission will continue to be 3.0.

On campus, as well as around the country, energy, environmental pollution, and consumer protection continue to be major national issues for most students. According to the twelfth annual survey of entering freshmen conducted by UCLA and the American Council on Education in Washington, energy conservation has replaced the environment as the principal issue. The freshmen polled feel that the government should be doing more to discourage energy consumption, control pollution, and to protect consumers from faulty goods and services. (Editor's note: this was written as I watched the election returns on Proposition 13, our California tea party issue, subject of lots of lively departmental lunch, liquidus, and field trip conversation.)

Closer to home, our view of the South Campus will change with construction of the \$22 million Health Sciences Building, to be named for philanthropist Louis Factor. The 17-story structure, located in the Center for the Health Sciences complex, will house the UCLA Cancer Center, the School of Nursing, and various research facilities. Mrs. Factor made a substantial memorial contribution toward the building, for which

Louis Factor had planned a major gift before his death in 1975. Other substantial gifts were given by Mr. and Mrs. Kenneth Jonsson, Mr. and Mrs. J. E. Jonsson, and the Jonsson Foundation toward the Jonsson Cancer Center portion of the building, and by Dr. Armand Hammer and the Occidental Petroleum Corporation Foundation, Atlantic Richfield, Getty Oil and Union Oil. UCLA was designated as a comprehensive cancer center by the National Cancer Institute, the nineteenth such center in the nation to be recognized as a regional resource center for cancer treatment, prevention, education, and research.

On a lighter note, within the Department, running is competing with handball as the social recreation, and a few of our track-freaks know not only of UCLA's famous basketball and football teams, but also of some of our male and female track stars. If any of you return to UCLA, try our new exercise parcourse (modeled after European fitness courses), which has 18 exercise stations over the 1.8 mile cross country course.

A few of our ESS'ers applied for the mission specialist astronaut positions that were offered by NASA for space shuttle; and, while none made the new crews, there were varying degrees of success and encouragement from NASA for future applications. One UCLA alumna, Dr. Anna L. Fisher, who earned both her bachelor's and medical degrees here, was named as one of the six women to take part in the space shuttle flights scheduled for the 1980's.

We would like to mention a program not formally part of the ESS Department, but of interest to many--the Environmental Science and Engineering Program, which offers a Doctor of Environmental Science Degree in the interdisciplinary field of environmental studies. Students in the program take a Master's Degree in one of several related departments (e.g., Geology, Chemistry) and then apprentice for thesis work in the real world of applied programs. Recently a project proposed by the faculty and graduate students of this program was given a \$37,500 grant from the Ford Foundation to study California's wild and scenic rivers. The UCLA study will be joined by six agencies; it was one of nineteen projects selected from among two hundred proposals aimed at encouraging universities to work with state governments on improving management of the environment. The study will be conducted on California's north coast in an area that includes the last of California's free-flowing rivers, among them the Smith, Klamath, Trinity, Van Huzen, Mad, and Eel rivers. These waters are currently protected from development or diversion by the California Wild and Scenic Rivers Act of 1972, but with the continuous growth of Southern California and the specter of future droughts like the one of 1977, questions are being raised about the most beneficial use of the rivers in years to come. The head of the project is Professor Richard L. Perrine, Chairman of ESE; he will be aided by eight to ten students working on their degrees as "Environmental Doctor."

Turning from the wild rivers of the present to the wild fossils of the distant past, we are proud to report that Professor J. William Schopf received the Alan T. Waterman Award--the National Science Foundation award created to observe the Foundation's 25th anniversary and to recognize an outstanding younger scientist in the U.S. through the presentation of the Waterman Medal and a research grant of \$50,000 per year for a period of three years. Bill was the second recipient of the award. He was cited for his studies on the earliest known forms of plant and animal life, studies that push the date for the origin of life on earth back to some three billion years ago. Bill was

honored at a formal dinner held at the State Department on May 19 and immediately after the award ceremony flew back to UCLA for another ceremony in which he and four other faculty members were honored with 1977 Distinguished Teaching Awards. When last heard from, he was in deepest China checking out the time of the origin of life there....

Dr. Helen T. Loeblich, Professor of Paleontology and Geology, was awarded life honorary membership by the Society of Economic Paleontologists and Mineralogists "in recognition of leadership in micropaleontology, service to the Society, to government, and to university education, as a professional scientist and teacher, at the forefront of new concepts in paleobiology."

Dr. Margaret G. Kivelson, Professor in Residence, has been appointed as one of three U. C. faculty members to the Committee on Basic Energy Sciences of President Carter's Scientific Advisory Section of the Office of Science and Technology Policy. This committee is charged with the task of defining policies and strategies for allocation of research and development expenditures dealing with energy and resources.

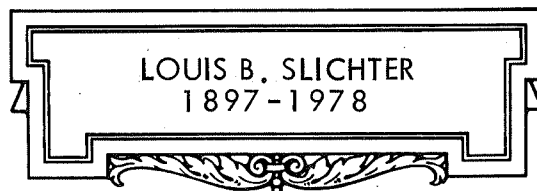
Professor William M. Kaula was one of seven UCLA scholars who won a 1978 Guggenheim Fellowship, a grant which he will use to do research on dynamical aspects of the origin of the solar system.

Professor Hugh H. Kieffer received the NASA Medal for Exceptional Scientific Achievement "in recognition of his exceptional scientific contributions and outstanding leadership, while directing the Martian Infrared Thermal Mapping investigations for Project Viking." He also shared, with other Viking scientists, the American Association for the Advancement of Science (AAAS) Cleveland-Newcomb award for outstanding papers in the journal Science, reporting on the results of the Viking mission. The award (\$5,000) was used to fund proposed research projects submitted by high school students.

Dr. Chris T. Russell, Associate Research Geophysicist in the Institute of Geophysics and Planetary Physics, received the Macelwane Award of the American Geophysical Union in recognition of his research in magnetospheric physics. He joins UCLA colleague Gerry Schubert, who received this award in 1975.

Finally, we close by noting the UCLA has left its mark on all corners of the globe. Five new place names have been added to the map of Antarctica honoring the veterans of the Antarctic program begun in 1968 by Professor Louis B. Slichter. The features are: Mount Hager (after Clarence L. Hager), Syrstad Rock (after Eric Syrstad), Jackson Glacier (after Bernard Jackson), Zurn Peak (after Walter Zurn), and Vane Glacier (after Gregg Vane). All the features are located on or near the southwest coast of Antarctica in Marie Byrd Land, except for Mount Hager, which is on the south coast of Victoria Land. A sixth feature, Kieffer Knoll, was named after Professor Hugh Kieffer in 1968 after he went to the Antarctic twice as a graduate student, once to explore Roosevelt Island and once to obtain snow and ice for studies of lead transport in the southern hemisphere. Let us know if there are other UCLA Antarctic veterans out there.





Professor Louis B. Slichter, a widely honored pioneer in the earth sciences died on Saturday evening, March 25, at the UCLA Medical Center at the age of 81. Memorial services were held at UCLA on Tuesday, April 4, 1978.

Born in Madison, Wisconsin, and educated at the University of Wisconsin, where his father served as Dean of the Graduate School, Dr. Slichter's 47-year-long academic career spanned teaching and research at Caltech, Massachusetts Institute of Technology, the University of Wisconsin, and UCLA.

He joined UCLA in 1947 as Director of the newly established Institute of Geophysics, which, under his leadership until 1962, became a leading center for studies ranging from the core of the earth to outer space. In 1966, the building housing the Institute was dedicated as Slichter Hall in his honor. As Professor Emeritus from 1965 on, he continued his research and guidance of students until the time of his death.

During both World Wars I and II, he served in the antisubmarine warfare branch of the U.S. Navy. In the 1920's, he was a partner in a geological consulting firm, during which time he developed important new techniques in magnetic and electrical prospecting for minerals.

During his long academic career, Dr. Slichter was an innovative researcher whose studies in seismology, gravity, earth tides and the crust, and heat flow and free oscillations of the earth clarified the history, structure, and evolution of our planet.

Among many other honors, Dr. Slichter was elected to the National Academy of Sciences in 1944 and received the Jackling Award of the American Institute of Mining Engineers, the William Bowie Medal of the American Geophysical Union, and honorary doctorate degrees from the University of Wisconsin and UCLA.

He is survived by his wife, Martha, of Pacific Palisades, two daughters, Mrs. Mary Lou Whaling of Pasadena and Susan Slichter of Los Angeles, two grandchildren, and a brother, Donald C. Slichter of Milwaukee.



THE RUBEY COLLOQUIUM 1978

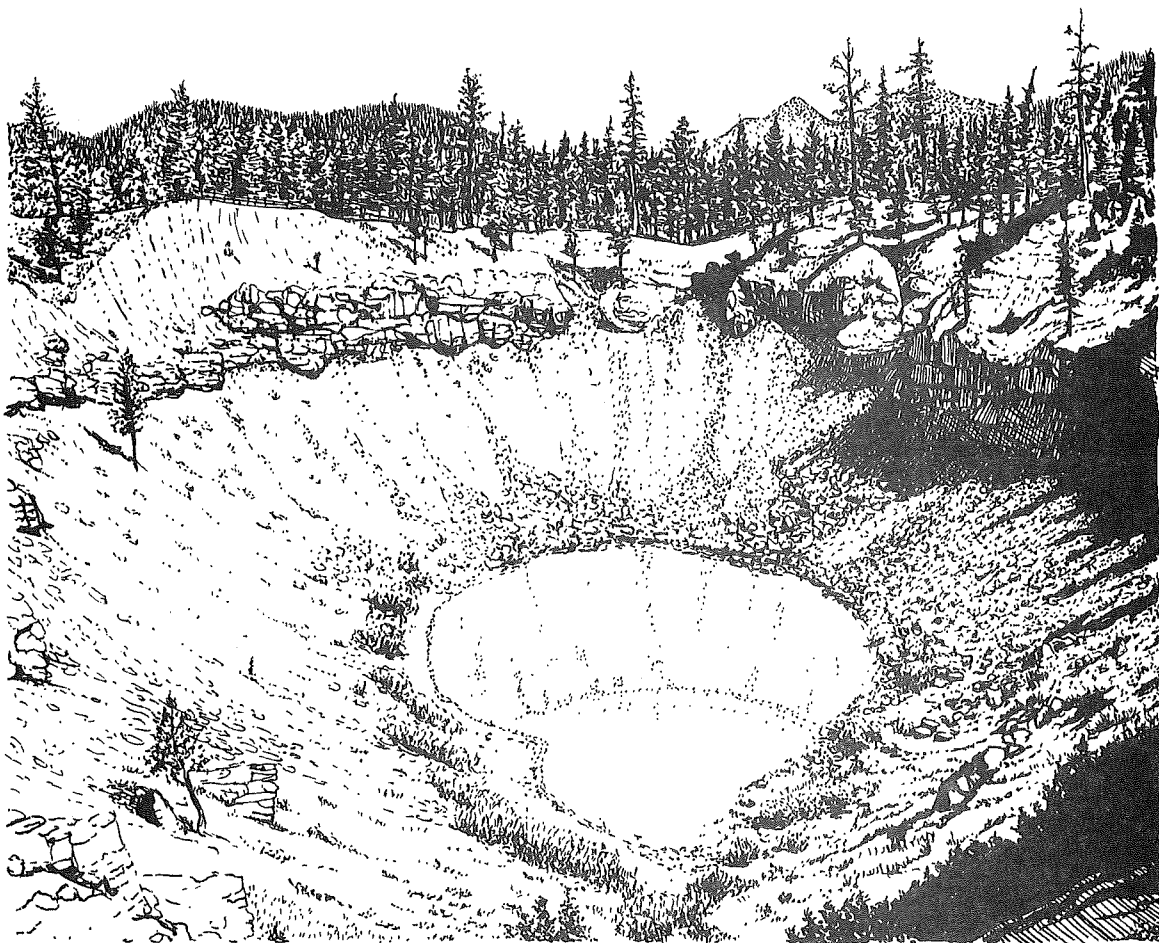
The Rubey Colloquium this year had as its theme "The Geotectonic Development of California." Invited speakers spent one to three days on campus and lectured about the geology and history of various provinces of the State and adjacent areas--placing all in a plate tectonic framework. The speakers and subjects were as follows:

Mon.	Jan. 9	Organizational meeting -- C. A. Hall
Tue.	10	Plate tectonic principles and the continental margin of California--
Wed.	11	W. R. Dickinson
Mon.	16	Klamath Mountains -- W. P. Irwin
Tue.	17	
Wed.	18	Klamath - Northern Sierra Development -- G. A. Davis
Mon.	23	Constraints on models; production of Sierran magmas --P. C. Bateman
Tue.	24	
Wed.	25	Central + southern Sierra Nevada -- Jason Saleeby and R. A.
Thu.	26	Schweikert
Mon.	30	Discussion -- W. G. Ernst
Wed.	Feb. 1	San Gabriels -- P. L. Ehlig
Thu.	2	
Mon.	6	Peninsular Ranges -- Gordon Gastil
Tue.	7	
Wed.	8	Peninsular Ranges ± San Gabriels -- L. T. Silver
Thu.	9	Discussion -- W. G. Ernst
Mon.	13	Mojave Desert and environs -- B. C. Burchfiel
Tue.	14	
Wed.	15	Basin and Range -- C. A. Nelson
Tue.	21	Great Valley -- D. L. Jones
Wed.	22	
Thu.	23	Northern Coast Ranges -- M. C. Blake
Mon.	27	Southern Coast Ranges -- B. M. Page
Tue.	28	
Wed.	Mar. 1	Coast Range Rift Basins -- C. A. Hall
Thu.	2	Discussion -- W. G. Ernst
Mon.	6	The Transverse Ranges and Tertiary San Andreas -- J. C. Crowell
Thu.	9	The modern San Andreas Fault -- C. R. Allen
Mon.	13	California Borderland -- D. H. Howell and Jack Vedder
Tue.	14	
Wed.	15	Summary -- W. G. Ernst

Students and faculty were very enthusiastic about this course. (Incidentally, we had 30 UCLA students officially enrolled and 8 from Cal. State Northridge, two from Southern Cal., and one from Cal. State Los Angeles, plus assorted staff, auditing

students, postdocs, and, Gary Ernst adds, "religiously, Mase Hill.") After 90-minute lectures, a one-hour beer bust was held in the Commons Room, followed by dinner and spirited discussions. Gary says, "We had a ball."

The participants are now contributing chapters to a book, the Rubey Volume, that Gary hopes will become a standard reference to the plate tectonic development of California and a well-studied example of an evolving continental margin. "All in all," Gary writes, "I believe that the Colloquium was an unqualified success as a multi-faceted educational experience."



CALENDAR OF SEMINARS FOR 1977-1978
DEPARTMENT OF EARTH AND SPACE SCIENCES

- DR. DAVID J. STEVENSON, Australian National University, Canberra, Australia, "The Structure and Evolution of the Major Planets," September 26, 1977.
- DR. PETER BUSECK, Arizona State University, Tempe, Arizona, "Minerals at 20,000,000 Magnification: Some Problems and Some Opportunities," October 11, 1977.
- PROFESSOR RENÉ VAN DER BORGHT, Monash University, Australia, "Finite Amplitude Convection in a Compressible Medium, October 18, 1977.
- DR. RAY BROWN, Exxon Research, Houston, Texas, "Seismic Imaging: Theory and Application," October 19, 1977.
- DR. GORDON CRAIG, Atlantic Richfield Oil, Los Angeles, California, "Oil in Alaska," October 25, 1977.
- DR. JEAN-BERNARD MINSTER, California Institute of Technology, Pasadena, California, "Present-day Plate Motions," November 1, 1977.
- DR. LEON KNOPOFF, Institute of Geophysics and Planetary Physics, UCLA, Los Angeles, California, "Why Everyone Else is Wrong About Equations of State for the Earth Interior and Grüneisen's Ratio," November 8, 1977.
- DRS. HOWARD WILSHIRE AND JOHN NAKATA, U.S. Geological Survey, Menlo Park, California, "Environmental Effects of Off-road Vehicles in the Desert," November 14, 1977.
- DR. ANDREW CHENG, Bell Labs, Murray Hill, New Jersey, "Hydrodynamics of Spherical Gravitational Collapse," November 21, 1977.
- PROFESSOR JIM HAWKINS, Scripps Oceanographic Institute, UCSD, San Diego, California, "The Geologic Evolution of the Yap Trench-Arc," November 22, 1977.
- DR. BRUCE GOLDSTEIN, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, "Determining the Interior Electrical Conductivity of the Moon, Mars, and Venus: 1) Lunar Results and Plasmas Effects, and 2) Ionospheric Current Systems at Mars and Venus," November 29, 1977.
- DR. PETER E. MALIN, Princeton University, Princeton, New Jersey, "Measurement of Small Seismic Velocity 20 km West of Palmdale, California," December 1, 1977.
- DR. JOHN E. WARME, Maurice Ewing Professor of Oceanography, Rice University, Houston, Texas, "The Care and Feeding of Turbidites for Fun and Profit, as Illustrated by the Sediment Transport System of the Eocene San Diego Embayment," December 6, 1977.
- DR. PETER H. MOLNAR, Assistant Professor of Geophysics, Department of Earth and Planetary Sciences, M.I.T., Cambridge, Massachusetts, "Cenozoic Tectonics of Asia," December 20, 1977.

CALENDAR OF SEMINARS FOR 1977-1978
DEPARTMENT OF EARTH AND SPACE SCIENCES
(continued)

DR. LAWRENCE J. BURDICK, Research Fellow, California Institute of Technology, Pasadena, California, "Modeling Upper Mantle Structure with Long Period Wave Forms," January 12, 1978.

DR. M. NAFI TOKSÖZ, Professor of Geophysics, M.I.T., Cambridge, Massachusetts, "Mars: Internal Structure and Evolution," January 17, 1978.

DR. GERALD M. MAVKO, Postdoctoral Scholar, Department of Geology, Stanford University, Stanford, California, "The Effect of Non-elliptical Cracks on the Mechanical Properties of Rocks," January 19, 1978.

DR. HAROLD H. DEMAREST, JR., Research Associate, Department of Geophysical Science & Materials Research Laboratory, University of Chicago, Chicago, Illinois, "High Pressure Properties of Minerals: Theory and Experiment," January 26, 1978.

DR. GORDON E. BROWN, Associate Professor of Geology, Department of Geology, Stanford University, Stanford, California, "Structure and Properties of Silicate Glasses and Melts," January 31, 1978.

DR. KAREN C. McNALLY, Research Fellow, Seismological Laboratory, California Institute of Technology, Pasadena, California, "Earthquake Patterns in Southern California," February 2, 1978.

DR. F.K. NORTH, Professor of Geology, Department of Geology, Carleton University, Ottawa, Ontario, Canada, "Episodes of Oil and Gas Generation: A Contrast," February 7, 1978.

DR. M.S.T. BUKOWINSKI, Assistant Research Geophysicist, Institute of Geophysics and Planetary Physics, UCLA, Los Angeles, California, "Nuclei, Electrons, and Planetary Interiors," February 9, 1978.

DR. CHRISTINE A. POWELL, Research Fellow, Seismological Laboratory, California Institute of Technology, Pasadena, California, "Lower Mantle Structure Determined by Large Seismic Arrays," February 14, 1978.

DR. JOHN M. WILCOX, Researcher, Institute for Plasma Research, Stanford University, Stanford, California, "Influence of the Changing Sun on Weather and Climate," February 16, 1978.

DR. HEINZ A. LOWENSTAM, Professor of Geology, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California, "Calcium Regulation and the Appearance of Ca⁺⁺ Bearing Skeletons in the Fossil Record," February 21, 1978.

MR. EMILE A. OKAL, Seismological Laboratory, California Institute of Technology, Pasadena, California, "Normal Mode Synthetics as a Tool for Source and Structure Problems," February 23, 1978.

DR. WILLIAM K. HARTMANN, Professor of Space Science, Planetary Science Institute, Tucson, Arizona, "Experiments and Theory on Planetary Origins," February 28, 1978.

CALENDAR OF SEMINARS FOR 1977-1978
DEPARTMENT OF EARTH AND SPACE SCIENCES
(continued)

- DR. ARTHUR G. SYLVESTER, Associate Professor, Department of Geological Sciences, University of California, Santa Barbara, California, "Geodetic Measurements of Tilt and Strain in the Palmdale Uplift," March 7, 1978.
- DR. THOMAS L. HENYHEY, Associate Professor, Department of Geological Sciences University of Southern California, Los Angeles, California, "Heat Flow and Cenozoic Tectonics in Southwestern U.S.," March 14, 1978.
- MR. RUSSELL POTTER, Graduate Student, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California, "Mineralogy of Desert Varnish," March 21, 1978.
- DR. A.E. RINGWOOD, Director, Research School of Earth Sciences, Australian National University, Canberra, Australia, "Siderophile Elements and the Origin of the Moon," April 4, 1978.
- DR. F.W. TAYLOR, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, "Some Aspects of the Structure, Chemistry and Meteorology of the Atmosphere of Jupiter," April 11, 1978.
- DR. J.P. MacDOUGALL, Scripps Institution of Oceanography, University of California, San Diego, California, "Carbonaceous Chondrites: Aspects of their Early History," April 25, 1978.
- DR. STANTON J. PEALE, University of California, Santa Barbara, California, "Did Bruno Kick the Moon?" May 2, 1978.
- DR. ALEXANDER McBIRNEY, Visiting Professor, California Institute of Technology, Pasadena, California, "Crystallization and Layering of the Skaergaard Intrusion," May 10, 1978.
- DR. CARL E. McILWAIN, University of California, San Diego, California, "Ionospheric Ions in the Earth's Magnetosphere," May 11, 1978.
- DR. ROBERT W. DECKER, University of Hawaii at Manoa, "Rifting and Volcanism in Iceland," May 16, 1978.
- PROFESSOR BRIAN WINDLEY, University of Leicester, England, "Crustal Development in the Archean," May 18, 1978.
- DR. M.N.A. PETERSON, Scripps Institute of Oceanography, University of California, San Diego, California, "Deep Sea Drilling - First and Second Decades," May 23, 1978.
- DR. WILLIS P. POPENOE, Professor Emeritus, University of California, Los Angeles, California, "Blindmen and Black Cats...Paleontological Dilemmas," May 25, 1978.

CALENDAR OF SEMINARS FOR 1977-1978
DEPARTMENT OF EARTH AND SPACE SCIENCES
(continued)

DR. M. KASTNER, Scripps Institute of Oceanography, University of California, San Diego, California, "Origin of Oceanic Cherts," May 30, 1978.

DR. CLIFFORD A. HOPSON, University of California, Santa Barbara, California, "Semail Ophiolite and Interpretation of Magma Chambers Beneath Spreading Ocean Ridges," June 6, 1978.



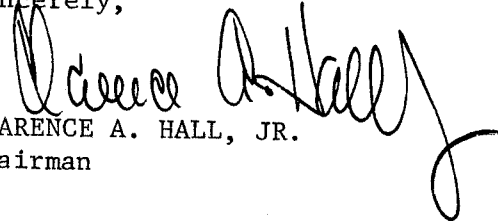
May 17, 1978

Dear Alumni:

During a three-day conference in April of 1978, UCLA held the "UCLA Conference on Earth and Space Sciences" to mark the formation of our new department composed of the former Departments of Geology, Geophysics and Space Physics, and the Program in Geochemistry. The object of the conference was to review the current state of the earth and space sciences, to discuss their evolution, and to consider how earth and space scientists can help make this a better Earth. The sessions and those speaking were: Planetary and Space Sciences (J.R. Arnold, Bruce Murray, G.W. Wetherill, W.I. Axford and A.P. Ingersoll); Earthquakes and Geologic Hazards (J.C. Crowell, C.B. Raleigh, K.V. Steinbrugge and F.B. Leighton); Mineral and Energy Resources (B.J. Skinner, J.W. Gabelman and I.R. Kaplan); and Earth Sciences (P.J. Wyllie, D.L. Turcotte, K.O. Emery and R.T. Bakker). The dinner speaker was Preston E. Cloud, Jr.

Those attending the dinner and hearing Dr. Cloud's address urged me to ask Professor Cloud if he might allow his comments to be published, so that a wider audience could benefit from his scholarly discourse. We feel that what Dr. Cloud had to say is applicable to studies of science in general and not just to earth and space sciences at UCLA or elsewhere. We would like to share with you Dr. Cloud's thoughtful comments and views relative to the future of the earth sciences, and the importance of a progressive science that provides hope for the future of mankind.

Sincerely,



CLARENCE A. HALL, JR.
Chairman

CAH:gm

cc: Dr. P.E. Cloud, Jr.

Eppur se muove¹

(Some Challenges for the Teaching and Practice of the
Earth and Space Sciences)

by

Preston Cloud
U. S. Geological Survey and
Department of Geological Sciences
University of California
Santa Barbara, California 93106

¹This is a condensed version of a talk given at a dinner celebrating the establishment of a combined Department of Earth and Space Sciences at UCLA, 13 April 1978, eliminating introductory persiflage and bantering asides.

We are here to celebrate the joining of the established branches of geophysics and geology at UCLA, together with biogeology, geo- and cosmochemistry, lunar science, planetology, atmospheric physics, and geophysical fluid dynamics into a single Department of Earth and Space Sciences. This is as auspicious an event as I can imagine. I take particular pleasure in it as a fellow scientist, a former member of this great institution, and a long-time friend of the late Bill Rubey who worked so selflessly during his lifetime to bring about just such a union.

Rites of passage such as this are all too little observed in our over-sophisticated society. It is important that they be observed, however, not only because we need ceremony in our lives but because they provide opportunity for stock-taking and for looking ahead. I propose to use this occasion to offer some reflections on the opportunities, challenges, and hazards you here at UCLA will face as you attempt to convert your interesting multidisciplinary flirtation into a successful marriage of the earth and space sciences.

While considering words that might be appropriate to a development at once so promising and yet so uncertain as to outcome, I was struck by Clarence Hall's conference charge to "consider how earth and space scientists can help to make this a better earth" and how universities might best respond to "these current and future problems." This led me to focus on science and other forms of systematic inquiry as cultural phenomena. Indeed, organized learning according to the self-testing rules of science is a determining aspect of that form of culture we refer to as humanistic exactly because of the power it possesses to define and ameliorate or resolve the problems of mankind through the unfettered application of observation, synthesis, recall, and reason. Thus, to the seeker after practical utility I offer the university as the best place to discover the relevance of the seemingly irrelevant, the connections between the seemingly unrelated, and the liberating aspects of reasoned judgement, based on verifiable observation, experiment, and synthesis--free of any compulsion to conform or to produce ideologically approved responses.

And as I mused on the tribulations, opportunities, glories, shortcomings, and frustrations of pure scholarship, there came to mind those famous words of creative apostasy said to have been muttered by Galileo Galilei as, on the 21st of June, 1633, in his 70th year, he was led from the inquisitional hearings at which he had been forced to recant on bended knee the heresy of a heliocentric planetary system: "Eppur si muove," (and yet it moves). Be the phrase apocryphal or not, it sums well the combination of independent mindedness, defiance of inflexible dogma, and struggle for objectivity, combined with a certain bemused subversiveness, that floods the rational mind confronted with the nonnegotiable demands of unreasoning authority.

Galileo, a late starter by current standards, had only the year previously published his most cited work, Dialogue of the Two Chief World Systems--a sobering thought for those who think that senility begins at 40. With this he simultaneously dealt the coup-de-grâce to the earth-centered solar system, mortally wounded the vanity of Pope Urban VIII, and lost his long struggle to persuade the Church of Rome that it would be, as he put it, "a terrible detriment for the souls if people found themselves convinced by proof of something it was...made a sin to believe." The Church's response, as articulated by Scipio Chiaramonti, was that "the earth has no limbs or muscles, therefore it does not move. It is angels who make Saturn, Jupiter, the sun, etc., turn round. If the earth revolves, it must also have an angel in the center...; but only devils live there...."

That was not quite three and one-half centuries ago--a long time in human memory but only the blink of an eye in human history. During the years since then mankind has learned more about planet earth, the life on it, and the universe in which these are imbedded than in all the hundreds of millenia of previous human existence. Such phenomenal progress was no accident. It was the inevitable result of man's free use of his senses and reasoning powers in the pattern of the great and steadfastly independent minds of Renaissance and later scholarly immortals.

But success in the struggle for intellectual freedom is never final. If Chiaramonti's logic sounds more laughable than threatening, try reading some of the anti-evolutional, anti-geological, and generally anti-intellectual rantings that are being mouthed and published right here in southern California today and finding favor among state and local school boards across the nation. Or consider that at the recent annual meeting of the American Association for the Advancement of Science, of all places, sociobiologist E. O. Wilson was shouted down with cries of fascism and racism as he tried to suggest that genetics as well as environment might have something to do with the behavior of individual members of the species Homo sapiens, as it does with that of other animal species. Or recall that there are still institutions of higher learning in this nation where a precondition of faculty appointment is declared acceptance of a literal interpretation of biblical mythology as revealed truth. In some this declaration must be repeated annually. Like Galileo, any scholar unable to accept a six-day creation a few thousand years ago would have to perjure himself to teach here, only he or she would have to do it annually.

We do not have to look far, therefore, to see that freedom of the mind is ever imperiled--not only in remote places and times but here and now--and the price of preserving what we have is constant vigilance. The struggle against authoritarianism that science shares in common with truly humanistic enterprise everywhere, the struggle to separate probability from dogma and to promote the solution of mankind's problems through the application of evidence, reason, and verifiable natural principle, must constantly be renewed. Our freedom to think, to teach, to work at making this a better earth if you

please, is profoundly affected by the outcome. To the extent that mankind rises to the level of which it is capable, science must be at liberty to interweave its findings with the rest of the reasoning human enterprise toward the betterment of the human condition. And toward this end science must become more self-consciously aware of and speak out about its own universality, its unity of principle, its interaction of subject matter, its limitations, and the hazards that imperil its free pursuit. The administrative union we applaud this evening is a heartening step in that direction for an important sector of science, but it is only a step.

Let me play the part of Banquo's ghost at this banquet to remind you here at UCLA that the hard part lies ahead. Not only good faith but a great deal of conscious effort will be required if this new and hopefully more perfect union you are in the process of forging here is to become the beacon of effectively interacting, self-critical, multidisciplinary, progressive, humanistic excellence your well-wishers believe it can become.

What I am trying to say is that this new and welcome administrative union of yours, in addition to its symbolic value, could also be a means toward a most important end. That end is the effective fusion of the partial and uneven programs we now see in our several specialties into a holistic science of earth and space--a science that underscores and emphasizes the common ground, the unifying theories, and the great unsolved problems without blurring appropriate differences; a science that pays more than lip service to interdisciplinarity; a science of mutual respect without pecking order; a science that is neither unaware of its limitations nor averse to being found useful. It is all too easy for such a happy beginning as that you have made here to founder on the Scylla of over-administration or the Charybdis that lurks in clashes of will or personality. You will need actively to seek the high and common ground if the result of your union is to prosper and become an object of pride and an inspiration to others.

Bearing in mind that we look, above all, to the future, I direct my words especially to you who may recently have joined the community of scholars we call the university as students or as younger members of this faculty. For you, reflection on Galileo's words of puzzled defiance brings out some special thoughts--familiar, but worth reiteration:

1. Freedom of the mind can never be taken for granted, even in otherwise civilized societies.
2. All views that are now accepted were once minority views. Do not, therefore, shrink from being a minority of one when such a position results from reasoned consideration of the available evidence.
3. You can disagree agreeably, however, and you can be openminded without being wishy-washy. A clear recognition of our own fallibility frees us to hold and defend even provisional views without constant discursive qualification until such time as new and contrary or modifying evidence is introduced.
4. Nevertheless, a decent respect for the judgement of one's thoughtful peers advises reconsideration of one's own positions when they are found to be in conflict with the well-considered views of others. Abandonment of carefully thought out views, to be sure, is called for only where reflection on independently verifiable evidence advises it--but the provisional nature of all science is axiomatic, and it is always a sign of strength to concede error discovered.

5. Don't run after bandwagons. Popularity doesn't make an idea wrong, but it tends to generate uncritical acceptance, blur nuances, and conceal unsolved problems. Even turbidity currents didn't solve all problems in sedimentology--as we now realize. Even plate tectonics may have little to say about intra-plate tectonics. Even first principles and ruling hypotheses should be reexamined by each new generation of scholars.

6. Occam's razor may not always yield definitive answers, but it frequently sharpens fuzzy thinking. It doesn't, as some suppose, assert that the simplest answer is always right. Einstein aptly rephrased it in saying that "science seeks to reduce the connections discovered to the smallest possible number of independent elements."

7. The most interesting ideas are the ones we haven't thought of yet.

8. Ideas new to you may not be new to science. We all have an obligation to be knowledgeable about the published views of others, including those of our predecessors. Someone else will be, and the only thing more painful than reliving history is to be caught at it.

9. A hypothesis has outlived its usefulness when it no longer provokes fresh inquiry. Scientific progress consists as much in the abandonment of fruitless or unsustainable hypotheses as it does in the invention of new ones.

Giving up untenable views early enough to derive some benefit from that action is, of course, very important, although most of us are better at advising it than doing it. But, once grasped and acted on as a general principle, it should have the happy effect of persuading professors that it isn't really essential to catch students up with knowledge before turning them loose to think for themselves. When, in later life, we think back to our own student days, we realize that most of the ideas we learned than have turned out to be wrong or at least in need of major modification. Have you been out of graduate school for fifteen years or more? Remember the geosynclinal theory of mountain building? Remember when continental drift was considered to be an aberration of European and Southern hemisphere armchair theorists? Remember the outrageous hypotheses we were asked to swallow in order to explain away that long pre-Phanerozoic metazoan record that simply had to be there even though evidence for it was nowhere to be found?

What stays with us that is important is not the ideas themselves so much as it is the experience and the stimulation of recognizing and clearly formulating problems, mastering the subject matter and devising plans of research intended to solve these problems, pursuing an inquiry to a conclusion or alternative conclusions whose probability of approaching the truth can be evaluated and tested, and preparing a report of results that bears up under critical review. Where faculty can give students the basic principles, set an example of personal and professional integrity, and get students so fired up with the love of learning that they'll want to go on doing it for the rest of their lives, education takes care of itself. When students have those basics and that motivation, they are ready to fly and should be pushed out of the nest (if necessary) to do so.

Yet education is basic. H.G. Wells once aptly remarked that "civilization is a race between education and catastrophe." The truth of this insight was verified at the First Lunar Science Conference in Houston by no less a person than the renowned cosmogonist, Sir Fred Hoyle, the banquet speaker on that occasion. Hoyle there related

the results of a physics test given in his schooldays. Asked to define Newton's law of gravitation, one of his classmates replied: "Newton's law of gravitation states that the grass in every churchyard must be cut once a year." Doubtless you will think of other examples that show just how close this great educational enterprise of ours has always been to catastrophe.

The point I want to emphasize is far from our everyday concerns, but it should not be. It is that science is too bound up in the fabric of every person's life, too much the stuff of which the future is made, to tolerate an educational system or pedagogical practice that fosters a division of civilized mankind into the "two cultures" of Snow--scientific ignoramuses on the one hand and, on the other, a scientific elite that is remote from or ignorant about the rest of human experience. That is a real catastrophe. The trend toward ever-narrower specialization, so essential for important aspects of scholarly progress, needs a counterbalancing process. It is imperative, and it is a special challenge to the university community, that there be developed a common framework of knowledge, principles, and ethics to give coherence of thought and purpose to a society confused as to goals, beset by discord as to means and principles, and threatened with disintegration.

Such a common framework cannot emerge where, even within university departments, there is no shared intellectual interest or discourse, where boundaries between disciplines and departments are too sharp, and where the sciences, languages, arts, and other learned professions--humanities all, each in their own way--make little effort to learn from one another or to communicate with broader audiences.

If there is anything a responsible faculty can and should do well besides transmitting the subject matter of its own specialties, it should be to provide curricular guidance toward the education of the kind of broadly informed and cultivated citizenry that can best cope with an uncertain future. Under pressure from a succession of student bodies eager to exercise a greater degree of self-determination without regard to curricular basics or course content, faculties have, over the past two decades, increasingly abdicated this responsibility.

It is time to redress the balance, and a good way to start is to communicate better across the compartments of our own fields as we're trying to do at this celebration. Without returning to restrictive concepts, we should insist on the distinction between liberal education as a foundation for enlightened living and problem solving and vocational training as a basis for job-hunting--without in any way belittling the value of vocational training or manual skills in the appropriate framework. We need in particular to impart the realization that science is basic to any culture that claims to be humanistic and that an ignorance of the nature and scope of science is as lamentable in the citizenry as is an ignorance of history and the great works of literature and art. The crucial social decisions that lie ahead will be resolved best by a public whose grasp of the issues is both culturally illuminated and scientifically informed. Wouldn't it be fun to teach a course on the universal laws of science and their meaning for mankind--on the generality of the laws of thermodynamics, the conservation of angular momentum, the law of superposition, Snell's laws, the gas laws, the principles of exponential growth, Le Chatelier's rule, the principal of biotal succession, and so on--or on science as art, starting with atomic structure and the periodic table and moving into biological adaptation, mineralogy, the solar system, and plate tectonics?

Consider the importance of the earth and space sciences in resolving the issues that confront mankind around the world today. A wise choice among energy options, the problems of materials shortages, environmental degradation, nuclear safeguards, population growth, the benefits and hazards of space exploration, the uses and governance of artificial satellites, the perception and reduction of natural hazards, the wise use of our lands and waters, the siting of public works and private dwellings alike--all these and more are matters of large and growing relevance for the lives of all citizens, as well as matters that carry a large geological and geophysical content. They are too important to leave solely to economists, politicians, professional managers, or an uninformed electorate.

The nature, origin, and progressive development of our planet and the life upon it; its differentiation into concentric shells and the chemical evolution of the atmosphere, seas, and crust; earth's deep structure and motions; the courses, times, and causes of plate motions at its mobile surface; its long history and cosmic connections--all these and more of the things we love to study are matters of the most profound poetic and philosophical as well as practical interest. And this is only a part of science, in fact only a part of earth and space sciences.

I do not presume to suggest to those more knowledgeable about other aspects of culture how they might best inculcate a greater awareness of and familiarity with the basics of great art, literature, and other more personal forms of learning on the part of the scientist. Scientists, I suspect, are on the whole rather more likely to be informed about and appreciative of such matters than others are of science. I will say, however, that most of us could do with a greater exposure to these aspects of culture than is usual, and that I particularly regret the waiving of the Ph.D. language requirement in favor of even highly desirable scientific skills that an appropriately motivated person might better acquire at the post-doctoral level.

There is, to be sure, a limit to what any individual or department can do, but I am happy to see and pleased to commend the steps this department is taking to inspire and motivate its students and to inculcate high standards. Improvement begins at home, and the first broad goal to be striven for is the elucidation and mastery of that common core of communicable principles and knowledge that enlivens and unites the earth and space sciences, plus the ability to communicate these things clearly to others. In our eagerness to impart some sense of science to nonscientists, let us not overlook or minimize that many scientists are themselves quite lopsided, even as scientists--lopsided and all too often just a bit condescending toward fields they make little effort to understand, within as well as out of science.

Here I would stress that the earth and space sciences have a biological as well as a physical component. In the course of our commendable efforts to assure that our students are well trained in math, physics, and chemistry, we must beware of graduating biological ignoramuses and inadvertently belittling the central historical aspects of earth and space science. Being ourselves the product of biological evolution, and living on a planet whose interacting and co-evolving atmospheric, hydrospheric, and crustal history has been profoundly affected by biological events and processes, it ill behooves us to tolerate a biological gap in our world view or in the professional preparation of our successors.

Such hazards should and can be overcome. A common core of courses can also be developed that brings together the irreducible basics of earth and space science, and I note in your Chairman's letter of a year ago to the alumni that such a curriculum of core courses is being developed by this department. So much the better.

The last point I want to emphasize is that the earth and space sciences could play a special role in conveying a broader understanding of science and its function as a part of the general culture. Our field is one that brings the whole of science to focus on the history, structure, and biology of the planet on which most of us will live our entire lifetimes, and the solar system of which it is a part. As we have seen so amply here these last two days, that story is one of soaring poetry, of gripping drama, of mind-expanding concepts. Its main elements are easy to convey in relatively simple language without an excess of window-dressing quantification that frightens off a more general student body. The earth sciences and the exploration of space also illustrate very well the operation, interactions, and evolution of science and its relevance to the affairs of man in ways that almost anyone can be interested in and, with a little attention, can also readily grasp and appreciate. And the subject begins almost immediately to repay the student's investment of time and effort in terms of a widened outlook, an enhanced understanding, and a greater and more perceptive enjoyment of his or her surroundings, especially where connected with imaginative laboratory exercises and well-chosen field trips.

Thus, departments of earth and space science are ideally suited to serve as the central focus for a fresh attempt, through appropriate general education, to enhance the scientific literacy of future scientists. We are advised to reach toward this goal by more than opportunity, altruism, and the joy of telling a great story, however. The man and woman in the street have made it clear that they intend to have more say about the great social and moral issues that have emerged and are emerging from scientific discoveries and technological developments, whether they understand science or not. It is in the interest of all, therefore, not only that we do everything reasonably possible to prepare them to understand both the critical scientific contents of problems to be resolved and the abiding relevance of the pursuit of understanding for its own sake, but that we level with them concerning our own uncertainties and the limitations of science and technology.

Going beyond the workings of science and its eventually inevitable practicality, one finds a deeper meaning. Science, it seems, has something timeless and universal to say about philosophy and ethics that is not culture-bound and that applies worldwide, wherever free inquiry and discussion prevail.

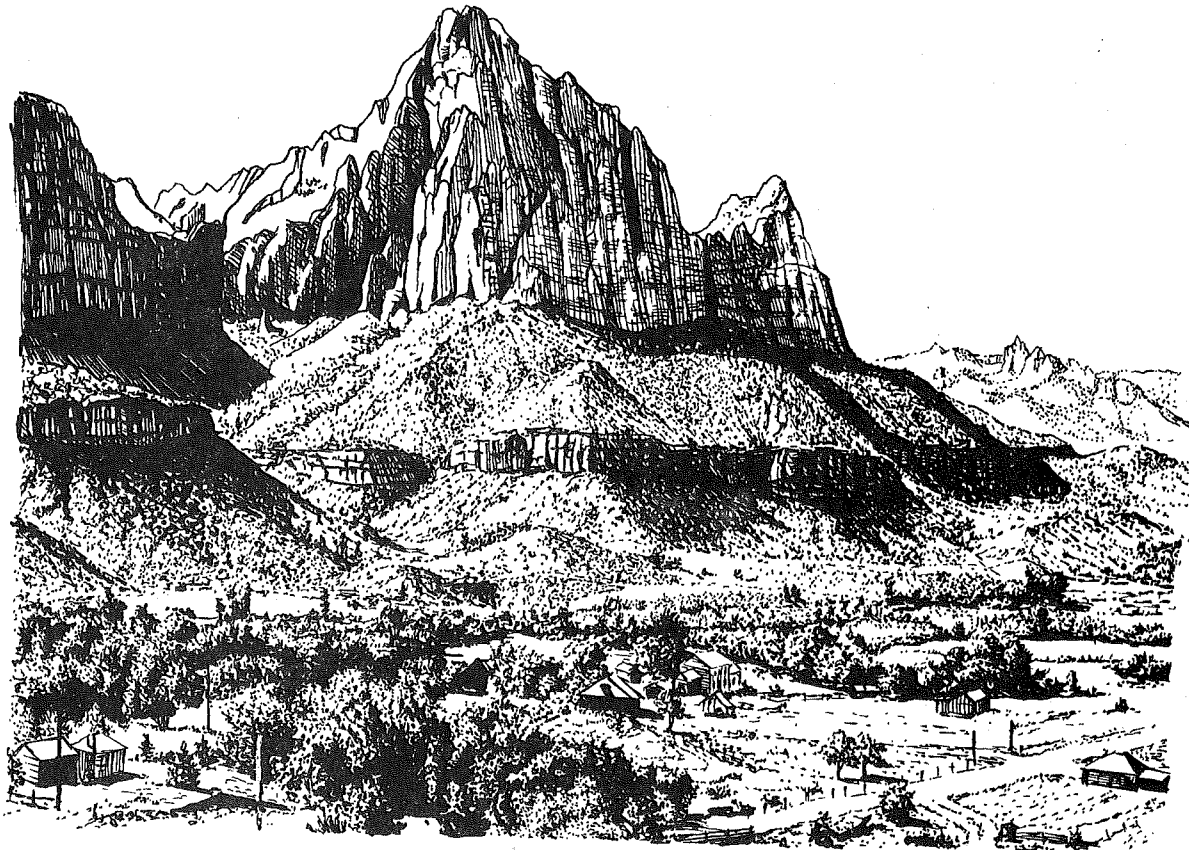
Science has shown that there is such a thing as objective truth and that verifiable rules can be formulated for finding and testing it. It has shown that unanimity concerning basic issues, causes, and cures can in many instances be achieved among those who are willing to adhere to the rules--by examination of the evidence and the exercise of free will and not through coercion or appeal to authority. It has established that profound questions of concern to the general welfare can be linked to experiences that can be visualized and to some extent shared by all mankind. Areas of agreement can be broadened and areas of disagreement reduced to those that spring primarily from parochial cultural differences or defined in a way that contributes to their resolution once the vantage point of a balanced scientific outlook has been attained.

This universality of science and its applications provides a potential basis for a common world ethic and, more widely extended in human affairs, to agreement on the

resolution of pressing global problems such as population growth, nuclear proliferation, the sharing of resources, and territorial conflict. It also identifies sciences as an irrevocable and indispensable part of the general world culture and not as something apart. Even if pursued for no practical reasons, it would still be worth pursuing for beauty and insight alone.

When, in 1863, in the midst of a desperate fratricidal war for survival of the Nation, its hard-beset president paused to establish a National Academy of Sciences, he formally recognized the contribution that science has to make to society and to the Nation. A hundred years later, in October of 1963, another president, also shortly to be cut down by an assassin's bullets, stood before that same Academy at its centennial celebration to speak, as he put it, of A century of scientific conquest. At the end of his talk John Kennedy told the story of the great French Marshal, Louis Lyautey, who had just instructed his gardener to plant a tree at a certain site the next day. "But," said the gardener, "it won't bear fruit for a hundred years." "In that case," Lyautey said, "plant it this afternoon." You here have done better than that, you started a great thing yesterday.

Your efforts, thoughtfully pursued, can make a priceless contribution to the general culture and to the eventual success of mankind, through the responsible uses of science, in overcoming the many and serious problems that confront it around the world today.





THE DEPARTMENT OF EARTH AND SPACE SCIENCES
University of California, Los Angeles
Announces a
CONFERENCE ON EARTH AND SPACE SCIENCES
April 12-14, 1978



--To review the current state of the earth and space sciences, to discuss their future evolution, to examine their practical implications for mankind, to consider how earth and space scientists can help make this a better earth, and to suggest the responses of universities to these current and future problems. The conference marks the merger of the Departments of Geology and Geophysics and Space Physics into the Department of Earth and Space Sciences.

The Program

April 12, Wednesday, Noon: Opening luncheon; Speaker: Bruce Murray, JPL: "Future Prospects in Space Exploration."

Wednesday, 2-5 p.m.: Session I: Planetary and Space Sciences

James Arnold, U. C., San Diego: "Primordial Condensation of Solid Grains: Some Ground Rules for the Game."

George Wetherill, Carnegie Institution of Washington: "Formation of the Terrestrial Planets."

Ian Axford, Max Planck Institute, Lindau: "Interplanetary Medium and Magnetosphere."

Andrew Ingersoll, Caltech: "Why Study Planetary Atmospheres?"

April 13, Thursday, 9 a.m. to Noon: Session II: Earthquakes and Geologic Hazards

John Crowell, U. C., Santa Barbara: "What We Know and Do Not Know of the History of the San Andreas Fault."

Barry Raleigh, U. S. Geological Survey: "Predicting Earthquakes on the San Andreas Fault."

Karl Steinbrugge, San Francisco: "Earthquake Hazards Reduction: A National Implementation Plan."

Beach Leighton, Irvine: "Slope Instability in California."

Thursday, 2-5 p.m.: Session III: Mineral and Energy Resources

Brian Skinner, Yale University: "The Many Origins of Mineral Deposits and Predictions of Mineral Abundance."

John Gabelman, Utah International: "Nuclear Energy Resources."

Isaac Kaplan, UCLA: "Geochemical Studies on the Genesis and Exploration of Petroleum."

Orson Anderson, UCLA: "The Prospect of Coal in California's Energy Future."

Thursday Evening: Banquet: Speaker: Preston Cloud, U. C., Santa Barbara: "E Pur Si Muove."

April 14, Friday, 9 a.m. to Noon: Session IV: Earth Sciences

Peter Wyllie, University of Chicago: "Magmas: From Mantle Peridotite to Mountainous Granite."

Donald Turcotte, Cornell University: "Plate Tectonics—Successes and Failures."

Kenneth Emery, Woods Hole: "Marine Sediments and Plate Tectonics."

Robert Bakker, Johns Hopkins: "Darwin was a Geologist: Evolutionary Theory from Geological Observations."

The luncheon will be at the Sequoia Room and banquet will be held at the West Alumni Center, sessions at the Faculty Center.

Dear Alumni:

"A funny thing happened on the way to press" this year--
--the Faculty got lost....

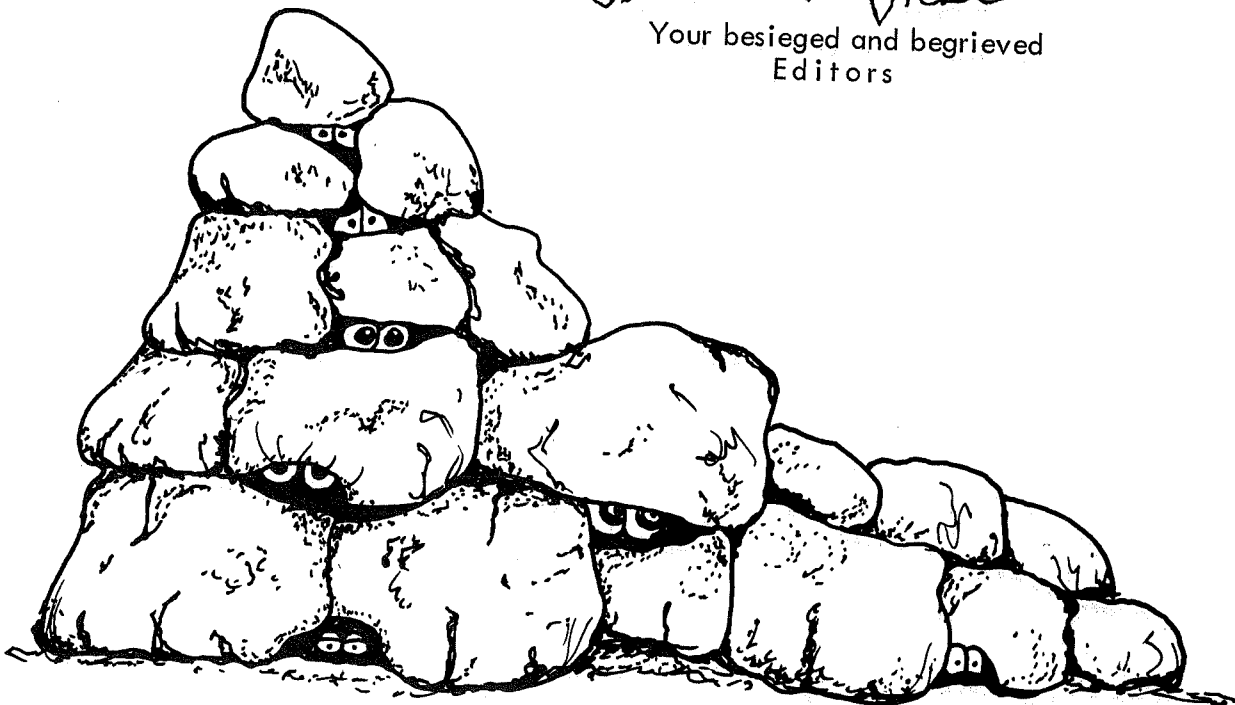
In the final typing of this Newsletter, the Faculty News section disappeared. So, because of the late date, approach of the end of classes, and dispersal of everyone to the field for summer work, we are showing you how our Department appears to the outside world in more formal listings than you are used to seeing in past Newsletters. This is a "Peterson's Guide" type of listing of faculty and their research interests. Perhaps you'll find some hidden aspect of your former prof's that you didn't know existed..

The editors apologize to the Alumni and, especially, to the Faculty, who contributed substantially to this issue.

Sincerely,

Sue & Vicki

Your besieged and begrieved
Editors



PROFESSORS

ANDERSON, Orson L., Ph.D., Utah, 1951. Mineral physics, elastic properties and shear instabilities of rocks and rock-forming materials; physical properties of lunar rocks and glasses.

BOETTCHER, Arthur L., Ph.D., Pennsylvania State, 1966. Experimental and field studies in igneous petrology; phase equilibria, andesitic volcanism and plate tectonics; ultramafic xenoliths; hydrous minerals; volatiles in planetary interiors; volcanic history of the Mojave Desert.

BUSSE, Friedrich H., Ph.D., Munich, 1962. Geophysical fluid dynamics; nonlinear problems in hydrodynamics; bounds on turbulent transport; instabilities in rotating systems; origin of geomagnetism.

CARLISLE, Donald, Ph.D., Wisconsin, 1950. Mineral deposits and theory of mineral economics; structural-geochemical relations of the Coast Range batholith, British Columbia; marine volcanology; structural studies in central Nevada.

CHRISTIE, John M., Ph.D., Edinburgh, 1956. Geology and structural analysis of metamorphic rocks in southern California and other areas; studies of the deformation of quartz and other minerals; transmission electron microscopy of minerals; interpretation of microscopic structures, textures and preferred orientations of minerals.

COLEMAN Jr., Paul J., Ph.D., UCLA, 1966. Physics of plasmas in space; magnetic fields of stars and planetary bodies; cosmic rays.

DOLLASE, Wayne A., Ph.D., M.T.T., 1966. Crystal chemistry; crystal structure analysis; relation of structure to properties; phase transformations; Mössbauer spectroscopy.

ERNST, W. Gary, Ph.D., Johns Hopkins, 1959. Chairman designate of the Department. Observational, theoretical, and experimental chemical petrology; mineralogic phase equilibria; crystal chemistry of silicates; electron microprobe and Mössbauer analysis; metamorphism and plate tectonics; circum-Pacific and Alpine metamorphism.

HALL Jr., Clarence A., Ph.D., Stanford, 1956. Structural geology and plate tectonics of the California Coast Ranges; Cenozoic paleontology and stratigraphy; paleoecologic and paleoclimatologic studies.

KAPLAN, Isaac R., Ph.D., U.S.C., 1961. Biogeochemistry of recent sediments; California offshore and deep-sea sediments; origin of petroleum; cycling of elements in the ocean; isotope geochemistry of terrestrial and lunar rocks and meteorites; organic geochemistry of returned lunar material.

KAULA, William M., D. Sc., Ohio State, Honorary Degree in 1975. Planetary and orbital dynamics with application to solar system origin and evolution; mechanics of planetary interiors; statistical problems in geophysics.

KIVELSON, Margaret G., Ph.D., Harvard, 1957. Physics of particles and fields in the magnetospheres of the earth and Jupiter; convection; wave-particle interactions; models of geomagnetic activity.

LINGENFELTER, Richard, B.A., UCLA, 1956. Gamma ray astronomy; high-energy astrophysics; cosmic ray origins, interactions and propagations; solar flare particle interactions; lunar and planetary surface processes; atmospheric radioisotope production; hydrology; and western American history.

LOEBLICH, Helen T., Ph.D., Chicago, 1942. Micropaleontology; paleoecology, evolution, morphology, microstructure, and systematics of modern and fossil protists (protozoans and algae).

McPHERRON, Robert L., Ph.D., California, Berkeley, 1968. Physics of the magnetosphere emphasizing auroral phenomena, including low-frequency wave-particle interactions, and substorm associated magnetic field variations. Also instrumentation and techniques of data processing and analysis.

NELSON, Clemens A., Ph.D., Minnesota, 1949. Stratigraphy and paleontology; Cambrian and Precambrian stratigraphy; Cambrian trilobite paleontology; geology of eastern California and the Great Basin area.

OERTEL, Gerhard, D. rer. nat., Bonn, 1945. Structural geology; mechanics of faulting; mechanics of slaty cleavage; mesoscopic fabrics; structures of plutonic rocks; model experiments of rock rheology.

ROSENFELD, John L., Ph.D., Harvard, 1954. Phase transformations and texture in metamorphic rocks and their relationships in time and space to tectonics, as exemplified in the northern Appalachians and the Central Alps; crystallization conditions of ensembles of metamorphic rocks; pressures and temperatures of crystallization in rocks from elastic effects around inclusions in nonopaque minerals.

SCHOPF, J. William, Ph.D., Harvard, 1968. Paleobiology-evolution of primitive terrestrial organisms; organic geochemistry of Precambrian sediments; evolutionary biology; paleobotany; electron microscopy of microfossils; lunar studies.

SCHUBERT, Gerald, Ph.D., California, Berkeley, 1964. Astrophysical and geophysical fluid dynamics; stellar winds and their interaction with planetary objects; motions in earth and planetary interiors; electrical conductivity of the moon.

SHREVE, Ronald L., Ph.D., Caltech, 1959. Geomorphology and glaciology; theoretical fluvial geomorphology, glacial landforms, glacier physics.

WASSON, John T., Ph.D., M.I.T., 1958. Cosmochemistry; trace elements in meteorites and lunar rocks by neutron activation techniques; origin and evolution of meteorites and the moon.

WATSON, Kenneth D., Ph.D., Princeton, 1940. Petrology and mineral deposits; petrology of lamprophyres; massive sulphide deposits; metamorphosed mineral deposits.

ASSOCIATE PROFESSORS

JACKSON, David D., Ph.D., M.I.T., 1969. Seismology; elastic and anelastic properties of earth materials; attenuation of elastic waves; interior structure of the earth; fault mechanics and earthquake prediction; geophysical inverse problems.

KIEFFER, Hugh H., Ph.D., Caltech, 1968. Planetary atmospheres and surfaces; visible and infrared spectroscopy; simulation of planetary environments; infrared radiometry.

REED, Walter E., Ph.D., California, Berkeley, 1972. Sedimentology; geochemistry of sediments and organic matter; origin of petroleum, environmental geochemistry.

ASSISTANT PROFESSORS

BIRD, G. Peter, Ph.D., M.I.T., 1976. Modeling of temperatures of subducting plates and origin of magmas; mechanical modeling of orogenies including nonlinear creep of rocks; seismology and the earthquake mechanism.

DePAOLO, Donald J., Ph.D., Caltech, 1978. Geochemistry and geochronology; mass spectrometry, radiogenic isotopes of Neodymium and Strontium, chemical evolution of the mantle and crust of the earth and moon, petrogenesis of igneous rocks.

KIEFFER, Susan W., Ph.D., Caltech, 1971. Geological physics; mechanisms of eruption of geysers and volcanoes; thermodynamic and fluid flow properties of multiphase systems; theoretical models of harmonic and anharmonic properties of minerals; experimental determination of thermal diffusivity, conductivity, and specific heat of minerals to 30 kb pressure; shock wave physics; optical, X-ray, and transmission electron microscope studies of shock metamorphism of porous rocks; astrogeology; origin of chondrules.

RONAN, Thomas E., Ph.D., California, Davis, 1975. Geological and biological oceanography, ecology and paleoecology of soft-sedimentary environments.

LECTURERS

GEORGE Jr., Richard P., Ph.D., S.U.N.Y. Stony Brook, 1975. Structural petrology of ophiolite complexes and alpine-type peridotites; experimental rock deformation; massive sulfide deposits in ophiolites.

JOHNSON, Bradford K., Ph.D., UCLA, 1954. Petroleum exploration.

JONES, Robert E., B.S., San Diego State, 1961. Electron microprobe and related analytical methods.

LOEBLICH, Alfred R., Ph.D., Chicago, 1941. Micropaleontology; studies of algae and protozoans; systematics, evolution, paleoecology, and stratigraphic application of microfossils.

MERIFIELD, Paul M., Ph.D., Colorado, 1963. Engineering and environmental geology; space photogeology.

SABINS, Floyd F., Ph.D., Yale, 1955. Remote sensing related to the development of natural resources.

STUMMER, Gerhard, B.S., Luetzkendorf, East Germany, 1951. X-ray analysis.

SUSUKI, Takeo, M.A., UCLA, 1951. Upper Triassic and middle Miocene paleontology; photo techniques for publication and for thesis.

EARTH AND SPACE SCIENCES

Degrees Awarded 1977-1978

Doctor of Philosophy

Lichtenstein, Bernard Robert

Apollo 15 and 16 Subsatellite Magnetometer Measurements of Solar Wind and Magnetospheric Plasma Interactions with the Moon.

Professor Schubert

Lincoln, Timothy Nye

Trace Element Redistribution during Metamorphism of the Karmutsen Basalts, British Columbia.

Professor Carlisle

Miller, Calvin Francis

Alkali-rich Monzonites, California: Origin of Near Silica-Saturated Alkaline Rocks and their Significance in a Calc-Alkaline Batholithic Belt.

Professor Watson

Miller, Molly Beth Fritz

The Origin of Spreiter in Trace Fossils.

Professor Ronan

Nakanishi, Keith Koji

The Deep Structure of the Upper Mantle from the Dispersion of Long-Period Rayleigh Waves.

Professor Knopoff

Wegner, Warren William

The Rate of Metamorphic Reactions: an Example from the MgO-SiO₂-H₂O System.

Professor Ernst

Weissman, Paul Robert

Physical and Dynamical Evolution of Long-Period Comets.

Professor Kaula

Yuen, David Alexander

Some Problems of Local Flows in the Earth's Upper Mantle.

Professor Schubert

Master of Science

(Thesis Plan)

Colbath, George Kent

Organic Walled Microplankton from the Eden Shale (Ordovician),
Indiana, U.S.A.

Professor A. Loeblich

Countryman, Robert Loren

The Subsurface Geology, Structure, and Mineralogy of the Billie
Borate Deposit, Death Valley, California.

Professor Carlisle

Macdonald, Robert, III

Contour Maps of Expected Bedrock Acceleration from Earthquakes:
a Critique.

Professor Carlisle

Perez, Humberto Ramon

Geology and Geochemical Exploration of the Gold-Silver Deposits
at Soledad Mountain (Mojave, Kern County, California).

Professor Carlisle

Redfern, Richard Robert

Geology and Uranium Deposits on the Prince Claims, Elko County,
Nevada.

Professor Carlisle

Sandstrom, Mark William

Hydrocarbons in Surface Sediments from the Alaska and Southern
California Continental Shelves.

Professor Reed

Saunders, Margaret Janet

Mineralogy and Metamorphism of the Valdez Group, Kenai Peninsula,
Alaska.

Professor Ernst

Witter, Robert Allen

Radiochemical Neutron Activation Analysis of Zinc and Antimony in
Group IVA Iron Meteorites.

Professor Wasson

Master of Science
(Comprehensive Examination Plan)

Block, Marta Navarova
Conley,Carolynn Lee
Deutsch, Marie Jose
Hood, Lonnie Lamar
Piper, Kenneth Allen
Roth, Steven Robert
Sandwell, David Tomas
Searls, Craig Allen
Steinbrenner, Peter Dean
Stewart, Glen Robert
Zimbelman, James Ray

Bachelor of Science

DeSosa, David M.
Ehlig, Kathleen A.
Escandon, Richard F.
Fall, Theresa C.
Gjerde, Michael W.
Hausback, Brian P.
Hill, James A.
Horton, Elizabeth A.
Kraemer, Susanne M. C.
Kronenberg, Andreas K.
Lee Berman, Richard E.
Lehotsky, Charles R.
Mallich, Anthony V.
Mayerson, Drew A.
Meisling, Kristian E.
Messerotes, Gary P.
Popoff, Marin A.
Vaitl, Jonathan D.
Wacker, Charles H., III
Wallace, James W. F., IV
Wyatt, Glen M.

TEACHING ASSISTANTS 1977/78

Michael J. Apted
John Bacheller
Bruce J. Bilodeau
Jeri Lynn Cameron
Mark P. Cloos
Anita L. Crews
Joan M. Delany
Stephen N. Ehrenberg
Christian C. Finch
Nurit Hildebrand
Carl E. Jacobson
Peter J. Juda
Karen R. Hochstrasser
Kenneth N. Kettenring
Steven R. Lipshie
Carol Mankiewicz
Michael O. McCurry
John J. McGuirk
Carl V. Mendelson
Cheryl T. Miyagishima
Albert V. Nyberg
Warren M. Thomas
Wayne A. Zeck

GRADUATE FELLOWSHIPS 1977/78

Regents' Fellows

Sarah P. Damassa
Richard P. Ditteon
Richard C. Elphic
Albert V. Nyberg
Alison Ord
Glen R. Stewart

Shell Fellows

Allen Glazner
Carl V. Mendelson
Alison Ord

NSF Fellows

William D. Carlson
George K. Colbath
Allen Glazner
Carl V. Mendelson

UNDERGRADUATE SCHOLARSHIPS

Getty Oil Scholarships

Cynthia L. Ricks
Michael R. Tiffany

American Geological Institute Scholarships

Richard F. Escandon
Ricardo L. Zepeda

Standard Oil Scholarship in Petroleum Geology

Elizabeth Horton

Cities Services Foundation - NAGT

1977

Richard Escandon
Brian Hausback
Elizabeth Horton
Charles Lehotsky
Samuel Robertson
Roberta Score

1978

Mark Cutler
Elizabeth McDonald
Karen Robinson

Michael Dewitt Lien Fund - Cities Services

Victoria C. Bennett
Ian H. Douglas
Lawrence W. Korb
Katherine A. McCarville
Michael R. Tiffany
Shari L. Wamsley
Robert I. Zweigler

Joseph Murdoch Memorial Fund

William H. Hirt

Getty Fellowships

Eric Finnstrom
Lawrence W. Korb

TEXACO FUNDS AWARDED FOR GRADUATE STUDENT FIELD EXPENSES

Mark P. Cloos
Anita L. Crews
Larry Kanuer
Michael O. McCurry
Wayne A. Zeck

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25 May 1978

To: Professor S. W. Kieffer, Editor, Newsletter

From: Spring Verity

Subject: Elizabeth Horton

I hope it is not too late to squeeze one more item into your new Newsletter. Elizabeth Anne Horton, who graduated on March 24, 1978, has received Departmental Highest Honors. To my knowledge, this distinction has been conferred on only one other person, Ken Shay, who graduated in 1974. As you probably know, Elizabeth will be a graduate student at Caltech in September. She is a credit to this Department, and I feel that her achievement merits special mention in the Newsletter.

ESSSO DOINGS

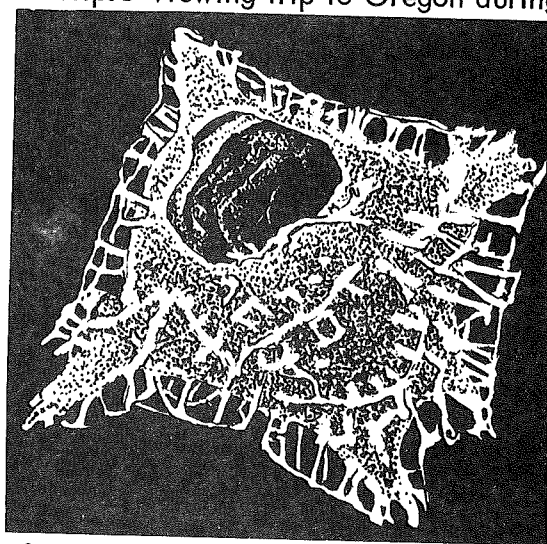
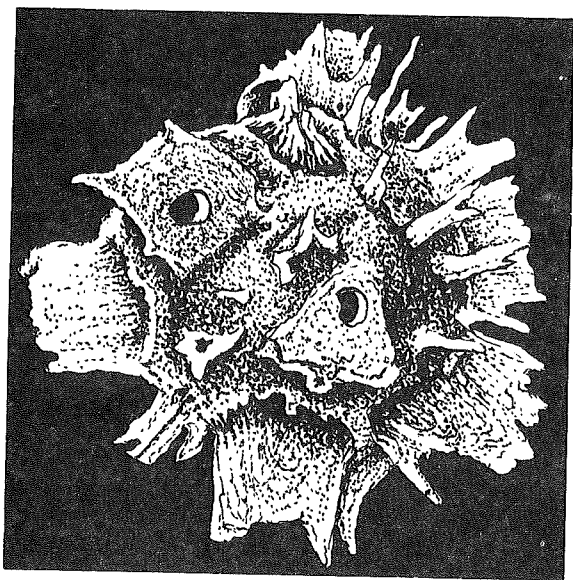
ESSSO Co-chairs: Lucia Perry, Erdem Idiz, Carl Mendelson

ESSSO (Earth and Space Sciences Student Organization) has four main areas of activities. They sponsor the ESS Seminar, an informal brown-bag lunch affair, held at noon in Room 6704 Geology on Thursdays. Available slots are filled by volunteer speakers; this year saw no less than three undergraduate students make speaking debuts.

The "Phase Liquidus" venture is well and faithfully attended in the Commons Room on the third floor every Friday evening. Undergraduate student Lucia Perry was very successful in organizing the refreshments and also instituted a scheme whereby more of the liquidees would become involved in the preparation and clean-up....

ESSSO sponsored two very nice picnics last year, one in the fall and one in the spring quarter. The annual fall picnic serves as a way for new students to familiarize themselves with their new environment--faculty, staff, and more-seasoned students. It is generally held at UCLA's Sunset Canyon Recreation Center. The spring picnic this year was also held at the Recreation Center--the ideal spot for the vicious on-going softball challenges between faculty and students.

ESSSO's field trip for the year took place just prior to the beginning of classes in September. Mesozoic and Cenozoic strata of the Colorado Plateau were a good excuse for a trip to see Zion and Bryce Canyon National Parks and Cedar Breaks National Monument, all in the state of Utah. Graduate student Steve Lipshie led a demand rerun of his Eastern Sierra field trip during the spring quarter; word of Steve's trip spread to several other institutions of higher learning, and the trip had a caravan of over a dozen cars. Three field trips are being planned for the coming year: Kent Colbath will be leading a fall field trip to the Peninsular Ranges following the first week of classes; there will be a Death Valley field trip during the winter quarter, and a Grand Canyon hiking trip in the spring. There may also be an eclipse-viewing trip to Oregon during the winter quarter.



Graduate student Sarah Damassa's scanning electron micrographs of her new dinoflagellate fossils, *Hystrichokolpoma n. sp.* (left) X 1240, and *Kisseleria n. sp.* (right) X 530, from the Coastal Belt of the Franciscan Complex, Mendocino Co., California (Eocene).

The Weekly (not to mention Weakly) Intrusion blazed new trails into literary excellence this year under the guidance of Editor Mark Robinson. While contributions were somewhat lacking in quantity, those that were published more than made up for this in quality. An especially notable example is undergraduate Amy's "Johnsonian" (Shakespearean) sonnet:

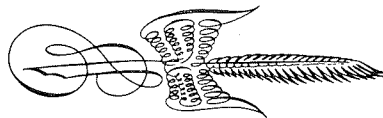
A chronical of ages yet to come
Was before me written on the sheet
And yet I knew that it was just the sum
Of all the knowledge I have yet to meet.
I glanced upon the page, then looked away
To send my dreams across and not within;
Thus, with my dreams I found that I could play
The songs of ages, which shall now begin:
"Time present and time past are both contained
Within time future, which circles as before.
The circles shall repeat, the past is claimed
By futures found in past and present lore."
And thus, so can the knowledge of earth history
Serve as a chronicle of what is to be.

Another feature of the Intrusion was the continuing saga of the intrepid geologist, Chrys O'Tile, and her fairy rockmother, Rockmom. The "Clastic Chronicles" graced nearly every issue and introduced such characters as Cowboy Brucite, the Mineral King, and Rintintinnida (the King's dog).

In addition, the Intrusion did its civic duty by publishing undergraduate Liz Horton's controversial cartoon, in which she neglected to portray 111C with what Clem Nelson considered to be the proper degree of importance. A rash of irate letters followed, and eventually a corrected cartoon was printed.

Unparalleled levels of artistic excellence were also reached with some of the cover designs, especially those by graduate Al Nyberg.

Throughout the year the Intrusion kept pace with the departmental activities and supplied the Department with a most important facet of its "personality"--a sense of humor.



ALUMNI NEWS

JIM AITKEN (Ph.D., 1954) is a research scientist for the Geological Survey of Canada. 3303 — 33rd Street NW, Calgary, Alberta T2L 2A7 CANADA. He writes that he is up to his ears in current research on the Proterozoic of northwestern Canada, while trying at the same time to wrap up the last of his Cambrian studies in the southern Cordillera (his fieldwork from 1961 to 1967). He and W. H. Fritz have been preparing for a 1979 visit to the Mackenzie Mountains by members of the international Precambrian—Cambrian Boundary Working Group. He hopes that Clem Nelson will be among the learned tourists. He has a G.S.C. Memoir in press and is awaiting reaction "to a rather radical reinterpretation of Cambrian cyclicity," submitted for publication to the AAPG Bulletin. He claims that the latter appears to have shocked the referees into catatonia.... As Vice-Chairman/Secretary of the American Commission on Stratigraphic Nomenclature, Jim feels he is active in "one of North America's better clubs."

A. A. ALMGREN (B.A., 1944) is Sr. Paleontologist with Union Oil Company, P.O. Box 6176, Ventura, California 93003 (he moved to Ventura in June of 1977). His new home address is 2711 E. Via Corza, Camarillo, California 93010.

ANDREW G. ALPHA of Andy Alpha and Associates, 1101 Monaco Parkway, Denver, Colorado 80220, is a consulting geologist.

HOWARD T. ANDERSON (UCLA, 1941-1942; A.B., 1931, M.A., 1935, U.C. Berkeley) is now an independent consultant, having retired from Standard Oil of California in 1971 after 28 years mostly in California and Iran. He is the Chairman of Riverside County Open Space Resource Committee, is the 1978 President of the California Section of the Association of Professional Geological Scientists, and is a member of the SCAG-208 Citizens Advisory Committee. Home address: 4465 Ninth Street, Riverside, Ca. 92501.

Robert W. Webb writes that JOHN Q. ANDERSON (B.A., 1937) passed away in Seattle in 1977, date unknown.

KEN ARNESTAD (B.A., 1942, M.A., 1948) is an airplane specification engineer for Lockheed California Company in Burbank, California. His home address is 1416 Buena Vista Street, Burbank, California 91505.

KWAME A. B. (Ed) ASIHENE (B.A., 1959, M.S., 1962, Ph.D., 1970) was promoted from Lecturer (viz., Asst. Professor) to Senior Lecturer (viz., Assoc. Professor) and became the Director of the Institute of Mining and Mineral Engineering, University of Science and Technology, Kumasi, Ghana, and the Head of the U.S.T. School of Mines, Kumasi. He reports that he has completed his main assignment in the establishment of this new institute under the University of Science and Technology. He has also established a Geological Engineering course now in its third year in this Institute. In addition, he completed research on the geological stability of the Keta Basin in southeastern Ghana and is now writing up his results. With K. Barning of the Ghana Geological Survey Department, Kumasi, Ed coauthored "A Contribution to the Stratigraphy of the Birrimian System of Ghana." He is currently the President of the Ghana Association of Engineering Geologists. He adds a very nice tribute: "After reading through the 1976-77 Newsletter, I wish I were young and back at UCLA. I'd take some of the newly introduced courses--especially in Natural Resources, Engineering Geology, and Exploration Geophysics. However, what I got from UCLA is helping Ghana immensely in the formulation of a mining and mineral education policy. I am very proud of UCLA Geology." We thank him for his support.

STEVE BACHMAN (M.S., 1974) is working for Chevron in San Francisco and attending U.C. Davis for his Ph.D. His research on trench sedimentation models, Coastal Belt Franciscan of Mendocino Coast, is supported by the G.S.A. and Chevron. Home address: 3601 Walnut Blvd., Walnut Creek, California 94596.

ROLAND J. BAIN (B.A., 1952, M.A., 1954) is a Geological Consultant and Vice-President, Tri-Valley Oil and Gas Co. He had also been the President of the Sacramento Geological Society in 1960, the President of the Sacramento Petroleum Association in 1970, and Vice-President of California Independent Producers Association in 1977. From 1956 to 1957 he was a Fulbright Scholar at the Institut Français de Pétrole and the Sorbonne in Paris. Home address: 2844 Latham Drive, Sacramento, Ca. 95825.

Allen Hatheway writes that he and PAT BAROSH (B.A., 1957, M.A., 1959) are working for Haley & Aldrich, consulting geotechnical engineers and engineering geologists in Cambridge, Massachusetts.

WILLIAM J. M. BAZELEY is working for Atlantic Richfield, P.O. Box 147, Bakersfield, California 93302.

DICK and KAREN (ROBINSON) BILD were in Germany from March 1976 through August 1977 while Dick was a post-doctoral fellow at the Max Planck Institut für Kernphysik, and at the University of Arizona from September 1977 to June 1978, when he took a permanent position at the Sandia Corporation.

BYRON R. BERGER (M.S., 1975) has resigned from the Research and Development Department of Continental Oil Company, Ponca City, Oklahoma, and has joined the Branch of Exploration Research, U.S. Geological Survey, Golden Colorado.

EUGENE W. BERKOFF (B.A., 1954) has become an excellent skier as well as a computer expert while working for the Mining Department, Department of Energy, Grand Junction, Colorado 81501.

MICHAEL S. BINDER (B.S., Chemistry, 1973) claims that he is a "tenured" graduate student at Yale who gets promoted every year (now in his fifth), but whose faculty would love to retire him. Mike received a Master's from Yale ("just a consolation prize they give you along the way to the Ph.D."), is "T.A.ing his life away in Introductory Geology and Sedimentology," and claims that he is learning some "real" geology at last. Mike is treasurer of the Dana Club (grad. student organization). Address: Department of Geology and Geophysics, Yale University, New Haven, Connecticut 06520.

CHARLES W. BLOUNT (Ph.D., 1965) has been Chairman of the Department of Geology at Idaho State University in Pocatello, Idaho 83209, since 1975. His publication "Barite solubilities and thermodynamic quantities up to 300°C and 1400 bars," appeared in the American Mineralogist, v. 62, in 1977. Home address: 274 Hyde Avenue, Pocatello, Idaho 93201.

TOM BRADY (B.A., 1954; M.A., 1958), who writes that he "can't seem to keep away from Africa," is Exploration Manager, Occidental of Libya, Inc., P. O. Box 2134 Tripoli, LIBYA.

JAMES B. BROWN (B.A., 1955) is a Regulatory Assistant for the Southern California Gas Company, P. O. Box 3249 Terminal Annex, Los Angeles, Ca. 90051. He reports

that he "retired from night-time graduate work after 20 years at USC and Cal. State University, Los Angeles." Home address: 7702 Luxor Street, Downey, Ca. 90241.

ROY BUDNIK (Ph.D., 1974) is traveling around the world and breeding prize winning Simmental cattle. Address: Wheatley Farms, Layton Road, Stanfordville, New York 12581.

A. LOUIS CANUT (B.A., 1954), who had been the President of Sage Oil Company, Inc., for eight years, formed Alcoil Exploration, Inc., 2525 Cerritos Avenue, Signal Hill, California 90806, in October 1976, to do exploration mainly in Rocky Mountain States and California. He has completed all of the requirements except his thesis for the M.B.A. degree in the Pepperdine University Executive Program. Home address: 3947 Marshall Way, Long Beach, Ca. 90807.

Don Carlisle reports that FRED V. CARILLO (M.A., 195?), Geologist, Western Field Operations Center, U.S. Bureau of Mines, E 315 Montgomery Ave., Spokane, Wash. 99207, turned up recently in Sacramento to discuss chromite resources with the Calif. Division of Mines people.

CHARLES CARRIGAN (Ph.D., 1978) completed his research on "Buoyancy Driven Flows in Planetary Cores" and left for Cambridge, U.K. to do postdoctoral work with Dan McKenzie at the Department of Geodesy and Geophysics.

E. R. CHIPP (B.A., 1958) is now Vice-President and Secretary of Resource Associates of Alaska, Inc., P.O. Box 80006, College, Alaska 99701. He obtained an M.Sc. in Geology from the University of Nevada, Reno, and has worked in exploration in Alaska since 1961.

BLASE A. CILWECK (B.A.) is Senior Engineering Geologist for Ventura City Public Works, 597 E. Main Street, Ventura, Ca. 93301.

JIM CONSORT (B.S., 1976) is a graduate student at the Geology Department of San Diego State University, San Diego, Ca. 92182.

WILLIAM C. CORNELL (Ph.D., 1972) is an Associate Professor of Geology, University of Texas at El Paso, Texas 79968. Bill completed 18 months as Acting Chairman of the department in January 1977 and is returning to full-time teaching and research. He was the Program Chairman for the South-Central Section GSA Meeting in El Paso in March, 1977, and was co-convenor (with Bilal Ul Haq) of the symposium "Fossil Paleobiogeography" at the North American Paleontological Convention, II. Mr. and Mrs. Cornell had a son on February 23, 1977. Home address: 440 Francisco Avenue, El Paso, Texas 79912.

KEN CRAWFORD (Ph.D., 1974) is the Director of the Environmental Center (Tiburon Peninsula) for CSU San Francisco Department of Geology.

JAMES CLIFFORD DAWSON (B.A., 1965, M.S., 1967; Ph.D., 1970, University of Wisconsin, Madison). Jim is the newly appointed Director of the Institute for Man and Environment, State University of New York, Plattsburgh, New York 12901. He has been a member of the Plattsburgh State faculty since 1970, teaching courses in geology and oceanography. He served two terms as Chairman of the Plattsburgh Faculty Senate and was Chairman of the Department of Earth Sciences prior to becoming acting director

and then director of the Institute. He and the former Caroline Weiss of Madison, Wisconsin, were married on June 12, 1971, in Plattsburgh, New York. Home address: Birchwood Drive, Peru, New York 12972.

FRANK DENISON (B.A., 1966) works at Kovacs-Byer & Associates, 12526 Ventura Blvd., Studio City, Ca. 91604 as a project geologist. His specialty is coastal engineering geology and geologic inspections. Home address: 28582 Conejo View Drive, Agoura, Ca. 91306.

BRIAN S. DICKER (B.S., 1976) is the Manager, Accounting Department, Mutual Credit Buying Systems International, 9420 Wilshire Blvd., #700, Los Angeles, Ca. 90048. He and Marcelle Richardson (B.S., 1976) were married in Trinidad on September 10, 1977. Home address: 9837 Tabor #7, Los Angeles, Ca. 90034.

J. J. (Jim) EIDEL (M.A., 1966) is now Manager of Exploration, Eastern U.S., for Hanna Mining Company. He lives in St. Louis.

BRADLEY G. ERSKINE (B.S., 1976) is a first-year graduate at San Diego State University Geology Department, San Diego, Ca. 92182. He had worked as a geologist for Earth Research Associates, Inc. (a small soils and consulting engineering geology company) in Costa Mesa before returning to graduate studies. Home address: 4229 Ocean Blvd., Pacific Beach, Ca. 92109.

FRANK A. EXUM (B.S., 1956, M. A., 1957) was promoted to Exploration Supervisor, Northern Rocky Mountain area, Marathon Oil Company, P.O. Box 120, Casper, Wyoming 82602. He had formerly been a senior geologist on staff of the District Exploration Manager for Marathon Oil. Home address: 1244 Granada Avenue, Casper, Wyoming 82601.

SCOTT FENTON (B.S., 1976) is a graduate student in the Geology Department, San Diego State University, San Diego, Ca. 92182.

TONY FINNERTY (Ph.D., 1976) is finishing two years as a post doc. at the Geophysical Lab. of the Carnegie Institute, 2801 Upton Street NW, Washington, D.C. 20008. He has been working on experimental partition coefficients for mafic and ultramafic minerals for calibration of geobarometers and geothermometers. Tony is trying to reestablish himself as a Californian.

W. PHELPS FREEBORN (Ph.D., 1976). After a triumphal geologic teaching run at the University of Oklahoma during the fall semester of 1977, he is now a Research Associate at the Materials Research Laboratory, Penn. State University. Home at last and very happy.

ROBERT GAAL (B.A., 1953) received his Ph.D. from USC. He worked for a time for the L.A. County Museum and for the Smithsonian Institute. For several years now he has been working at the Gemological Institute of America, 1660 Steward St., Santa Monica 90404. Bob has set up a new SEM lab. at the Gemological Institute. He teaches mineralogy courses at two or three local city and state colleges and is currently an editor of Gems and Gemology published by the Gemological Institute of America.

JOE GALBREATH (B.A., 1958) is the Director of Marketing, Rocket Research Company, Redmond, Washington. Home address: 1439 Eighth Place East, Edmonds, Washington.

ROGER F. GANS (Ph.D., 1969) is an Assistant Professor, Mechanical and Aerospace Sciences, University of Rochester, Rochester, New York 14627. He is working in geophysical fluid dynamics and teaching applied mathematics and laboratory fluid dynamics. His recent publications include: "On steady flow in a partially filled rotating cylinder," in the Jour. Fluid Mechanics, v. 82 (1977); "Poiseuille-like flow in a rotating gas," in Phys. Fluid, v. 19, and "Laboratory plate tectonics: a new experiment," in Science, v. 191.

MICHAEL O. GARCIA (Ph.D., 1976) is an Assistant Professor in the Department of Geology and Geophysics, University of Hawaii, Honolulu, Hawaii 96822, and is researching Pacific Coast andesite and Hawaiian volcanics. Mike and his wife, Karin, caught some spectacular photographs of eruptions on a recent trip to the big island of Hawaii. Mike has also been breathing life into an old microprobe and is buying a brand new one as well.

CHARLES M. GILBERT (Ph.D., 1965), Chairman of the Department of Geological Sciences at Virginia Polytechnic Institute, is currently on leave spending a sabbatical year with the Oklahoma Geological Survey and completing a geologic map of the Wichita Mountains.

MIKE GJERDE (B.S., 1976) is a graduate student in the Geology Department of San Diego State University, San Diego, Ca. 92182.

JAMES E. GROOM (A.B., 1955) is Senior Geophysicist with Union Oil of California, 416 S. Boylston, Los Angeles, Ca. 90051.

DAVID J. GROVER (B.S., 1975), Project Geologist, Kovacs-Byer & Associates, 12526 Ventura Blvd., Studio City, Ca. 91604 is performing engineering geology and site seismicity studies for hillside residential construction. His most recent projects include underwater geology studies for a pier and heliport in Catalina, a 129 lot subdivision in Granada Hills, and a 22-acre subdivision in Bel Air. He is an associate member of the Association of Engineering Geologists and is AEG Student Joint Council Committee Chairman. Home address: 17830 Sherman Way #376, Reseda, Ca. 91335.

BILL GUSTAFSON (Ph.D., 1970), Assistant Professor of Geology at Calif. State University, Northridge. Gary Ernst reports that Bill is "conducting experimental studies on pyroxene end members and solid solution series with Wayne Dollase--in my hydrothermal lab. Also takes extension course trips to Hawaii..."

ALLEN W. HATHEWAY (A.B., 1961) is the Associate and Chief Geologist with Haley & Aldrich, consulting geotechnical engineers and engineering geologists of Cambridge, Massachusetts. Home address: One Tyler Road, Belmont, Massachusetts 02178.

DON HANSEN (Ph.D., 1953) continues to be very active with his own geophysical and geochemical research company (ScienTerre, Inc.) out of Spokane. Address: N. 10921 Waikiki Road, Spokane, Washington 99218.

JAMES R. HERRING (B.S., 1968) works with Southern California Coastal Water Research Project, 1500 E. Imperial Highway, El Segundo, Ca. 90245. His research interests are in marine geochemistry, especially in characterization of fine particulates. Home address: 6803 Monlaco Road, Long Beach, California 90808.

K. J. HSÜ (Ph.D., 1954) is the Chairman of the Geological Institute, ETH, Sonneggstrasse 5, Zürich, Switzerland. He joined the IUGS delegation and visited China during September and October of 1977. He went to the Tachin Oil Field, Chou-Kou-Tien (Peking Woman), and Yunan (Indonesian Suture Zone). He is currently working on lakes and oceans, studying sedimentation and structure problems related to major plate motions, and is also heavily involved in experimental tectonophysics. Gary Ernst claims that "the world seems to be his field area and laboratory."

L. C. HSU (Ph.D., 1967), Associate Professor of Geology at the MacKay School of Mines (University of Nevada, Reno) is conducting experimental hydrothermal research on tungsten and molybdenum ore minerals, as well as continuing field and mineralogic studies of ore genesis.

Robert G. Maynard reports that he saw FRED HUMPHREY (Ph.D., 1956) in Reno in February 1977.

RICK HURST (Ph.D., 1975) recently started working at Cal. State University, Los Angeles, after a year or two at the University of California, Santa Barbara. Gary Ernst (the sleuth) reports that Rick is "messing with the oldest rocks in North America (sic) and is ready to attack Cenozoic volcanism in the California Coast Ranges."

SARA JACOBSON (M.S., 1978) is working for the Conservation Division of the USGS on geology related to oil leases off the Atlantic Coast. Gary Ernst reports that she has apparently combined forces with Mike Garcia to produce a manuscript on Crater Lake andesitic clots or something.

TERRY KATO (Ph.D., 1976), Research Geologist at Shell Development Co., Houston, Texas, is studying active continental margins "with all the geologic, seismic, and drill hole data of an industrial titan at his disposal. Also flying around the world to attend scientific sessions (Intl. Geodynamics Meeting, Tokyo; Penrose Conference, Santa Barbara; and other exotic places like the Gulf of Alaska, I think." (Gary Ernst)

Ed Asihene reports that GODFRIED O. KESSE (B.A., 1960) is now the Director of the Department of Geological Survey in Accra, Ghana.

Don Carlisle thinks that SCOTT KEYS (M.A., 1955) is with the Water Resources Department of the USGS in Denver, Colorado.

JOHN KINGSLEY (B.A., 1957, M.A., 1963) wrote Steve Lipshie for a copy of Steve's Geological Guidebook to Long Valley-Mono Craters Region of Eastern California and added, "As ex-president of GSUCLA, I hope the profits from this book go to supply beer at picnics." Editor's note: Profits from this book, now in its third reprinting, are nonexistent. If there were any, they should definitely go to supplying beer for Lipshie.... John's home address: 1595 Josselyn Canyon Road, Monterey, Ca. 93940.

THEODORE A. KONIGSMARK (M.A., 1956) is now in Coral Gables, Florida, working for ESSO Interamerica, Inc. He received a Ph.D. in geology at Princeton University in 1958.

MARK G. KOVINICK (B.A., 1955; M.A., 1956) passed away during 1977.

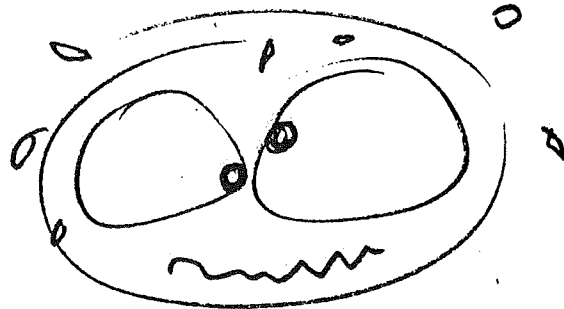
WILLIAM N. KREBS (B.S., 1970) spent 14 months at Palmer Station, Antarctica from December 1971 to January 1973 doing research for his dissertation "Ecology and preservation of neritic marine diatoms, Arthur Harbor, Antarctica," which he finished in December of 1977 at U.C. Davis. He is now a micropaleontologist with Amoco Production Company, Security Life Bldg., Denver, Colorado 80202.

THEKKEY KRISHNAN (Ph.D., 1976) is consulting with Iron Ore Company of Canada. He visited UCLA from November to March.

SHINGI KUNYOSHI (M.A., 1966; Ph.D., 1972) is now with the Bureau of Land Management in Las Vegas, Nevada.

DONALD R. LINDSAY (M.A., 1952) returned to California in June of 1978 to work for Occidental Exploration and Production Company, 5000 Stockdale Highway, Bakersfield, Ca. 93309 in their geothermal program. He had formerly worked for Shell Oil in Texas where he initiated Shell's geothermal project in the Geysers area of Northern California in 1971. They had completed seven commercial steam wells and in July of 1977 signed a contract with the Northern California Power Agency to install a 110-megawatt power plant that they hope to have on steam by 1981. Don was elected Director of the Geothermal Resources Council in March of 1977.

J. G. LIOU (Ph.D., 1970), Associate Professor of Geology at Stanford. Last fall Louie received the MSA Award from the Mineralogical Society of America. His research includes various field-petrologic studies in western California and two NSF-supported international projects (Taiwan and Japan). Gary Ernst adds, "Louie is also the maitre d' of a large hydrothermal lab. at Stanford. He writes about 10-12 papers a year--all of which I have to review."



PETER P. MARSH (B.A., 1958) is the General Manager, Transmetales Ltda. (subsidiary of Basic Resources International, S.A.), 13 Calle 7-51 Zona 9, Guatemala City, C.A. During 1974 and 1975 he had been District Mining Engineer, USGS Conservation Division, Pocatello, Idaho. In his present position, he manages the mineral development company which operates surface and underground copper mines, prospects in nickel, magnesite, lead-zinc, barite, gold, and manganese. He is also the Secretary of the Guatemalan Geologic Society.

ROBERT G. MAYNARD (A.B., 1941, M.A., 1947) retired from Sun Oil Company in July of 1977 after 30 years in exploration and is presently a full-time consultant to Sun Energy Development Co. (SUNEDCO) in uranium exploration. His current work involves geochemistry of uranium, radon and helium surveys, and remote sensing (active systems applicable to mineral exploration). Home address: 9819 Elmcrest, Dallas, Texas 75238.

CONRAD J. McCARTHY (B.S., Applied Geophysics, 1975) currently is a graduate student in the Department of Geology, University of Washington, Seattle, Washington 98195. He completed his Master's degree in June 1977 and began work on the physics of sediment transport by rainsplash and sheetwash for a Ph.D. thesis. He is using the U.S.D.A. Agric. Res. Service rain tower in Pullman, Washington, for the experimental part of the research.

CALVIN and MOLLY MILLER (Ph.D., 1977, and Ph.D., 1977) are now at Vanderbilt University Department of Geology, Nashville Tennessee 37235 sharing a position as Assistant Professors and awaiting the arrival of their first offspring. Calvin is planning some joint research with Skip Stoddard, and Skip and Calvin will be at UCLA for a visit in early June of 1978.

JOEY NAGEL (B.S., 1972) is the Curator of the M.Y. Williams Geological Museum at the University of British Columbia, Vancouver, British Columbia V6T 1W5 CANADA.

MARCI NELSON (B.S., 1976) is a Museum Guide at the Griffith Park Observatory, 4800 E. Observatory Road, Los Angeles, and is involved in updating the geology exhibits in the Museum. She hopes to have saved enough money to return to school for a Master's degree next September. Home address: 13824 Grevillea, Hawthorne, Ca. 90250.

David V. Wilson reports that he met BRAD NEWMAN (B.S., 1972, M.S., 1975) in Bakersfield at the AAPG meetings. Brad is working for Getty Oil, Box 197-X, Bakersfield, California 93308.

WARREN NOKLEBERG (B.A., 1961) accepted a new position with the Branch of Alaskan Geology in the summer of 1977. He is based in the U.S. Geological Survey, Menlo Park, California 94025. He is working on stratiform lead-zinc deposits, western Brooks Range, Alaska.

JIM NORMAN (B.S., 1974) is now Technical Support Coordinator for American Borate Company, Death Valley, California. The company is engaged in underground mining of a borate orebody, with an expected life of 30-50 years. Jim began work on borate deposits in Death Valley with Tenneco a number of years ago "with the intention of remaining there for three months."

DOROTHY Z. OEHLER (Ph.D., 1973) and JOHN H. OEHLER (Ph.D., 1973) are both research scientists with the Exploration Research Division, Continental Oil Company, P. O. Box 1267, Ponca City, Oklahoma 74601. Their present jobs, working on organic geochemical techniques in petroleum exploration, began in January 1977. They had previously been in Australia working on the paleobiology of Precambrian base metal sulfide deposits for the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Canberra for three years. They have published a dozen or so papers on Precambrian paleontology, silica diagenesis, organic geochemistry, and sedimentary sulfide mineral deposits over the past three or four years and have several more in press or in preparation. Home address: 2425 Kingston Rd., Ponca City, Oklahoma 74601.

E. R. (Bob) ORWIG (B.A., 1946, M.A., 1948, Ph.D., 1957) is a research geologist for Mobil Oil Corp., P.O. Box 900, Dallas, Texas 75221, where he frequently lunches with Robert G. Maynard (A.B., 1941, M.A., 1947).

GARY PARKISON (B.S., 1973) received an M.S. at U.C. Berkeley in 1975. He is now living in Reno and is employed as an exploration geologist in Nevada by International

Minerals and Chemical Corp. (IMC). Home address: 1039 Watt Street, Reno, Nevada 89509.

WILFRED W. PEAK (B.A., 1948) is the Chief Geologist, State of California Division of Safety of Dams, 1416 Ninth Street, Sacramento, California 95814. He is a 29-year employee of the California Department of Water Resources. In his new post, Peak is staff advisor in all geologic work related to DWR's planning, design, construction, and operation activities, including the State Water Project. He has been chief geologist in the Department's Division of Safety of Dams since 1964 and earlier was involved in the geologic investigations for the design and construction of the Project. He served on the Board of Registration for Geologists for six year, ending in 1975, and was the Board's first president for three years beginning in 1969. Home address: 6360 Eichler Street, Sacramento, California 95831.

B. J. PRESLEY (Ph.D., 1969) is an Associate Professor in the Department of Oceanography, Texas A & M University, College Station, Texas 77843. His work, under five different granting agencies, covers "Sediment-seawater interactions," "South Texas outer continental shelf monitoring," "Trace metal behavior in the river-seawater mixing zone, anoxic marine environment and open ocean," "Analytical, biological, geochemical, and oceanographic studies of ocean dumping of industrial waters in the Gulf of Mexico," and "Chemical analysis of marine waters." He attended the AGU Fall Meeting in San Francisco, the AGU National Meeting in Washington, D.C., and has published several papers during 1977.

RICHARD REDFERN (M.S., 1977). From June 1975 through March 1976, he served as a Junior Geologist in the uranium exploration program of Public Service Co. of Oklahoma. His work included evaluation of stratabound uranium deposits in Arizona and vein-type deposits in Colorado and Arizona. From March 1976 he has been a Geologist in the Denver office of Urangesellschaft U.S.A., Inc. His work for this company has included evaluation of roll-front uranium deposits in South Dakota and geologic and radiometric surveys in parts of the Great Plains and Basin and Range Province. Home address: 2160 S. Holly St., #200, Denver, Colorado 80222.

LOWELL REDWINE (A.B., 1935, M.A., 1937, Ph.D., 1972*) reentered consulting practice on October 1, 1976, after retiring from the exploration group of the Union Oil Co. Research Department. He is a member of the AAPG Distinguished Lecture Committee. *He adds "it was nice to be remembered by Professor Hall in the 1976-77 Newsletter and listed on page 5 as a '...recent geology graduate.' For the record, however, he indicated that I was 'retreaded' in 1973, but actually I received my Ph.D. in September 1972, almost on my 61st birthday, so I remember the occasion quite well. He may have been misled by the peculiar copyright date (1973) on my dissertation." Address: 2728 Loreto Avenue, Costa Mesa, California 92626.

MARCELLE RICHARDSON (B.S., 1976) and Brian Dicker (B.A., 1976) were married in Trinidad on September 10, 1977. The new Mrs. Dicker had been associated with Trinidad-Tesoro Oil Company, Ltd., before her marriage. Home address: 9837 Tabor #7, Los Angeles, Ca. 90034.

JACK SARGEANT (B.A., 1958) is working for Honeywell Marine Systems in Seattle, Washington, according to Joe Galbreath (B.A., 1958).

MARGARET SAUNDERS (M.A., 1977) is a Research Geologist at Shell Development Co., New Orleans, doing well and getting lots of salary raises.

MICHEL SEMET (Ph.D., 1973) is an Associate Professor at the Institut du Physic du Globe, University of Paris. Michel for many years worked on the ion probe prototype, but is now studying eruptions of various types of volcanos and associated phenomena around the entire world.

ARSEN A. SHAHNAZARIAN (B.A., 1961) is a geologist and petroleum engineer with Hunnicutt & Camp Drilling Company, P.O. Box 399, Rio Vista, California 94571. Home address: 2121 Alturas Court, Fairfield, California 94533.

BOB SHANK (B.S., 1973) is a geologist with Union Carbide at their tungsten mine at Tempiute, Nevada. Address: P.O. Box 521, Alamo, Nevada 89001.

MARLENE (REAMER) SHUFORD (B.A., 1955) receive a Master of Science degree in June of 1977 from the University of Oregon on thesis research involving biostratigraphy and sedimentation rates of the Taiwan continental slope. She is now a consulting geologist in Eugene, Oregon. Address: 4265 Perry Street, Eugene, Oregon 97405.

WARREN B. SMITH (B.A., 1950) is a research specialist in chemistry with McDonnell Douglas Corporation, Huntington Beach, Ca. 92647. He comments that since the departmental name has been changed, it now includes him as a space scientist, though he has not been active in geology. His work is chemical analysis and testing of space vehicle components and propellants (27 years with Douglas Aircraft and McDonnell Douglas). Home address: 2617 Mountain Pine Drive, La Crescenta, California 91214.

PARKE D. SNAVELY, III (B.S., 1975) is a graduate student in the Ph.D. program at U.C. Santa Cruz. He has been working on sedimentary petrology and depositional history of the Thebes Formation, Egypt, and implications for Cenozoic rifting of the Red Sea. He is also helping to organize U.C.S.C.'s field camp program which he has taught for the last two springs at Poleta Folds and adjacent environs. Address: Earth Sciences Board, University of California, Santa Cruz 95064.

FRANK SPEAR (Ph.D., 1976) is finishing up a post doc. at the Carnegie Institute's Geophysical Laboratory. He has accepted a faculty position in the Geology Department at M.I.T., and will take up residence there in the Fall of 1978. Gary Ernst adds that Frank is "now goofing off in New England (i.e., field work in Maine)." Address: Geophysical Laboratory, 2801 Upton Street NW, Washington, D.C. 20008.

SKIP STODDARD (Ph.D., 1976) is teaching at the Department of Geoscience, North Carolina State University, P.O. Box 5966, Raleigh, North Carolina 27607, but will return to UCLA with Calvin Miller to bug Bob Jones and the microprobe this summer.

DOUGLAS H. STILES (B.A., 1953) is working on the Cretaceous of Wyoming's Powder River Basin as a geologist with Marathon Oil Co., Casper, Wyoming 82601. He was transferred to Casper in 1964.

HAROLD H. SULLWOLD, Jr. (B.A., 1939, M.A., 1940, Ph.D., 1959), a geologist with Geo. H. Roth & Assoc., North Hollywood, Ca., 5210 Carpinteria Avenue, Carpinteria, California 93013, has been specializing in exploration for gas in the Sacramento

Valley for the past 18 years. In September of 1977 he was chairman of the two-day short course (attendance 149) on deep water sand reservoirs that was offered in Ventura for the Coast Geological Society. His Tarzana Fan paper of 1960 was included in Benchmark Papers in Geology 1976 volume, Submarine Canyons and Deep-Sea Fans. Home address: 560 Concha Loma Drive, Carpinteria, Ca. 93013.

JERRY TREIMAN (B.A., 1972) has been working as a geologist with the California Division of Mines and Geology since October 1977. At present he is mapping in the Newhall quadrangle.

RICHARD S. TREMAINE (B.A., 1947) is Vice President, Division Manager, Amoco Production Co., P.O. Box 50879, New Orleans, Louisiana 70150, a position he has held since July 1973. He had previously been the Vice-President in charge of exploration. Home address: 3610 Red Oak Ct., New Orleans, Louisiana 70114.

TOM TROUTMAN (B.A., 1974) worked as an exploration geologist on borate deposits in Death Valley for Tenneco Mining Co. from 1974 to 1976. Since Fall 1976 he has been a graduate student at the University of Nevada, Reno, in an M.S. program in the area of mineral deposits. During the summer of 1977 he was employed as an exploration geologist in Nevada for Duval Corp. Home address: 1039 Watt Street, Reno, Nevada.

STEVEN USDANSKY (B.S., 1976) is a Ph.D. candidate in mineralogy-petrology at the Department of Geology and Geophysics, University of Minnesota, Minneapolis, Minnesota. He is developing purely geometrical and topological methods for classifying and examining petrogenetic grids in n-dimensional spaces, and is mapping in the Precambrian basement terrane near Gunnison, Colorado. Address: Department of Geology and Geology and Geophysics, 108 Pillsbury Hall, 310 Pillsbury Drive SE, Minneapolis, Minn. 55455.

WM. RANDALL VAN SCHMUS (Ph.D., 1964), Professor of Geology, University of Kansas, Lawrence, Kansas 66044, has main research interests in deciphering the Precambrian geology and geochronology in the Great Lakes area with particular emphasis on Wisconsin and Upper Michigan. He is currently serving as an Associate Editor for the Geological Society of America Bulletin, plus serving as a member of the Lunar Sample Analysis Planning Team (LSAPT) for NASA. Home address: 813 W 27th Terrace, Lawrence, Kansas 66044.

DONALD D. WALLS (B.A., 1959), is Chief Engineer, New York Commercial Division, Mobil Oil Corporation, 670 White Plains Road, Scarsdale, New York 10583.

JOHN E. WARME (Ph.D., 1966) is on a leave of absence from Rice University, Houston, Texas 77001, to teach advanced paleontology at UCLA.

ROBERT W. WEBB (A.B., 1931) retired from teaching in February of 1975 but was recalled to active service as a Professor Emeritus at the University of California, Santa Barbara, California 93106. He was a visiting professor at the University of Colorado Shipboard Education Program Semester at Sea aboard the S.S. Universe--a trip round the world teaching general geology, marine geology, and environmental geology from February to June of 1977. His book, Geology of California (Wiley), coauthored with Robert M. Norris, was released in January of 1977. Home address: 898 Via Campabello, Santa Barbara, Ca. 93111.

WARREN WEGNER (Ph.D., 1977) is busy reading books. Home address: 5620 S. Eighth Street, South Arlington, Virginia 22204.

DAVID V. WILSON (M.S., 1975) was transferred from Bakersfield to a new office, 2323 Knoll Drive, Ventura, as a geophysicist for Union Oil Company of California, P.O. Box 6176, Ventura, Ca., 93003. He is currently working as a regional geophysicist in the San Joaquin Basin. Home address: 5490 E. Holly Ridge Drive, Camarillo, Ca. 93010.



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PROFESSIONAL AND OTHER ACTIVITIES (DEGREES FROM OTHER SCHOOLS;
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COMMENTS: