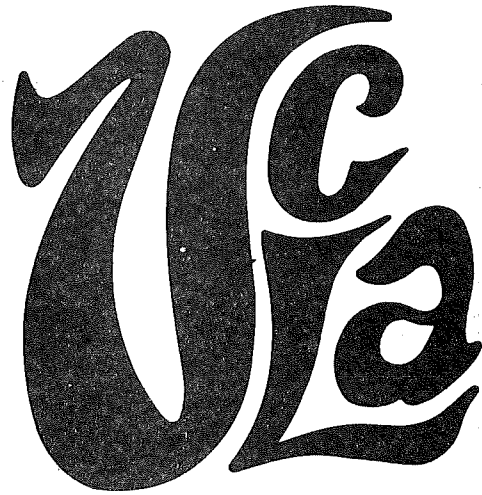
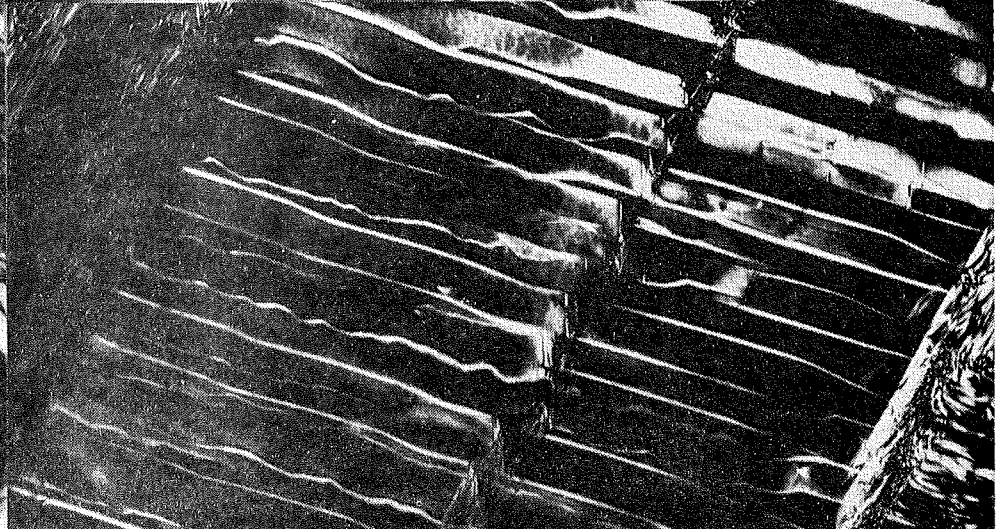
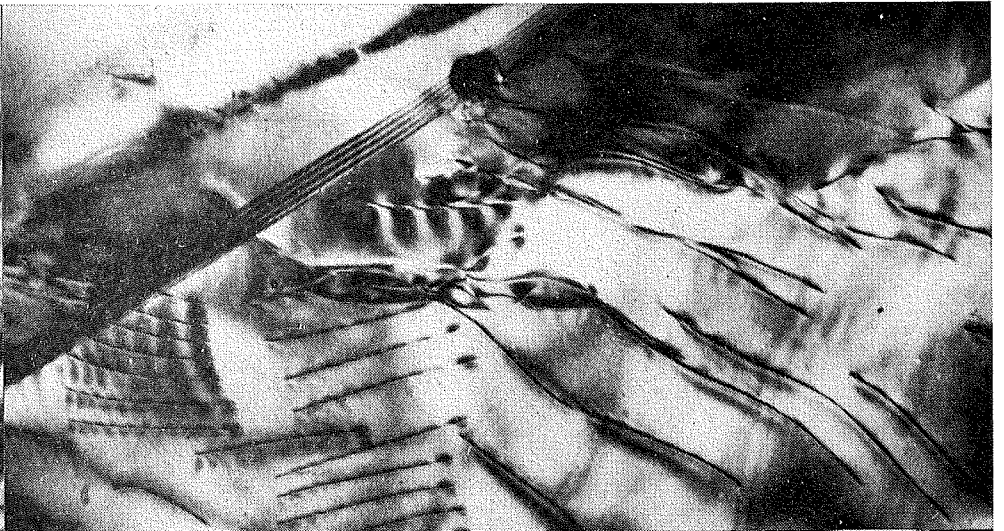
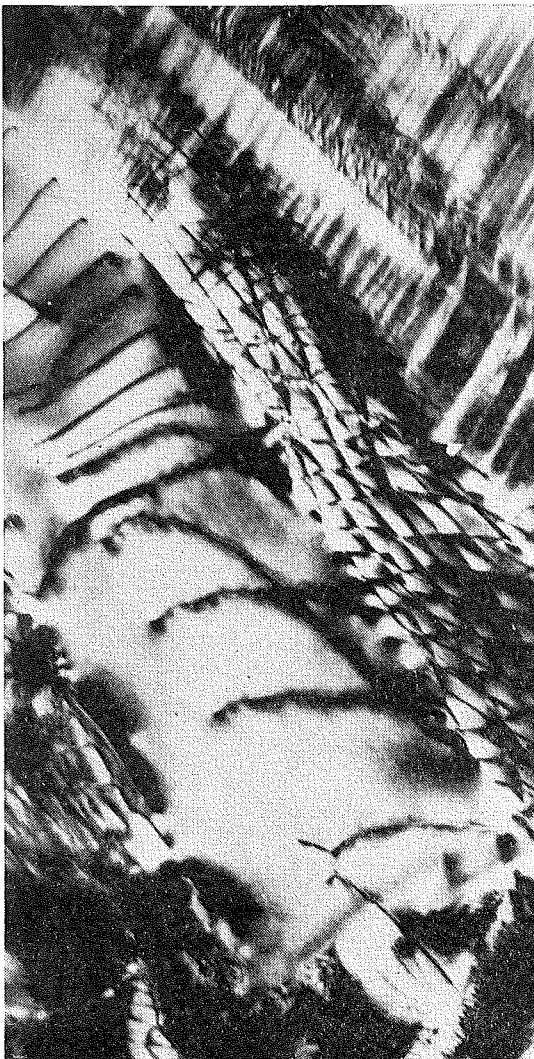


**Geology
Department**



**1970
Newsletter**



THE COVER

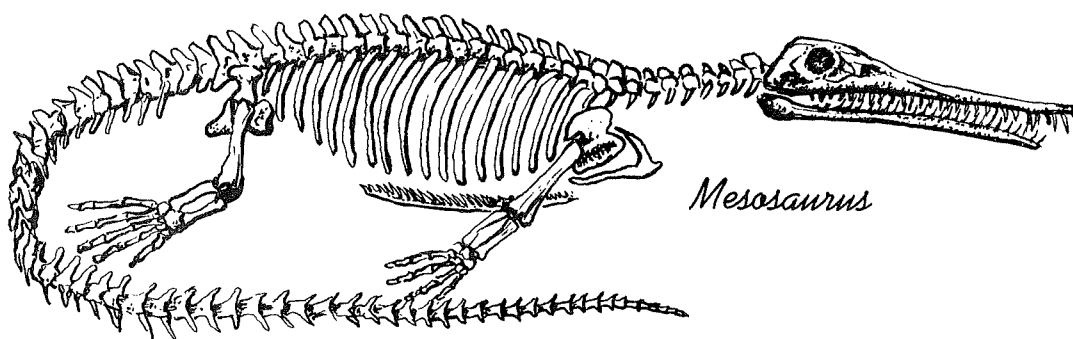
Cover illustrations represent some of the work being done at UCLA on lunar samples. The top row of illustrations are of glass spheroids that form the lunar dust, collected by the Apollo 11 mission from the Mare Tranquillitatis, July, 1969. The dust is believed to result from impact melting caused by meteorites. Some spherules show surface pitting (top left) or a vesicular appearance (top center) due to degassing as the material solidified. The left specimen also shows a "hypervelocity impact crater" at the top. Some are dumbbell-shaped (center) or show beaded surfaces due to collection of splatter droplets during solidification (top right). Illustrations are scanning electron micrographs (bars represent 0.1 mm) taken with the Geology Department JEOLCO JSM-2 Scanning Microscope by J. W. Schopf.

The three lower figures are among the first direct transmission electron micrographs ever made of rocks. The specimens of Lunar Rock 10029 were thinned by argon bombardment, and the extremely thin slices then photographed on a million volt electron microscope at the U. S. Steel Research Lab at Pittsburgh. The left figure shows a diagonal grain boundary between plagioclase (lower left) and pyroxene (upper right). The plagioclase shows arrays and networks of dislocations, and the pyroxene shows characteristic exsolution structures of augite and pigeonite (X 32,000). The right center figure is of plagioclase, showing twin boundary at top left (with dark and light interference fringes) and arrays of dislocations (black linear features) (X 10,200). The lower right figure is a pyroxene crystal, showing two sets of lamellar exsolution structures, approximately 100 angstroms in thickness. This darkfield micrograph is X 26,000. The electron petrography studies are being jointly made by UCLAans J. M. Christie and D. T. Griggs (Geophysics), with S. V. Radcliffe and A. H. Heuer (Case Western Reserve), and R. M. Fisher (U. S. Steel). Photographs courtesy of U. S. Steel.

ACKNOWLEDGMENTS

We are grateful to Chevron Oil Field Research Company, La Habra, California, for reproducing the entire Newsletter in their laboratory. Cover illustrations were supplied by J. W. Schopf and John Christie; the transmission electron micrographs by courtesy of U. S. Steel. Cover drafting was done by Jeanie Martinez, sketches by Vicki Doyle and Julie Guenther, and typing by Vicki Doyle. All those who supplied data, news items, and information are also gratefully acknowledged, as the Newsletter could not be compiled without their assistance.

Helen Tappan Loeblich



The sea floors form mountains by an inch every year,
But Nature at times more impatient can be
With avalanche, earthquake, volcano or flood
Fast changing the border between land and sea.

Rememb'ring the past, with less volatile changes,
I'll admit to nostalgia for ivory towers,
Yet time won't turn backward, 'tho wish it we may,
Just sundials record only sunny hours.

We're challenged on all sides by problems galore,
Solutions escape us, yet time's running out
While people and pesticides, trashpiles and smog
Earth Spaceship's bright future leave still
more in doubt.

The youth that we've taught learned their lessons
quite well,
So they've now little patience for talk and delay
They're aware that as always the Meek may be Blessed,
But the earth they'd inherit, 'stead of green
would be gray.

Everyone is certainly aware that college campuses are making news these days, and UCLA is no exception. Strangely enough, the largest part of this "news" does not reach the front pages or the TV newscasts. Some of the news items below about the Geology Department may have escaped your notice.

Probably the most advertised item was the display of moon rocks that became the major feature of the UCLA Open House on October 19. Some 19,055 visitors viewed the display of an ounce and a half of the lunar dust (see cover of the Newsletter) and rock fragments in a six-hour period. Four lines of visitors formed to pass by the outdoor exhibit of photos and rocks in display cases. At least another 3,700 UCLAans had already seen the display during three days prior to the formal Open House. The moon rock display was organized and prepared by Geology Museum Curator David Weide, Jeanie Martinez, Vicki Doyle, and Stephen Lawrence of the Institute of Geophysics and Planetary Physics.

During the afternoon of the Open House, some 600 people listened to a panel discussion of the analyses of the lunar material by Geology faculty members Isaac Kaplan, J. William Schopf, George Wetherill, and Chemistry faculty member, John T. Wasson.

Lunar samples were studied and reports published in the Special Issue of Science, v. 167 (January 30, 1970) by the above-mentioned Geology faculty, Kaplan, Schopf, and Wetherill and by John Christie, as well as by additional UCLAans from Chemistry and Geophysics.

In May a more earthly special exhibit in the Geology Library displayed assorted fossils of various ages, including specimens of the Permian aquatic reptile Mesosaurus brasiliensis from the Xisto formation of Brazil. The distribution of this small fresh-water reptile in Brazil and in the Dwyka Formation of Africa was long one of the major bits of paleontologic evidence for the theory of Continental Drift. The theory recently has been rejuvenated through paleomagnetic evidence and the concept of ocean-floor spreading.

Many other geologic activities are covered in the news of faculty members and present graduate students in later sections of the Newsletter. However, it is interesting to observe that two of the major awards presented at the last G.S.A. meeting went to UCLA geologists. W. Gary Ernst received the annual award of the Mineralogical Society of America, and Ronald Shreve received the Kirk Bryan award of the Geomorphology Division of the G.S.A.

Our Department and UCLA were particularly well represented at the First North American Paleontological Convention, held in Chicago, September, 1969. Among the 80 invited speakers at the various symposia were N. Gary Lane, J. William Schopf, and Helen Tappan Loeblich, members of the Geology Faculty; Everett C. Olson and Peter Vaughn, Vertebrate Paleontologists in the Department of Zoology Faculty; William C. Cornell, graduate student in Geology; and Jere H. Lipps (UCLA graduate and Ph.D.) of the U.C. Davis Faculty. At one time a UCLA faculty member was speaking at each of the three concurrent sessions. The six current UCLAans outnumbered those from any other University, Harvard being second with four representatives, Berkeley, Princeton, and Michigan having three each, and the other institutions of North America being represented only by one or two.

Last year's newsletter reported the death of Michael deWitt Lien in a plane crash in Alaska. He had been employed by the Cities Service Oil Company following his graduation the previous month. This year, his parents, Mr. and Mrs. Floyd Lien, donated a number of books to the Geology Library in memory of their son. In addition, the Cities Service Company has granted \$5000 to

be administered by the UCLA Foundation, the interest to provide a yearly scholarship of about \$250 for a deserving senior Geology major, the award in memory of Mike to be made at the beginning of the student's fourth year of study.

Regardless of what you may have read or heard from other sources, Geology courses were not restructured into political action groups this year. In fact the graduate students and faculty could be found hard at work in their laboratories during the "Moratorium," just as during the more usual periods of the year. This was not because of disinterest, but due to a necessity for budgeting time closely. For that matter, the building is rarely empty on weekends or holidays. A recent University-wide study of the activities of faculty members, based on questionnaires, interviews, and computer-aided studies of a random sample of the faculty, was compiled for presentation to the Board of Regents by President Hitch. The report indicated that the average faculty member works a 60-hour week, about 2/3 of this (40 hours) being related to instruction. Some 31.3 hours per week were involved in teaching, course preparation, or student advising, supervising, and consultation; and some 8 hours of research time per week was directly linked to instructional results. During the three quarters of the year, about 70 percent of the faculty work 50 to 71 hours weekly, and only when examination periods and summers are averaged in does the average work-week drop to 58.3 hours.

For some more statistics that might be of interest, the report released in January of the National Register of Scientific Personnel states that the median salary for earth scientists is below that for Chemistry, Atmospheric and Space Sciences, Physics, Mathematics, Computer Sciences, Biological Sciences, Psychology, Statistics, and Economics, but slightly above that for Agricultural Sciences, Sociology, Political Science, Anthropology, and Linguistics. Those in educational institutions, both in earth sciences and in science as a whole, had median salaries below those for federal or other government employees, industry, non-profit organizations, or self-employed scientists. The median salary level for scientists in the Los Angeles-Long Beach area employed by educational institutions was only 80 percent of the median for scientists in the area.

One reason why the faculty keeps so busy is the still-growing student enrollment. During the 1969-1970 academic year, UCLA had the largest total increase in students of any of the University of California campuses (an increase of 1939 students last fall over the enrollment of the previous fall quarter). This brought the UCLA total to 28,563 students on the general campus; an additional 2,373 in the medical sciences gave a campus-wide total of 30,936 students. (In contrast, Berkeley's general campus enrollment dropped by 44 students from the previous year to a total of 28,088 students.)

Institute of Environmental and Evolutionary Biology

This new institute was created on the UCLA campus in 1970 with Vertebrate Paleontologist Professor Everett C. Olson of the Department of Zoology as Acting Director. Members of this Institute from the Department of Geology include Drs. Clarence Hall, I. R. Kaplan, Gary Lane, Helen Loeblich, and J. W. Schopf. Others are from the Departments of Anatomy, Anthropology, Botanical Sciences, Engineering, Geography, Geophysics, Psychiatry, Public Health, and Zoology. Gary Lane is on the Advisory Committee for the Institute and J. W. Schopf on the Program Committee.

Lectures sponsored by the Institute thus far include:

- Dr. Ralph C. Johnson, University of Chicago, "Variations in diversity within marine Benthonic communities," March 10, 1970.
- Dr. Alexei P. Kusnetsov, Institute of Oceanography, Academy of Sciences of the U.S.S.R., Moscow, "Trophic zonation of marine bottom fauna: Principles and observations," March 31, 1970.
- Dr. Stephen T. Emlen, Cornell University, "Unsolved problems in bird navigation," April 8, 1970.

Undergraduate Seminar

A new addition to the curriculum was the Undergraduate Seminar, "Frontiers in Earth Science," first offered in the fall quarter, 1969-1970. Nine one-hour lectures were given, the undergraduate majors in geology enrolling for two units on a passed-non passed basis. Graduate students, staff and visitors also attended, although in future years, attendance may be restricted to the undergraduates. Different speakers and topics will be covered in successive years. Those of the first year were:

- Dr. N. G. Lane, "Mississippian Crinoidal Zonation," October 6, 1969.
- Dr. G. Oertel, "The problem of slaty cleavage," October 13, 1969.
- Dr. W. G. Ernst, "Low Grade Metamorphism in Western California and Japan," October 20, 1969.
- Dr. G. Kennedy, "Fine Structure of the MOHO," October 27, 1969.
- Dr. H. T. Loeblich, "Frontiers in Micropaleontology," November 10, 1969.
- Dr. K. D. Watson, "Kimberlites and Carbonatites," November 17, 1969.

- Dr. G. W. Wetherill, "Lunar Geology," November 24, 1969.
- Dr. J. L. Rosenfeld, "Piezothermometry from Piezobirefringence Around Inclusions in Minerals," December 1, 1969.
- Dr. J. W. Schopf, "Recent Advances in Precambrian Paleobiology," December 8, 1969.

Lecture Series, 1969-1970

The lecture series is sponsored jointly by the Department of Geology and the Geological Society of UCLA. Lectures are open to the public, and most are advertised in the University Weekly Calendar that is distributed to other institutions and companies in the area, as well as on the campus. When notice of visitors is too short for such publication, the departmental bulletin boards must suffice. Lectures are a considerable aid to the students and faculty alike, as they cover a wide variety of the current trends and newer ideas of geology. Those during the past academic year are listed in order of presentation.

- Dr. Gregory A. Davis, University of Southern California, Los Angeles, "Implications of Tectonic Correlations between the Klamath and Sierra Nevada Mountains," October 23, 1969.
- Dr. Stephen Jay Gould, Museum of Comparative Zoology and Department of Geology, Harvard University, "Towards a Science of Form,--a Paleontological Perspective," October 30, 1969.
- Dr. L. S. B. Leakey, Director, National Museum for Prehistory and Paleontology, Nairobi, Kenya, "East-African Origins of Proto-Man, Near-Man, and Man Himself," November 3, 1969.
- Jan Tullis and Terry Tullis, Department of Geology, UCLA, "A Japanese Summer" (illustrated with slides), November 5, 1969.
- Dr. Yan Bottinga, Department of Geology, University of Oregon, "Present Aspects of Molten Silicates," November 20, 1969.
- Mr. James M. Cole, District Geologist, Humble Oil and Refining Company, "Geology of the Ventura Basin as an Approach to Exploration of the Continental Margin," December 4, 1969.
- Mr. David Lachlan Meyer, Peabody Museum of Natural History, Yale University, "Functional Morphology and Living Habits of Shallow Water Crinoids of the Caribbean Sea," December 10, 1969.
- Professor J. F. Dewey, Department of Geology, Cambridge University, "The Alpine Plate System," December 11, 1969.

- Professor E. Julius Dasch, Department of Geophysics and Geochemistry, The Australian National University, "Strontium Isotopes in Sediments and Sedimentary Rocks," January 12, 1970.
- Dr. R. H. Dott, Jr., Department of Geology, University of Wisconsin, "Tectonics of Southwest Oregon and Related Areas," January 15, 1970.
- Dr. J. H. Dieterich, Geophysicist, U. S. Geological Survey, Menlo Park, California, "Computer Experiments on Mechanics of Folding," January 22, 1970.
- Mr. James T. Sprinkle, Museum of Comparative Zoology, Harvard University, "Evolutionary Patterns in Early Attached Echinoderms," January 23, 1970.
- Dr. J. H. Dieterich, U. S. Geological Survey, Menlo Park, "Computer Modeling of Fault Zone Tectonics and Seismicity," January 23, 1970.
- Dr. Dennis S. Wood, Department of Geology, University of Illinois, Urbana, Illinois, "Quantitative Rock Deformation in Relation to Slaty Cleavage," January 27, 1970, and "The Structural Solution of the African Continent," January 28, 1970.
- Mr. Stanley Margolis, Department of Geology, University of California, Riverside, "A Study and Interpretation of Quartz Sand Grain Surface Textures from Electron Microscopy," February 12, 1970.
- Dr. Harry Mutvei, Naturhistoriska Riksmuseet Paleozoologiska Sectionen, Stockholm, Sweden, "The Ultrastructure of the Nacreous Layer in Some Recent and Fossil Molluscs," February 26, 1970.
- Dr. Christoph Hemleben, University of Tubingen, Germany, "Ultrastructure of Planktonic Foraminifera based on SEM (Scanning Electron Microscope) Observations," April 6, 1970.
- Dr. Bennie Troxel, California Division of Mines, San Francisco, "Fault Patterns of Death Valley," April 8, 1970.
- Dr. George W. Wetherill, Chairman Department of Planetary and Space Science, UCLA, "Radiometric and Impact Dating of Lunar Terranes," April 28, 1970.
- Dr. John M. Christie, Department of Geology, UCLA, "High Voltage Transmission Electron Microscopy of Apollo 11 Lunar Rock (or The New Cosmic Electron Petrography)," April 30, 1970.
- Dr. John Suppe, Department of Geology, UCLA, "Offset of Mesozoic Basement Terranes by the San Andreas Fault System," May 14, 1970.

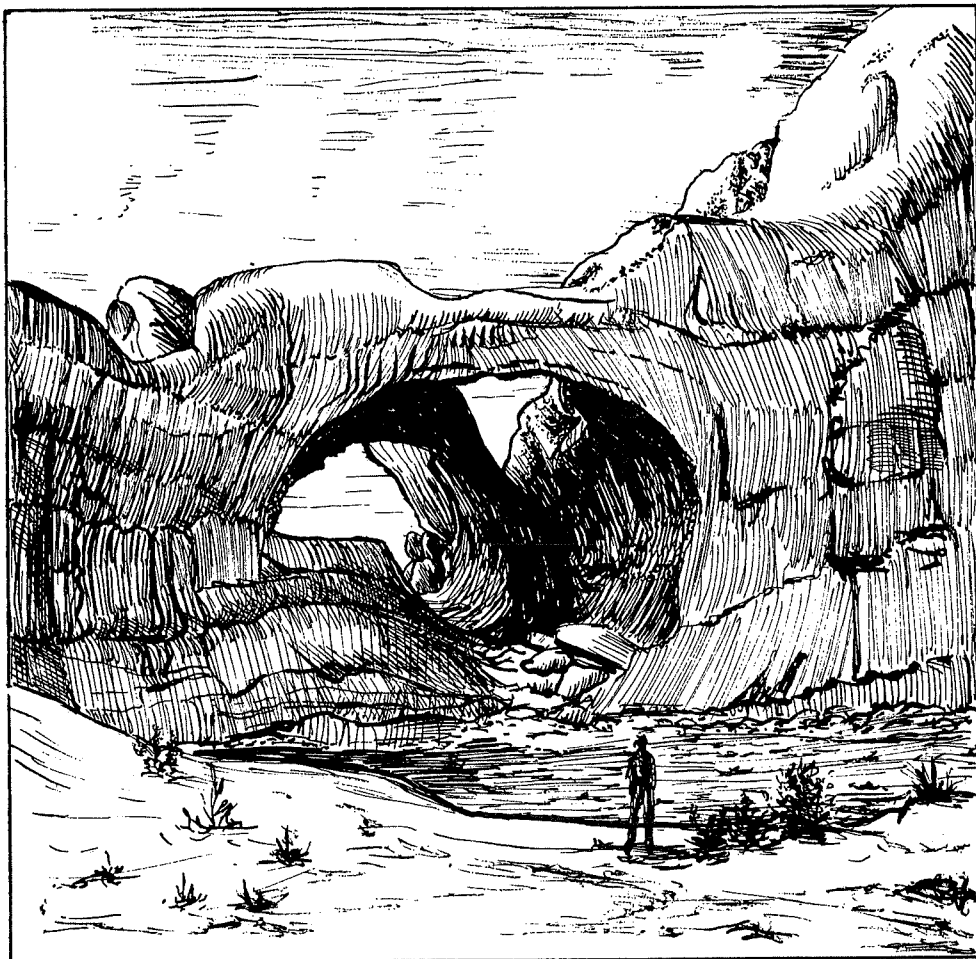
Dr. Robert Garrels, Professor of Geochemistry, Scripps Institution of Oceanography, University of California, San Diego, "Long Term Diagenetic Changes in Sedimentary Rocks," May 18, 1970.

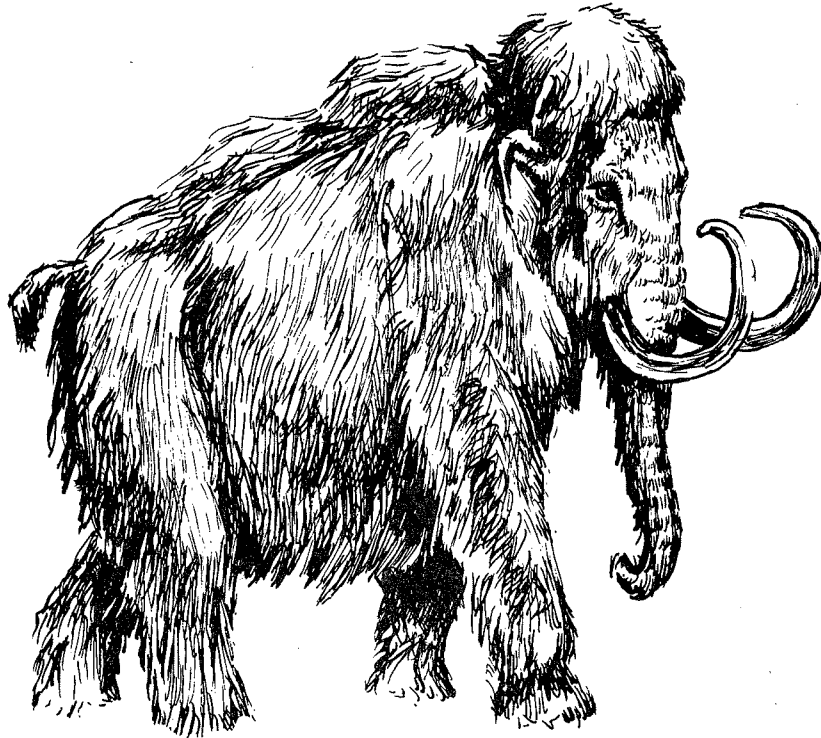
Professor Arden L. Albee, Division of Geological Sciences, California Institute of Technology, Pasadena, "Lunar Petrology," May 28, 1970.

Mr. Robert J. Parks, Asst. Laboratory Director for Flight Projects, Jet Propulsion Laboratory, Pasadena, "Life in our Solar System? (Particular Emphasis on Mars)," June 3, 1970.

Dr. Robert Coe, Department of Geology, University of California, Santa Cruz, "The Effect of Non-Hydrostatic Stress on Coherent Polymorphic Transitions," June 4, 1970.

Dr. Lisa Heller, Department of Geology, Hebrew University, Jerusalem, "Interaction of Clays with Organic Molecules," June 9, 1970.

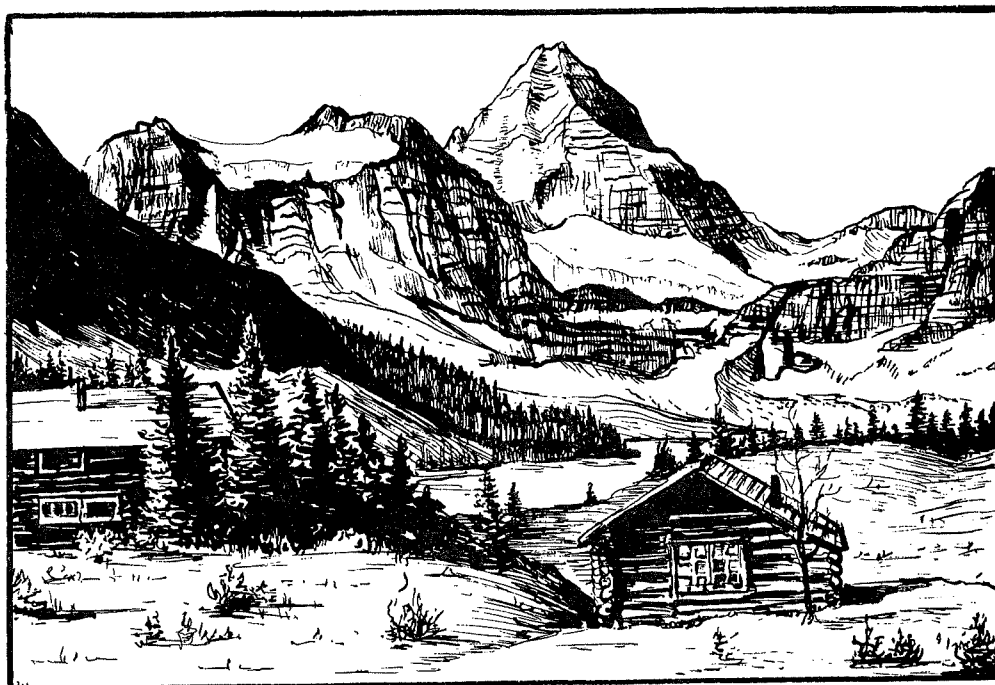




Faculty News

During each year that the Newsletter has appeared, some changes have been reported in the faculty roster. Of those occurring this year, Clem Nelson continued as Chairman through the fall quarter (1969) then left for an eight-month sabbatical leave, during which time Gary Ernst became Acting Chairman. Clem returns in the fall (1970), and Gary leaves for Switzerland but will become Chairman again in 1971. Gary Lane served as Vice Chairman and Graduate Advisor until February, at which time Ken Watson replaced him in this position, and Lane could spend more time in his duties as Co-editor of the Journal of Paleontology.

Ronald Gibbs, a member of our Department for three years, left in January, 1970, to become Associate Professor at Northwestern University. Malcolm J. Rutherford had been a post-doctoral fellow and Acting Assistant Professor during the year but left August 1 to become an Assistant Professor at Brown University. Terry Tullis had been Acting Instructor while completing his Ph.D. here and also joined the faculty at Brown University. Two new additions to the faculty as of July, 1970, will be on leave for the coming academic year, joining us in 1971. These are James Dieterich, at present with the U.S.G.S. at Menlo Park, and Douglas Rumble from Harvard. More data on these new additions to the faculty are included in the section on faculty news.



THE FACULTY

Donald Carlisle, Ph.D., Wisconsin. Professor; Associate Dean, Graduate Division.

As Associate Graduate Dean, Don has been largely concerned with student support, particularly educational opportunities for minority students at the graduate level. Since 1967 the program, now known as Masters and Doctoral Advancement Fellowship Program, doubled twice and now has tripled. Perhaps of greatest interest is the fact that the Black Graduate Student Association has developed into a thoroughly constructive, cooperative, and realistic organization. A new factor was the rise of a Chicano Graduate Student Association with its vigorous thrust for parity. Don reports that there have been stormy sessions, and more will undoubtedly follow; but he strongly believes that through education and opportunity the needed solutions will appear. An interesting and positive new development is the gradual spread of minority students into fields other than the social sciences and humanities. Thus far, the Life Sciences have participated in this more than the Physical Sciences, even though Gary Lane and Ken Watson as Geology Graduate Advisors have actively searched for candidates with geologic interests.

In addition to his administrative duties, Don taught his seminar course in geology this year. During the early part of the current summer, Don and Takeo Susuki (Senior Museum Scientist) examined numerous Upper Triassic sections over the whole of Vancouver Island, British Columbia, as an extension to their Iron River and Open Bay work and to accumulate data for better paleogeographic control. As Don's NSF Undergraduate Research Participation Grant was renewed, five students will accompany him in the field in British Columbia during August and September. One graduate dissertation was completed under his direction this year, that of K. Asihene on the magnetite deposits of Texada Island, British Columbia.

John M. Christie, Ph.D., Edinburgh. Professor.

Much effort during the year was spent in a collaborative study of the moon rocks obtained by the Apollo missions (see cover photos), in part using transmission electron microscopy techniques for which they coined the term "electron petrography." John and D. T. Griggs (Institute of Geophysics, UCLA) collaborated with metallurgist S. V. Radcliffe and ceramist A. H. Heuer, both of Case Western Reserve University, and R. M. Fisher, Manager of Physics at U. S. Steel's Bain Fundamental Research Laboratory, in using both the conventional 100 KV electron microscope and the million-volt electron microscope at U. S. Steel. Both lunar rocks and terrestrial ones were examined after thinning to one micron or less in an ion-bombardment thinning device at UCLA. The new techniques reveal sub-microscopic structures and provide new information on the history of crystallization, cooling, deformation, and radiation in the lunar rocks and give new insight into the structure of terrestrial minerals and rocks. Professor Griggs received the Walter Bucher Medal of the American Geophysical Union (third recipient) for his contributions to understanding the deformation of the earth.

Christie and Griggs attended the January 5-8 Lunar Science Conference in Houston; papers on the "electron petrography" appeared in the Moon Issue of Science and the three volume "proceedings" in Geochimica et Cosmochimica Acta. A contribution has also been accepted for the Seventh International Congress of Electron Microscopy, to be held in Grenoble, France, August 30 - September 5.

The rock deformation project also is progressing well, with new discoveries made in the areas of preferred orientation of quartz, calcite, and olivine, and the flow mechanisms and flow laws of quartz and olivine. Papers on these topics were presented at the national AGU meeting by graduate students, of whom four, D. Baker, J. Blacic, J. Tullis, and T. Tullis, will complete degrees before September.

Publications include, "High-voltage transmission electron microscopy of lunar surface material," Science, v. 167, p. 638-640 (1970) (with S. V. Radcliffe, A. H. Heuer, R. M. Fisher, and

D. T. Griggs); "High voltage (800 KV) electron petrography of Type B rock from Apollo 11," Proc. Apollo 11 Lunar Science Conf., Geochim. et Cosmochim. Acta, v. 1, p. 731-748 (with same co-authors as above); "HVEM study of substructure of Apollo 11 and 12 lunar samples," Proc. VIIe Congrès Internat. Microscopie Electronique, Grenoble, France (with above co-authors and J. S. Lally); and "Syntectonic and annealing recrystallization of fine-grained quartz aggregates," Bruno Sander Festschrift, Springer-Verlag (in press, with H. W. Green and D. T. Griggs).

James H. Dieterich, Ph. D., Yale University. Assistant Professor.

Jim was appointed as of July 1, 1970, on leave of absence for the current academic year. He will join us in 1971, either in September or the following January.

Currently at the National Center for Earthquake Research, U.S.G.S., Menlo Park, California, his interests include theoretical and experimental tectonophysics, earthquake prediction, and computer modeling of faults and folds.

Wayne A. Dollase, Ph.D., M.I.T. Associate Professor.

Since the last yearbook, papers have been published on structural studies of piemontite, mullite, $\text{NH}_4\text{LiSiO}_4$, and staurolite. Wayne also attended the Atlantic City G.S.A meeting and the Washington meeting of the A.G.U. In addition to his experimental crystallographic studies, which are continuing during the summer, he is devoting an increasing effort to computer-based calculations on crystal structural stabilities, distortions, and ordering.

W. Gary Ernst, Ph.D., Johns Hopkins. Professor of Geology and Geophysics, Acting Chairman of Department, January to July, 1970.

Ernst was presented the Mineralogical Society of America Award for 1969 at the 50th Annual meeting of the G.S.A.-M.S.A. in Atlantic City. He also was awarded a N.S.F. 1970 Senior Postdoctoral Fellowship for research in the earth sciences at the University of Basel, Switzerland, during his Sabbatical Leave. He plans to study regional metamorphism in the Pennine Nappes.

During the past year, a petrologic reconnaissance of the Diablo Range was completed, and Gary also jointly taught (with Clarence Hall) the 1970 summer field course in geology, in the area near San Luis Obispo. Lectures were given during the past year at San Diego State College, California Institute of Technology, the University of Washington (2), University of British Columbia, Los Angeles State College, and the University of Wyoming (2). He also presented papers at the V.P.I. conference on chain-silicates, Blacksburg, Virginia; at the G.S.A. annual meeting

(Atlantic City); G.S.A. Penrose Conference on plate tectonics (Asilomar, California); G.S.A. Cordilleran Section (Hayward, California); and the annual meeting of the A.G.U. (Washington, D. C.).

Papers published during the year include "Tectonic contact between the Franciscan mélangé and the Great Valley sequence, crustal expression of a Late Mesozoic Benioff zone," J. Geophys. Res. 75, p. 886-901 (1970); "Comparative study of low-grade metamorphism in the California Coast Ranges and the Outer Metamorphic Belt of Japan," Geol. Soc. America Mem. 124, 280 p. (with Y. Seki, H. Onuki, and M. C. Gilbert) (1970); "Coexisting sodic amphiboles and sodic pyroxenes from blueschist facies metamorphic rocks," Mineral. Soc. America, Spec. Paper 2, p. 241-250 (with H. Onuki) (1969); and "An experimental study of tectonic overpressure in Franciscan rocks," Geol. Soc. America Bull. 81, p. 1325-1338 (with W. F. Brace, and R. W. Kallberg) (1970).

Clarence A. Hall, Jr., Ph.D., Stanford. Professor.

Together with Gary Ernst, Hall will conduct the summer field course in the California Coast Ranges, approximately 30 miles northwest of San Luis Obispo, California. Five weeks of the course will be spent in mapping a series of Jurassic, Cretaceous, and Miocene volcanic, pyroclastic, and sedimentary rocks. During the evenings, rock thin sections will be studied petrographically, and the relationship of the field area to the regional geology will be discussed. The sixth week of the course will be devoted to a study of the classic Tertiary sections of the Great Valley and the igneous and metamorphic rocks of the Yosemite area. Twenty students are enrolled in the course, the largest summer field course since 1959 (when there were 44). The UCLA Geology Department continues to feel a strong commitment to the field geology program and in particular to the summer field course.

Following the summer field course, Clarence will leave for a ten month sabbatical leave in northern Italy. He will be studying cyclic growth layers in Late Cenozoic bivalved mollusk shells from northern Italy as an aid in biogeologic interpretation.

Hall was joint author with R. C. Surdam and D. L. Turner of papers presented at the G.S.A. Cordilleran Section meeting in Hayward, 1970, entitled "Distribution and genesis of authigenic silicates in the Obispo Formation," and "The Obispo Formation and associated volcanics in the central California Coast Ranges - K/Ar ages and biochronologic significance." In press in the California Division of Mines and Geology is his "Geology of the Arroyo Grande Quadrangle, San Luis Obispo County, California."

Isaac R. Kaplan, Ph.D., University of Southern California.
Professor of Geology and Geophysics.

Kaplan was one of the principal investigators for study of lunar samples and undertook studies on the stable isotope geochemistry of carbon and sulfur in the lunar samples. Publication of the results was in the issue of Science devoted to the moon rocks and in greater detail in a Special Lunar Issue of Geochimica Cosmochimica Acta. Some of these studies were made jointly with John Smith of CSIRO Division of Mineral Chemistry, Australia, and Ed Ruth of UCLA.

UCLA is one of two laboratories in the country working on the chemistry of interstitial water in sediments obtained from the JOIDES (Joint Oceanographic Institutions Deep Earth Sampling) deep-sea drilling program. The work here is being carried out by Kaplan and post-doctoral fellow, Dr. B. J. Presley.

A Guggenheim Foundation Fellowship (1970-1971) will allow Ian to engage in research and travel to Japan to attend the International Conference in Biogeochemistry and Hydrogeochemistry, to New Caledonia to study the geochemistry of coral reefs and lagoons, to the volcanic areas of New Zealand, and to study ore genesis in Australia.

Recent publications include "Sulfur isotope studies on Red Sea Geothermal Brines and Sediments," in E. Degens and D. Ross [eds.] Hot Brines and Recent Heavy Metal Deposits in the Red Sea, Springer-Verlag, New York (with R. E. Sweeney, and A. Nissenbaum) (1969); "Uranium Isotopes in sea-floor phosphorites," Geochimica et Cosmochimica Acta 34 (with Y. Kolodny) (1970); and "Endogenous Carbon in carbonaceous meteorites," Science, v. 167 (with J. W. Smith) (1970).

N. Gary Lane, Ph.D., University of Kansas. Professor.

Gary completed his duties as Vice Chairman and Graduate Advisor for the Department at the end of 1969 and on January 1 officially became Co-Editor (with Peter Vaughn of the Department of Zoology) of the Journal of Paleontology (for the Paleontological Society). They spend one day each week at editorial duties.

He attended the First North American Paleontological Convention in Chicago in September, 1969, lecturing on "Crinoids and reefs" in the Symposium on "Reefs--organisms and structures through time." He also attended the G.S.A. meeting in Atlantic City in November. Field trips in several western states in June, 1969, and June, 1970, were made to collect Paleozoic echinoderms. His advanced paleontology class also spent a week in the field between the winter and spring quarters for a Late Paleozoic

biostratigraphic study near Silver City, New Mexico. A somewhat more exciting, but less productive, trip was made with grad student Irv Neder during the Thanksgiving vacation. The University Jeep caught fire while they were traveling across country and was totally destroyed. Irv and Gary escaped with only a few blisters, but considerable loss of personal property, and had to walk about 16 miles before catching a ride with a local rancher for the last 12 miles to the highway.

Helen Tappan Loeblich, Ph.D., University of Chicago. Professor.

Various protistans (unicellular plants and animals) are not only the ancestors, food supply, and source of oxygen for all life on our planet, but also were the cause of, and hence their study should provide the explanation for, a wide variety of geologic "happenings" according to the Loeblich philosophy. An expansion of this hypothesis, "Microplankton, ecological succession and evolution," was presented as the keynote talk for the symposium on "Ultramicrofossils" at the First North American Paleontological Convention in Chicago, 1969. The symposium volume is in press, scheduled to appear in October. Other aspects of these problems are discussed in "Quantification of phytoplankton fluctuations," Amer. Chem. Soc. 14th Ann. Rept. Res., 1970; and in "Geobiologic implications of fossil phytoplankton evolution and time-space distribution" (with A. R. Loeblich, Jr.) Geol. Soc. America, Spec. Paper 127; and "Phytoplankton abundance and Late Paleozoic extinctions, a reply," Palaeogeog., Palaeoclimat., Palaeoecol.; the last two articles are in press but probably will appear prior to the present Newsletter. Other publications of the past year include the annual "Annotated index and bibliography of the calcareous nannoplankton IV," Jour. Paleontology, 1970; and the article on "Foraminifera" for the Encyclopedia of Marine Resources, both with A. R. Loeblich, Jr.

Helen also attended the XI International Botanical Congress in Seattle, 1969, and visited Woods Hole, Massachusetts in 1970 as a member of the advisory panel on Paleontology and Stratigraphy for the JOIDES deep-sea drilling program, with a side visit to the Glomar Challenger drilling ship in Boston.

Graduate studies she is currently directing involve various aspects of Mesozoic and Cenozoic planktonic and benthonic foraminifera, Late Cretaceous silicoflagellates and Archaeomonads, and Late Devonian Acritarcha, the last-named two being supported by a grant from the American Chemical Society Petroleum Research Fund.

In addition to compiling and preparing the annual UCLA Geology Department Newsletter, she is making some progress on a textbook for micropaleontology and hopes to have it completed before the next Newsletter is due!

Joseph Murdoch, Ph.D. Professor Emeritus

Although officially retired, Joe continues to work regularly on his research problems. On February 19 the Department helped him to celebrate his 80th birthday with a many-candled cake in the "coffee room."

Clemens A. Nelson, Ph.D., Minnesota. Professor, Chairman.

Clem was the Chairman until January 1, when he began his sabbatical leave, heading west to Australia, the Soviet Union, east Africa, and Scandinavia. He will return to again take over the Chairmanship temporarily, while Gary Ernst leaves on sabbatical in the fall, 1970. Clem will give a fuller report of his travels next year.

Gerhard Oertel, Dr. rer. nat., University of Bonn. Professor.

Gerhard's research interests continue to be a study of slate fabrics. A recent publication, "Deformation of a slaty, lapillar tuff in the Lake District, England," appeared in the G.S.A. Bulletin, v. 81, p. 1173-1188 (1970). He also lectured on "Mud balls as strain gauges" at the U.C. Santa Barbara Geology Department in May. Field plans for the summer of 1970 are to spend a few weeks in the Labrador Trough of Canada.

Willis Parkison Popenoe, Ph.D. Professor Emeritus.

Also retired for some years, Parky still puts in about a 25-hour week at the office, mainly working on the chapter on Opisthobranchs for the Treatise on Invertebrate Paleontology, which hopefully will be completed by January, 1971. His studies of the later Tertiary fauna of the Bondoc Peninsula, Luzon, Philippines, is expected to be finished by September, 1970. In September of 1969, he took a combined business and pleasure trip through the northeast U. S., with a little time in Ontario and Quebec and a side trip to Chicago to attend the First North American Paleontological Convention. Later he spent about three weeks in the field in northern California in the Redding area, dodging the projectiles of deer hunters. Future plans include a full-time attack on the Cretaceous faunal studies as soon as the two above-mentioned projects have been completed.

John L. Rosenfeld, Ph.D., Harvard. Professor.

Field work in 1970, as during the 1969 season, involved mapping along the Precambrian-Cambrian boundary on the east side of the Green Mountain Anticlinorium in southern Vermont. John attended the 61st Annual Meeting of the New England Intercollegiate Geological Conference at S.U.N.Y., Albany, for field trips in the Berkshires. He also plans to attend the 62nd annual meeting of the N.E.I.G.C. this year at Rangeley, Maine, October 1-4.

His publication "Rotated garnets in metamorphic rocks," appeared as Geol. Soc. America Special Paper 129, 105 pages (1970). (Readers of this UCLA Geology Department Newsletter will recall that we scooped the G.S.A. by publishing a cover picture of the rotated garnets last year!)

In addition to the above, John informs us that he is "very excited about the pioneering results that Herb Adams is getting working here and with Professor Lewis Cohen at U.C. Riverside on his Ph.D. research, 'A petrogenetic grid based on experimentally determined curves of equal strain for almandine and quartz. Increasingly, the work coupled with petrographic observations points toward the validity of the aluminum silicate triple point determined by Bob Newton (Ph.D., 1963, UCLA).'" John is also continuing studies of the geology of the Eastern Highlands of Connecticut with Gordon Eaton.

William W. Rubey, D.Sc., Missouri, Villanova, Yale; LL.D., California. Professor Emeritus of Geology and Geophysics.

Bill Rubey on his half-time at UCLA continues to teach a graduate seminar on structural geology and tectonics during the winter quarter. Each year he finds "repeats" auditing the seminars, which may include such topics as modern concepts of the oceanic basins, processes leading to segregation of continental-type rocks, or the geochemical balance of erosion and sedimentation.

Bill also has continued as Director of the Lunar Science Institute in Houston on the other "half" of his time. He plans to give up the directorship as soon as a successor is found by the Universities Space Research Association, which has the responsibility for the functioning of L.S.I. Bill will continue to be a trustee of U.S.R.A.

In August of 1969 a group of scientists was convened by the Space Science Board of the National Academy of Sciences at Woods Hole, Massachusetts, to discuss and define the scientific objectives of lunar exploration and to develop a logical program for their implementation. The tragic death of Harry Hess, Chairman, on the first day of meetings caused a temporary suspension; but the group decided to continue the meetings as an appropriate tribute, and Bill Rubey was asked to take over the chairmanship. The results of this study have been published by N.A.S. under the title Lunar Exploration, Strategy for Research, 1969-1975.

In January, 1970, Bill co-chaired with ESSA Director, Wilmot Hess, a Symposium on Lunar Science, at the First Annual Meeting of the Division for Planetary Sciences of the American Astronomical Society in San Francisco.

He has been much interested in the possible connection of earthquake activity to fluid injection in deep wells since 1966,

when he served as a member of a panel convened by the Corps of Engineers to report on the Denver earthquakes (see previous Newsletters and Science article in the September 27, 1968 issue). In the fall of 1969 the Advanced Research Projects Agency began investigation of the possible correlation of earthquake occurrence and fluid injection. The Rangely Oil Field in northwestern Colorado was selected for study because of its remoteness, because fluid injection apparently caused small earthquakes, and because the Chevron Oil Company, which owns the field, agreed to cooperate with the U.S.G.S. ARPA wants such programs to be critically evaluated on a continuing basis by experts separated from contracted research. William Rubey and Frank Press (M.I.T.) are co-chairmen of the Panel, which also includes David Griggs of UCLA's Institute of Geophysics and Planetary Physics. Bill's interest goes beyond questions of the mechanics of earthquake generation by fluid injection, as he believes that possibly "pumping now" might avoid a major quake disaster later and that such research may be of great value in developing a method of weakening earthquakes.

Douglas Rumble, Ph.D., Harvard. Assistant Professor.

Officially a member of our staff effective July, 1969, Rumble has been on leave for 1969-1971 but will join us in September, 1971. His research interests include electron microprobe analysis of metamorphic mineral assemblages, field studies of sedimentology, stratigraphy, structure and petrology of metamorphic rocks, theoretical metamorphic petrology, and Central New England regional geology.

Malcolm J. Rutherford, Ph.D., John Hopkins. Post-doctoral fellow and Acting Assistant Professor, 1969-1970.

During the past year microprobe work continued on a suite of rocks collected from a metamorphic roof pendant in the Tehachapis. Hydrothermal experiments were continued in Ernst's lab on the metamorphic reactions involving biotite, staurolite, cordierite, and other "pelitic" minerals. A paper on the last work was presented in April at the Washington meeting of the AGU.

Recent publications include one on alkali feldspar-iron biotite equilibria in the Journal of Petrology, and a manuscript in progress will present the results of a study of aluminous biotites. After July 1, 1970, Mac will be an Assistant Professor at Brown University.

J. William Schopf, Ph.D., Harvard. Associate Professor.

A member of the Lunar Sample Preliminary Examination Team, Bill participated in the initial study of Apollo 11 samples in Houston in July-August and Apollo 12 samples in November-December, 1969, and was recipient of a NASA Group Achievement Award to the

Lunar Sample Preliminary Examination Team. Selected as a Visiting Lecturer in the American Institute of Biological Sciences Visiting Biologists Program (1969-1970), he lectured at the Department of Botany, University of Washington, Seattle; the Department of Biology and Geology, Carleton University, Ottawa, Canada; and the Department of Geology, University of New Mexico, Albuquerque. Other lectures were presented at the Gordon Research Conference on "The Physics and Chemistry of Space" in Tilden, New Hampshire; at the Symposium on "Major Evolutionary Events and the Geologic Record of Plants" at the XI International Botanical Congress, Seattle, 1969; at the Symposium on Ultramicroplankton of the First North American Paleontological Convention in Chicago, 1969; and at the "Third Conference on the Origins of Life, New York Academy of Science - Smithsonian Institution Interdisciplinary Conference Program, Palisades, 1970.

In addition to reports to NASA as a member of the lunar examination team, recent publications include "Possible algal microfossils from the Late Precambrian of California," *Nature*, v. 223, p. 165-167 (with A. M. Gustadt) (1969); "Preliminary examination of lunar samples from Apollo 11," with the Lunar Sample Preliminary Examination Team, 1969, *Science*, v. 165, p. 1211-1227; "Electron Microscopy of organically preserved Precambrian microorganisms," *Jour. Paleontology*, v. 44, p. 1-6 (1970); "Micropaleontological studies of lunar samples," *Science*, v. 167, p. 779-780; "A search for organic compounds in the lunar dust from the Sea of Tranquility" (with C. Ponnampereuma and others), *Science*, v. 167, p. 760-762; and "Preliminary examination of lunar samples from Apollo 12" (with others of the Lunar Sample Preliminary Examination Team), *Science*, v. 167, p. 1325-1339 (1970).

Bill has a NASA contract at UCLA for continuing studies of lunar and Precambrian samples.

Ronald L. Shreve, Ph.D., California Institute of Technology.
Professor of Geology and Geophysics.

Ron's research interests concern theoretical studies in stochastic geomorphology; he states that results of various preliminary skirmishes look good. Significant results are expected by the end of the summer and will be faithfully reported next year. Ron received the Kirk Bryan Award of the Geological Society of America at the 1969 Annual Meeting in Atlantic City for his paper on "The Blackhawk Landslide."

Recent publications include "Stream lengths and basin areas in topologically random channel networks," *Jour. Geology*, v. 77, p. 397-414 (1969); "Internal deformation and thermal anomalies in lower Blue Glacier, Mount Olympus, Washington, U.S.A." (with R. P. Sharp), *Jour. Glaciology*, v. 9, p. 65-86 (1970); and "Some statistical properties of dendritic channel networks" (with W. C. Krumbein), *Spec. Proj. Rept., Nat. Sci. Found. Grant GA-1137, Dept. Geology, UCLA*, 117 p. (1970).

Terry E. Tullis, B. A., Carleton College; M. S., UCLA. Acting Instructor.

Jointly with Shreve, Oertel and Shreve, respectively, Terry taught two quarters of the undergraduate Structure-Stratigraphic-Field Geology sequence and the graduate course in Stress and Deformation of Geologic Materials, while completing his dissertation. Terry also is consulting for a movie about the New Global Tectonics, as a globe model showing plate movements which he constructed is much in demand. A lecture was also given at U.C. Santa Cruz and a paper "Preferred orientations of mica after high and low temperature deformation," presented at the national meeting of the AGU was also published in the AGU Transactions [abstract].

Terry's research concerns the origin of slaty cleavage and an attempt to separate the effects of mechanical rotation of pre-existing grains from those due to recrystallization under non-hydrostatic stress. After obtaining his doctorate in September, he will begin teaching duties at Brown University, where he hopes to set up an experimental rock deformation laboratory to complement field studies of the New England slates and schists.

Kenneth D. Watson, Ph.D., Princeton. Professor, Vice Chairman, and Graduate Advisor.

Ken attended two conferences on uranium deposits last summer. One, sponsored by the Society of Economic Geologists, dealt with roll-front uranium deposits of Wyoming; the other, sponsored by the Atomic Energy Commission and held in Colorado, dealt with exploration and occurrence of uranium in general. Most of the summer was spent on field studies of metal deposits, mainly in Ontario and Quebec.

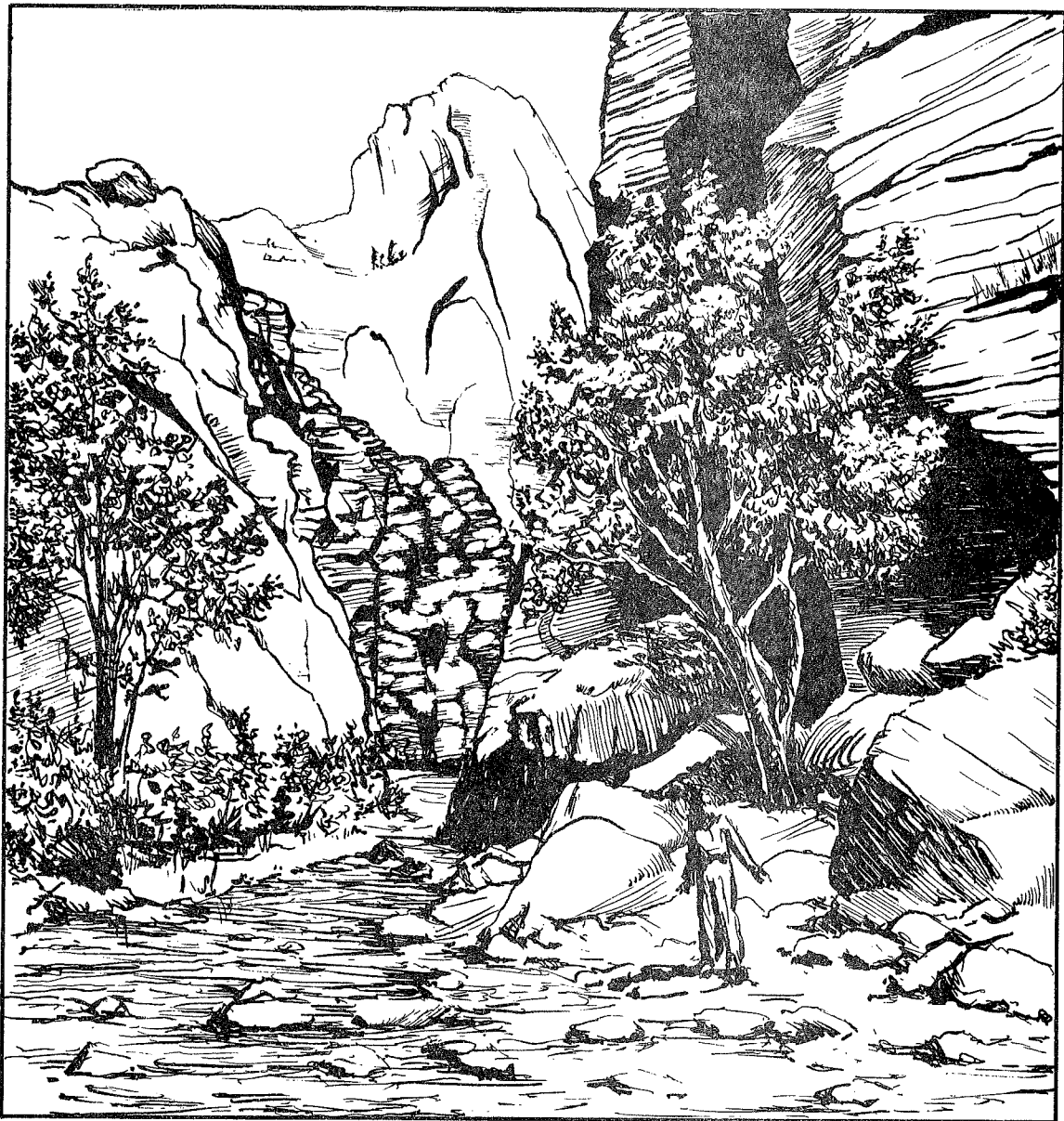
In collaboration with D. M. Morton (Ph.D., 1966, UCLA) of the California Division of Mines and Geology, a paper on carbonatite lenses within phlogopite-calcite dikes at Mountain Pass, California, was given at the Cordilleran Section Meeting of the G.S.A. The occurrence reported affords additional evidence of a genetic connection between the alkalic silicate rocks and rare earth-bearing carbonatites of this district.

George W. Wetherill, Ph.D., Chicago. Professor of Geophysics and Geology. Chairman, Department of Planetary and Space Science.

George is continuing work on lunar age dating using Rubidium-Strontium and Uranium-Thorium-Lead data obtained from lunar crystalline rocks, microbreccia, and lunar dust. Ages determined from two crystalline rock samples were 3575 and 4070 million years; the U-Pb and Th-Pb determinations of the dust gave ages of 4700 million years. The data suggest that a fission origin is excluded for the moon at any time significantly later than the origin of the solar system and also present difficulties for a lunar origin of tektites.

He attended the Apollo 13 launch and participated in the JPL-Caltech conference on the origin and evolution of the Solar System, presenting a talk on a cometary theory for the origin of meteorites.

In press is a joint article with K. Gopalan, S. Kaushal, and C. Lee-Hu, "Rb-Sr and U, Th-Pb ages of lunar materials."



VISITING PROFESSORS

1969-1970

Dr. William Chapple, Associate Professor, Brown University, Providence, Rhode Island. A structural geologist, Chapple taught a seminar in Structural Geology and Tectonics during the spring quarter, 1970.

Dr. John Southard, Assistant Professor of Geology, Massachusetts Institute of Technology, Cambridge, Massachusetts. Also here during the spring quarter, Southard taught a lecture course in Sedimentology and a Seminar in Sedimentology.

Dr. Peter Fleischer, University of Southern California, taught a course in Sedimentary Petrology during the winter quarter and the beginning geology course during the summer quarter, 1970.

1970-1971

Dr. C. D. Curtis, University of Sheffield, England, will be a Visiting Assistant Professor during 1970-1971 teaching sedimentation.

Dr. James Stout, Harvard University, will be an Acting Assistant Professor for the fall quarter, 1970-1971, and a post-doctoral fellow for the remainder of the year. He will teach a course in Phase Equilibria.

Dr. John Suppe has been an NSF Post-doctoral Fellow at UCLA for two years (1969-1971) doing field work on the Franciscan rocks of northern California. He will also be teaching one course this coming fall quarter. In the fall of 1971 he will become an Assistant Professor at Princeton University.

LECTURERS

Ted L. Bear, B. A., UCLA. A geological consultant (Bear & Kistler), Ted joins us each fall to teach a course in Petroleum Geology. He is also serving on the State Board of Registration of Geologists and gave a noon talk to the Department staff and students concerning the California registration of geologists and its potential effects in October. Ted is a delegate from the Los Angeles Basin Geological Society to the AAPG House of Delegates.

Paul M. Merifield, A. B., M. A., UCLA; Ph.D., University of Colorado; Partner, Lamar-Merifield, Geologists, Geophysicists. This firm has moved its offices to 1318 Second Street, Santa

Monica. Merifield also is Director of the Earth Science Research Corp. and is a Lecturer during the winter quarter, teaching a course in Engineering and Environmental Geology. First offered in the winter of 1970, it is again scheduled for 1971. His research involves a study of tidal currents and associated sand features in the Gulf of California under contract to the Office of Naval Research during 1969 and 1970. Two papers on satellite photography appeared in Photogrammetric Engineering (1969).

RESEARCH ASSOCIATES

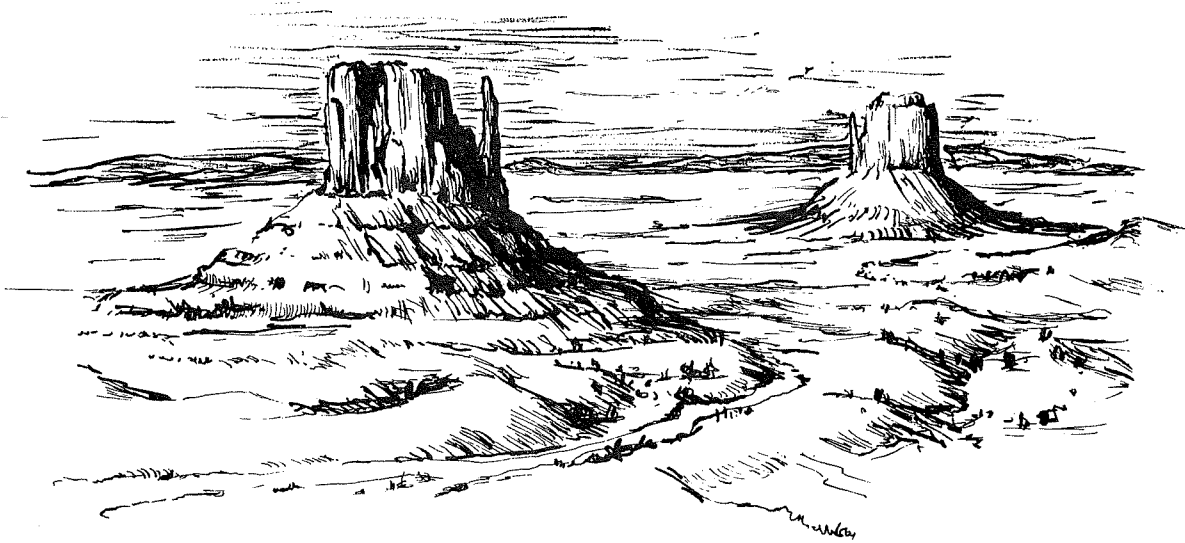
Dr. Mason L. Hill, Ph. D., Wisconsin. A research associate at UCLA since 1968, Dr. Hill was an A.A.P.G. Distinguished Lecturer during 1969-1970, speaking on "New global tectonics related to West Coast structure" at numerous geological societies and universities throughout the United States and Canada.

Dr. Alexander Stoyanow, Ph.D., Moscow. A former Professor of Geology at the University of Arizona, Stoy has been a Research Associate since 1950. After a lengthy illness this last year, we are delighted to report that he again comes to the office to work.

MUSEUM NEWS

LouElla Saul, Museum Scientist. LouElla is continuing her research on Upper Cretaceous gastropods and pelecypods, collecting material during the year from localities at Benecia, Milton, Folsom, Carlsbad, and Point Loma, California, and continuing description of the fauna of the type Chico Formation. Studies are completed on some groups of fossils whose members seem to indicate an evolving lineage. She also states that the manuscript "Evidence for the genesis of the Mactridae (Bivalvia) in the Cretaceous" will be sent to the University of California Press for its "smashing debut upon a breathless, waiting world (smog alerts get worse all the time)." Joint research projects with W. P. Popenoe include preparation of a check list of West Coast Cretaceous Mollusca and description of new gastropods and pelecypods that are common to the type Chico Formation and the Cretaceous of the Redding area.

David L. Weide, Museum Scientist. Curator of the rock collections, Dave and his wife, Dr. Margaret L. Weide, have received grants from the U. S. National Museum for work in Yugoslavia under a program sponsored by the Smithsonian, UCLA, and the Sarajevo Museum. The project involves archaeological excavation of a series of Mesolithic village complexes with tentative C₁₄ dates of 9,000 B.P. Margaret will supervise the archaeological excavation, and Dave will be responsible for a study of the geomorphology and Holocene geology of the Brigalnica River Basin. The project is scheduled for June to September, 1970, following which Dave will continue field work for his dissertation in the Warner Valley of Oregon, returning to UCLA in time for the Annual Christmas Instant Seminar.



When thinking of the bleak Wisconsin
I ask, "What killed this glacial age?
Did Indians do this deed so fateful
In some primordial blinding rage?
Or was the sun too hot, or high?
Was too much carbon in the sky?
Did shifting continental plates
Unloose the Arctic's frozen gates
To let the ocean currents run
From tropic clime to midnight sun?"
In brooding about the "late" Wisconsin
I ask "What stopped this glacial age?"
The long-sought cause may simply be
An epidemic glacier-phage.

— Slightly modified from contribution of Jim Quick, Geol. '72.

During the 1969-1970 academic year, about 55 undergraduates were majoring in Geology, and 20 of these were enrolled in the 1970 summer field course. Nine have received the B. S. degree since the last Newsletter. About 52 graduate students are actively enrolled, and others are continuing toward completion of dissertations or theses. Because of the California budgetary restrictions on the University, the Regents have placed limitations on the size of graduate enrollment on each of the campuses, which has necessitated quota-fixing all down the line. Our Department is presently limited to the number we had last year (52), hence acceptance of each new graduate student will require the prior completion of his studies by one already here. For information as to the current graduate students, a new section is added to the present Newsletter listing graduate students of the past year, where they obtained previous degrees, and the title or subject of their research for those who have progressed to that stage.

About two-thirds of the graduate students are married, and a slightly smaller number (about 57 percent) received some form of financial support as teaching assistants, research assistants, or through various fellowships, scholarships, or research grants to faculty. The increased registration fees, tuition charges, etc., of the University of California make such financial support increasingly necessary. Some have G.I. Bill support.

At UCLA, as elsewhere in universities or in the profession in general, the number of women in Geology is not high. Women represent some nine percent of the graduate students in Geology at UCLA, perhaps high for geology departments as a whole but considerably below the general percentage of women graduate students on the campus. Hence, the Department was particularly pleased that two of the ten 1970 Awards for Graduate Women from the Association of Faculty Women at UCLA were received by geologists Katherine J. Barrows and Julia Ann Tullis. Presentation of the awards was followed by a champagne punch reception honoring these women and their nominating professors (Ken Watson and John Christie, respectively). The award consists of a plaque and a check for \$50.

The UCLA Faculty each year selects four Distinguished Teaching Assistants from those nominated by the various departments. This year Herbert Adams of the Geology Department received Honorable Mention for 1969-1970, the award consisting of an honorarium of \$25 from the Faculty Fellowship Committee of the Graduate Council.

All Geology students and faculty belong to the Geological Society of UCLA (GSUCLA). The organization co-sponsors with the Geology Department the regular afternoon talks, as well as occasional noon talks, slide shows, etc. Because most of the lectures are held in the late afternoon, the speaker often joins a group for dinner afterward. This group may include both students and faculty most interested in the particular specialty of the speaker. Various social activities are also sponsored by GSUCLA, ranging from the informal picnic and beer party after the field exam for new grad students in the fall, Friday afternoon get-togethers at a local pizza-beer parlor, to a picnic in the spring quarter for faculty, students, and families held at Carillo Beach State Park, just south of Point Mugu.

The Tuesday noon Instant Seminars continue to be an excellent source of interaction between the hard and soft-rock geologists and laboratory and field types. An innovation this past year was the scheduling of an extracurricular field trip especially for undergraduates, although grads and faculty were also permitted to attend. This was held on October 24-26, leaving the campus around noon on Friday for a tour of the Great Basin Geology, the San Andreas Fault, Sierra Nevada, Inyo Mountains, Last Chance Range, and Death Valley.

Officer of the Society for 1969-1970 were:

Phelps Freeborn, President
Marty Goldhaber, Vice President
Dorothy Oehler, Secretary
Russ Parker, Treasurer
Jim Blacic } Graduate Student Affairs Committee
Jerry Dollinger }
Barney Berger, Graduate Students Assoc. Representative

For the coming year, 1970-1971, the elected officers are:

Ken Crawford, President
Bruce Haugh, Vice President
Vicki Doyle, Secretary
Sue Formiller, Treasurer
Barney Berger, Graduate Students Assoc. Representative

Graduate Teaching Assistantships and Fellowships
Awarded for 1970-1971

Teaching Assistantships: (* Students new to UCLA for 1970-71)

Stephen Alpert (B. S., UCLA)
John Barron (B. S., UCLA)
Barney Berger (A. B., Occidental College)
Hsing-Chi Chang (B. S., N. Taiwan University; M. S., Wayne
State University)
Ken Crawford (B. S., Fresno State College; M. S., U.C. Davis)
Jerry Dollinger (B. S., M. S., University of Wisconsin)
Thomas Fairchild (B. A., Stanford)
David Freshman (University of Pennsylvania)*
Richard Hurst (SUNY, Stony Brook)*
John McCormick (Penn. State)*
Gordon Moir (B. S., University of Capetown)
Elizabeth Recks (B. S., M. S., Massachusetts Institute of
Technology)

Shell Oil Fellow:

Bruce Haugh (B. S., University of Wisconsin; M. S., University
of Oklahoma)

Regents Graduate Intern Fellowship

Bernard Hallet (B. S., UCLA)

NSF Traineeship

Carl Evans (B. S., UCLA)

Atlantic Richfield Fellow (Fall Quarter)

Edward Warner (B. S., University of Colorado)

NSF Fellow

John Brady (Harvard University)*
Phelps Freeborn (B. S., Caltech; M. S., University of
Massachusetts)
Robert Horodyski (B. S., M. S., Massachusetts Institute
of Technology)
Dorothy Oehler (B. A., UCLA)

Standard Oil Undergraduate Scholars

William Neal } 1969-1970 (not selected in time to report
Gary Sherwood } in last year's Newsletter)

Paul Mankiewicz } 1970-1971
Mary Landes }

Graduate Students, 1969-1970

Among suggested additions to the Newsletter were those indicating an interest in the present graduate students and their thesis subjects, in addition to the list of those that completed their degrees during the current year. Not all responded to a request for information about their geologic interests and projects, perhaps from unnecessary modesty or because the request was timed too close to the end of the quarter, finals, and departure for summer field work or (for a few fortunate ones) summer employment. Those listed as completing M. S. and Ph.D. degrees in the following section are not repeated here.

Herbert G. Adams, B. A., 1961, Pomona; M. S., 1968, UCLA.

A teaching assistant during the past year, he received Honorable Mention and an honorarium as a Distinguished Teaching Assistant from the UCLA Graduate Council. He is currently working toward a doctorate on the subject "Experimental determination of curves of zero birefringence in almandine around quartz inclusions."

Stephen Alpert, B. S., 1969, UCLA.

A new graduate student this year, he will be a teaching assistant next year.

Brooks Anderson II, B. S., 1963; M. S., 1965, Bowling Green State College.

Brooks came to UCLA after completion of duty with the Corps of Engineers Nuclear Cratering Group at Lawrence Radiation Laboratory, Livermore. Research on the Mexican Cretaceous concerns an "Upper Cretaceous composite standard (time scale) based upon binary coding of Heterohelical Foraminiferal characters."

John A. Barron, B. S., 1969, UCLA.

A teaching assistant last year and for next year, Barron has a summer 1970 NSF Traineeship for Teaching Assistants.

Katherine J. Barrows, B. A., 1963, UCLA.

She received one of the ten awards presented to outstanding Graduate Women at UCLA by the Association of Faculty Women, 1970. Her dissertation concerns the "Geology of the Desatoya Mountains, Churchill and Lander Counties, Nevada" and will probably be completed this summer.

Byron R. Berger, A. B., 1966, Occidental College.

A Teaching Assistant last year and next, he also has been the representative from the GSUCLA to the Graduate Students Association.

Patrick E. Biliter, B. S., 1968, Ohio State University.

James D. Blacic, B. A., 1964, UCLA.

An NSF trainee while working on his doctorate, Jim will be teaching at the University of Washington this coming year.

Jan M. Blacic, B. S., 1968, UCLA.

A Graduate Intern Fellow during the past year, Jan is working on a masters degree.

Hsing-Chi Chang, B. S., 1964, N. Taiwan University, M. S., Wayne State University.

He was a teaching assistant last year and for the coming year while working on a doctorate.

Terry Chriss, B. A., 1968, UCLA.

Terry had a Shell Fellowship last year.

Richard W. Clymer, B. S., 1967, Massachusetts Institute of Technology.

Thomas K. Collins, A. B., 1965, Hunter College, New York.

His research concerns "The expected effects of tsunamis on the California Coast."

John C. Connor, A. B., 1966, UCLA.

Teaching Assistant last year.

William C. Cornell, B. S., 1963, M. S., 1965, University of Rhode Island.

An American Chemical Society Fellow for two years, Bill's dissertation concerns "Upper Cretaceous and Early Tertiary Silicoflagellates and Chrysophyte cysts, their stratigraphic and biologic significance." He also presented a talk at the First North American Paleontological Convention in Chicago (1969) on "Chryomonad cyst-families Chrysostomataceae and Archaeomonadaceae, their status in paleontology."

Kenneth Crawford, B. S., 1966, Fresno State; M. S., 1969, U.C. Davis.

A Regents Graduate Intern Fellow last year and a Teaching Assistant for the coming year, his doctoral studies concern "Areal geology and regional metamorphism in Franciscan rocks, northwestern Diablo Range, California." He is also the new President of the GSUCLA.

Gerald L. Dollinger, B. S., 1962, M. S., 1965, University of Wisconsin.

He will be a Teaching Assistant for the second year.

Thomas Fairchild, B. A., 1966, Stanford.

Tom was with the Peace Corps in Brazil until 1969. He will be a Teaching Assistant next year.

Ahmed Ali Fouda, B. S., 1952, Cairo University.

W. Phelps Freeborn, B. S., 1965, Caltech, M. S., 1968, University of Massachusetts.

He was President of GSUCLA during the past year and an NSF Fellow. In Alaska this summer his research involves "An experimental study of element partitioning in coexisting olivine-clinopyroxene pairs and related equilibria in ultramafic plutons of southeastern Alaska."

Orlando J. Gonzalez, B. S., 1964, Universidad Nacional, Colombia.

He had a Texaco Scholarship during 1969-1970.

John C. Grimmer, B. S., 1961, Wisconsin, M. A., 1966, University of Southern Illinois.

John was a T. A. last year and has a 1970-71 Mombusho Scholarship (Japanese Ministry of Education) for study of living crinoids in Japan.

Eugene B. Grudewicz, A. B., 1962, San Diego State.

Bruce N. Haugh, B. S., 1965, University of Wisconsin; M. S., 1968, University of Oklahoma.

Bruce will be a Shell Oil Company Fellow next year and Vice President of GSUCLA.

Robert Lee Hill, B. S., 1967, UCLA.

He was a Teaching Assistant last year working on the Geology and Geochemistry of the El Capitan Mercury Mine, Last Chance Range, Inyo County, California. He is currently in the U. S. Army.

Robert J. Horodyski, B. S., 1965, M. S., 1968, Massachusetts Institute of Technology.

He was an NSF Trainee last year and will be an NSF Fellow for the coming year.

Jeffery Johnson, B. S., 1969, San Fernando Valley State College.

Thekkey K. Krishnan, B. Sc., M. Sc., Madras University, Madras India; attended Syracuse University 1965-1967.

His research concerns the structural style of the Labrador geosyncline.

Gerald R. Licari, B. A., 1957, M. A., 1960, U.C. Berkeley.

His dissertation concerns Precambrian bluegreen and probable green algal microfossils from the Beck Spring dolomite of eastern California.

Kenneth H. Lister, B. S., 1967, UCLA.

Lidia D. Lustig, B. S., 1967, University of Buenos Aires.

She was a Teaching Assistant last year.

David C. McCoard, B. A., 1965, University of the Pacific.

His Master's thesis concerns "Structure of the Last Chance Thrust in the Last Chance Range, California." He will receive his degree in the summer of 1970.

Martin Matthews, B. S., 1960, Allegheny; M. S., 1963, University of West Virginia.

A Teaching Assistant during the fall quarter, he is now at Northwestern University.

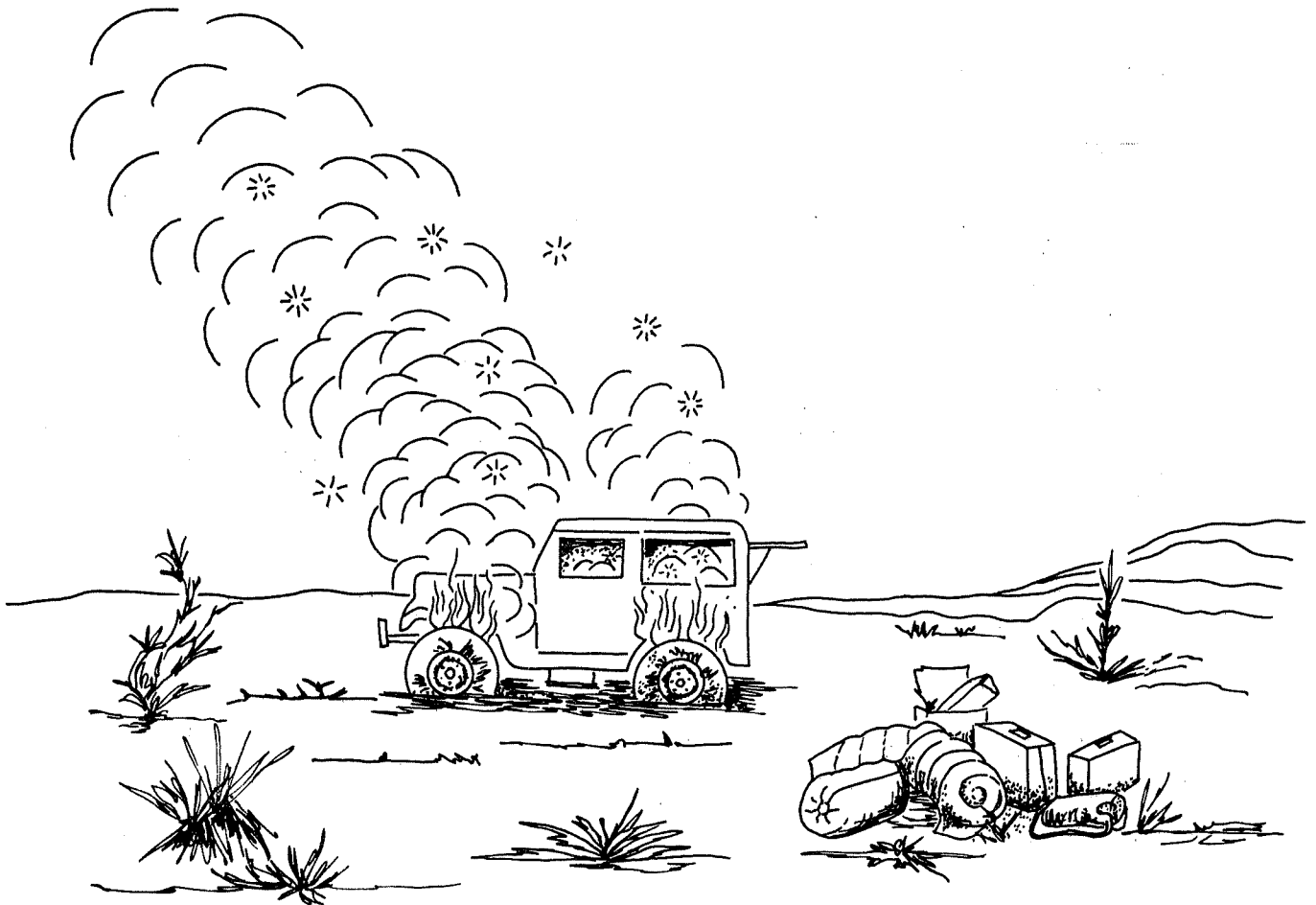
Gordon J. Moir, B. S., 1965, University of Capetown.

He will be a T. A. for the second year.

Jack D. Mount, B. S., 1969, California State College, Los Angeles.

Irving R. Neder, B. A., 1961, M. S., 1967, UCLA.

Irv's current research involves the Battleship Wash Formation of southern Nevada and its conodont fauna. Field work began somewhat inauspiciously last November when the University jeep (being driven by Professor Lane) caught fire on the way to the field area, with loss of cameras, maps, and most personal equipment. Later excursions were more successful, and the limestone has been sampled at many localities. During the summer, laboratory work will be largely completed, preparatory to geological and paleontological interpretation.



Dorothy J. Oehler, B. A., 1967, UCLA.

An NSF Trainee last year and NSF Fellow for next year, Dorothy was also GSUCLA Secretary last year.

John H. Oehler, B. A., 1966, UCLA.

John had a NDEA-IV Fellowship last year. He is working with Dr. Schopf on plant microfossils in cherts, particularly from the Polish Tremadocian, in which occurs an excellently preserved blue-green algal assemblage.

Charles R. Parker, B. A., 1942, Reed; M. D., 1945, Cornell.

Russ was GSUCLA Treasurer last year, and he is Museum Curator at Long Beach State College.

Robert L. Post, B. S., 1967, Massachusetts Institute of Technology.

He was an NDEA-IV Fellow last year and next.

Poernomo Prijosoessilo, B. A., 1963, Inst. Techn., Bandung.

He is at UCLA for a year on an Amoseas Fellowship.

Burleigh Putnam, B. S., 1968, UCLA.

Field work for his master's thesis will occupy his summer, as he will be looking for cinnabar in the Klamath National Forest in northern California. He also is currently working with Dr. Dollase on composition and cell parameter variations of sphene.

Elizabeth Recks, B. S., M. S., 1969, Massachusetts Institute of Technology.

Betty had a Chancellors Fellowship last year and will be a Teaching Assistant next year.

Gary D. Rosenberg, B. S., 1966, University of Wisconsin.

Gary had an NDEA-IV Fellowship last year. His dissertation concerns "Growth layers in the shell of Chione (Bivalvia)."

Ronald R. Schmidt, B. S., 1962, University of Illinois.

His dissertation on "Planktonic foraminifera from the Lower Tertiary of the California Coast Ranges" will be completed this summer.

Michel P. Semet, Eng. Geol., 1965, University of Louvain.

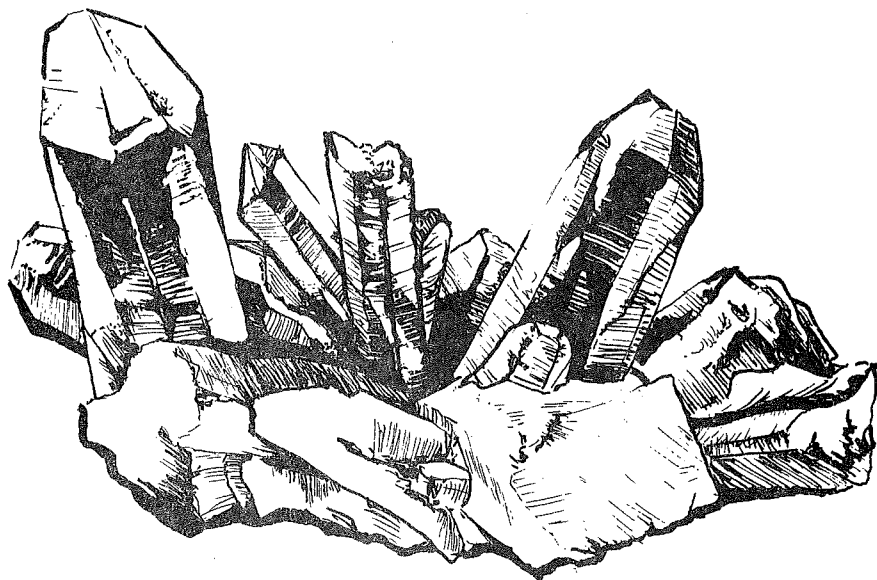
A Teaching Assistant last year, his research concerns "Stability relations and cation site populations of the amphibole magnesiohastingsite."

Robert E. Sweeney, B. S., 1967, UCLA.

Bob was an American Chemical Society Fellow last year.

Mark W. Tippetts, B. S., 1955, North Illinois University; M. A., 1962, West Virginia University.

His research will concern Paleocene paleoecology based on benthonic foraminifera.



Julia Ann Tullis, B. A., Carleton College.

As Chairman of the Student Curriculum Committee, she did some undergraduate course evaluations during the fall quarter. Her doctoral research concerns the production of preferred orientation in the original grains of experimentally deformed quartzites and determination of mechanisms that lead to the various patterns. Jan received one of the 1970 Awards to Outstanding Women Graduate Students from the Association of Faculty Women.

A recent publication, "Quartz: preferred orientation in rocks produced by Dauphiné twinning," appeared in Science. She presented "Dauphiné twinning produces preferred orientation in quartz aggregates" at the National AGU meeting, an abstract appearing in the AGU Transactions. A lecture was also presented at U.C. Santa Cruz in May; and following receipt of her doctorate in September, she will be a Research Associate at Brown University. Planned future research will be on mechanisms leading to preferred orientation in recrystallized quartz aggregates, in addition to field studies.

Terry E. Tullis (See under Faculty; Acting Instructor).

Edward M. Warner, B. S., 1968, Colorado University.

Ed had an NDEA-IV Fellowship last year and will have an Atlantic-Richfield Fellowship this fall.

E. Reed Wicander, B. S., 1969, San Diego State.

Reed will be an American Chemical Society Fellow for the second year. His dissertation research involves a study of the

acritarch assemblages of the Upper Devonian Chagrin Shale, Ohio, to obtain quantitative information on changes in the populations of these microfossils and develop a zonation of the Late Devonian based on acritarchs.

Richard Wisehart, B. S., 1968, UCLA

New Alumni, 1969-1970

For those obtaining graduate degrees, the thesis or dissertation title is given and the present position or address indicated.

Bachelor of Science, 1969-1970

Alpert, Stephen Paul
Evans, Carl Anthony
Hedrick, Louis Allen, Jr.
Lander, Eugene Bruce
Lee, Byron Keun Young
McKenzie, Charles Stuart, Jr.
Sherwood, Gary Iven
Thudium, Carl Frederick
Westbrook, Marston Thorn, Jr.

Master of Science

Heller, Jeff C.

"Clay Mineralogy of the Southwest Equatorial Atlantic Sediments." 1970. B. A., 1966, Fresno State College. Now employed by Cities Service Oil Company, 223 Thousand Oaks Blvd., Thousand Oaks, California 91360, and will be working on the North Slope of Alaska during the summer.

Doctor of Philosophy

Asihene, Kwame

"The Texada Formation of British Columbia and its Associated Magnetite Concentrations." 1970. B. A., 1959, M. A., 1961, UCLA. Now working for Mobil Oil Company, plans to return to teach in Ghana in the fall of 1970.

Baker, David Warren

"X-ray Analysis and Representation of Preferred Orientations in Crystal Aggregates." 1969. B. S., 1961, Massachusetts Institute of Technology. Now a post-doc at Yale, to be at the University of Illinois, Chicago Circle in the fall.

Brisbin, William Corbett

"Regional Bouguer Anomalies in Southern California." 1970. B. S. E., 1953, Manitoba. Teaching at the University of Manitoba, Winnipeg.

Coates, Donald Allen

"Origin of the Sauce Grande Formation, Southern Buenos Aires Province, Argentina." 1969. B. A., 1961, M. S., 1964, University of Colorado. Post-doc at the Polar Research Institute at Ohio State University.

Fritsche, Albert Eugene

"Miocene Geology of the Central Sierra Madre Mountains, Santa Barbara County, California." 1969. A. B., 1958, UCLA. Associate Professor of Geology, San Fernando Valley State College.

Gustafson, William Ivor

"Stability Relations of Andradite, Hedenbergite and Related Minerals in the System Ca·Fe·Si·O·H." 1970. A. B., 1964, UCLA.

Howe, Dennis Milton

"Post-Casper-Ingleside Unconformity of Southeastern Wyoming and Northcentral Colorado." 1969. B. S., 1964, M. S., 1966, University of Wisconsin. Employed with Shell Oil Company, Denver Area Exploration, 1700 Broadway, Denver, Colorado 80202.

Liou, Juhn-Guang

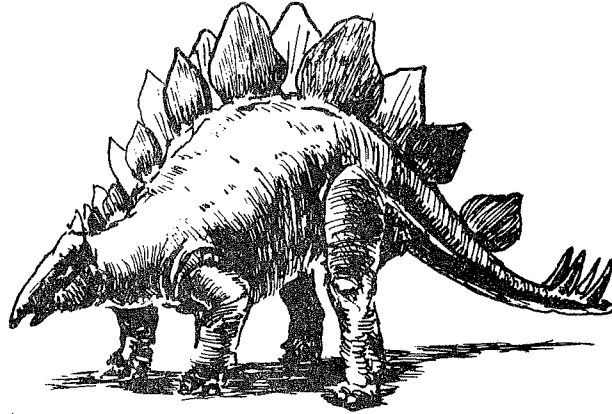
"Stability Relations of Zeolites and Related Minerals in the System CaO-Al₂O₃-SiO₂-H₂O." 1969. B. S., 1962, National Taiwan University. Presently a National Research Council Post-Doctoral Research Associate at the Manned Spacecraft Center, Houston.

Marzolf, John E.

"Evidence of Changing Environments during the Depositional History of the Navajo Sandstone, Utah." 1970. A. B., 1960, Wittenberg College. Taught last quarter at L.A. State College and at Santa Monica City College.

Presley, Bobby Joe

"Chemistry of Interstitial Water from Marine Sediments." 1969. B. S., 1957, Oklahoma State University; M. A., 1965, University of West Virginia. Is continuing at UCLA as a Post-Doctoral



ALUMNI NEWS

As usual we are requesting that you fill in the form on the last page to let us know what you are doing and your current address so that we can include this in next year's Newsletter. If any of your associates or friends that are UCLAans have not been included here, encourage them to write also. Those replying since the last Newsletter are listed alphabetically.

William L. Adams, M. A., 1956.

Division Geologist (for Western U. S. and Alaska), Pan American Petroleum Corp., Security Life Bldg., Denver, Colorado 80202. Adams states that his staff of 80 ± geologists occupies most of his time. Home address: 2750 Garden Road, Golden, Colorado 80401.

Stephen P. Alpert, B. S., September, 1969.

11106 National Blvd. #1, Los Angeles, California 90064. Steve is now a graduate student in the Department, with main interests in the fields of paleontology and stratigraphy.

H. Clifford Anderson, 1940.

New address: 4111 Marconi Avenue, Room 211, Sacramento, California 95821.

Morris A. Balderman, B. S., 1968.

Now Engineering Geologist with Moore & Tabe, Consulting Engineers and Geologists, 23011 Ventura Blvd., Woodland Hills, California 91364.

William Barry, B. A., 1943.

Instructor in Geology, Santa Ana College, Santa Ana, California 92706. Home address: 297 Claremont Avenue, Long Beach, California 90803. States that he is just busy "teaching."

Lawrence C. Crippen, B. A., 1965

Geophysicist, Pan American Petroleum Co., Denver, Colorado. Mailing address: P.O. Box 1994, Denver Colorado 80201. He is also now studying Applied Math at the University of Colorado, Denver Center.

Robert N. Critchlow, B. A., 1956.

Present address: 3616 Pinehurst, Bakersfield, California 93306.

James Clifford Dawson, B. A., 1965, M. S., 1967.

Received Ph.D., 1970, at University of Wisconsin, Madison, in Geology with minor in Geophysics and Oceanography. Dissertation was on "The sedimentology and stratigraphy of the Morrison Formation (Upper Jurassic) in northwestern Colorado and northeastern Utah." Beginning in September he will be Assistant Professor of Geology, Department of Physics and Geology, State University of New York, Plattsburgh, New York 12901.

Edwin B. Edwards, A. B., 1963.

Pauley Petroleum Co., Inc., 10000 Santa Monica Blvd., Los Angeles, California 90067. Currently doing subsurface geology for Pauley Petroleum. Had formerly been with Signal Oil and Gas Company.

Frank A. Exum, B. A., 1956, M. A., 1957.

Geologist, Marathon Oil Co., Denver Research Center, P.O. Box 269, Littleton, Colorado 80120. Although located in Colorado, he is working mostly in Gulf Coast Stratigraphy. Presently he is Chairman of the AIPG Committee on State Sections. Most recent publication was in the AAPG Bull., October, 1968. Frank writes that he regularly plays poker with David M. Poole (B. A., 1943, M. A., 1949).

Daniel B. Flynn, B. A., 1948, M. A., 1957.

Now with Coldwell, Banker and Co., 1020 Prospect Street, La Jolla, California 92037, a company specializing in real estate, property management, and insurance.

A. Eugene Fritsche, A. B., 1958, Ph.D., 1969.

Promoted to Associate Professor, effective September, 1970, Department of Geology, San Fernando Valley State College, Northridge, California 91324. Teaching structural geology, field geology, sedimentary petrology, fundamentals of paleontology, and physical geology, and continuing research in Miocene stratigraphy and paleontology along upper Sespe Creek. Home address: 17605 Cantara Street, Northridge, California 91324.

Joe Galbreath, B. A., 1958.

Manager, Product Support, Rocket Research Corporation, York Center, Redmond, Washington 98052. Presented a paper on "Cool Gas Inflation Systems" at Seventh Annual Survival and Flight Equipment Association Symposium, Las Vegas, October, 1969. Is Chairman of Public Affairs Committee of American Institute of Aeronautics and Astronautics, Pacific Northwest Section. Home address: 1439 Eighth Place East, Edmonds, Washington 98020.

Adlai F. Goldschmidt, B. A., 1952.

Associate Engineering Geologist, California Division of Highways, Bridge Department, 1120 "N" Street, Sacramento, California. Is a Registered Geologist and Certified Engineering Geologist of the State of California, and Sacramento Chairman AEG, 1966-1967. Home address: 7348 Nob Hill Drive, Carmichael, California 95608.

James G. Gould, B. A., 1949, M. A., 1951.

Now with Barnett Oil Company, 411 First National Bank, Wichita, Kansas.

David J. Gross, M. A., 1958.

Present address, c/o Tams Tarbela Dam Colony, District Hazara, West Pakistan, according to D. W. Hagen.

Donald W. Hagen, B. A., 1953, M. A., 1957.

Exploration Geologist, c/o Texaco Exploration, P.O. Box 3333, Calgary, Alberta, Canada. Hagen had transferred from Ventura to Los Angeles with Texaco, then northward to Canada. Currently he is working on the Canadian east coast offshore petroleum exploration.

Richard B. Haines, A. B., 1931.

Senior Geologist, Continental Oil Co., P.O. Box 3357, Ventura, California 93003. Was Past President, Pacific Section, A.A.P.G., and is currently Delegate from the Santa Barbara area to House of Delegates, A.A.P.G. Home address: 5562 Hollings Street, Ventura, California 93003.

James R. Hassel, B. A., 1958.

Died in the spring, 1969, according to Robert F. Martin, Jr.

Robert F. Herron, B. A., 1946.

Vice President, Exploration, Marine Resources Consultants, Inc., 225 Santa Monica Blvd., Santa Monica, California 90401.

The company is engaged in applied marine geology such as the evaluation of mineral deposits on the continental shelves and the acquisition of subbottom geological data for the design of port and harbor facilities. Current work in Brazil, the Philippines, East Africa, and Greenland. Home address: 2976 Glen Albyn Drive, Santa Barbara, California 93105.

Richard L. Hester, B. A., 1949.

Formerly with Pauley Petroleum Co., has recently become the Chief Marine Geologist for Marine Resources Consultants, Inc., 225 Santa Monica Blvd., Santa Monica, California 90401.

Richard H. Hopper, B. A., 1935, M. A., 1936.

Vice President, American Overseas Petroleum Ltd., 380 Madison Avenue, New York, New York 10017. Hopper received a Ph.D. from California Institute of Technology in 1939, then went to Indonesia as a field geologist for the California-Texas Oil Company group, owned by Standard of California and Texaco. American Overseas Petroleum is the New York coordinating agency for that group's activities in Indonesia and Libya. He lived in Indonesia 21 years before moving to New York and remains active in Indonesian affairs, being current Chairman of the American-Indonesian Chamber of Commerce. The company sent an Indonesian employee, Mr. Poernomo Prijosesilo, to UCLA for a year of graduate study in paleontology. Hopper's home address is 986 Black Rock Turnpike, Easton, Connecticut 06612.

Liang-Chi Hsu, Ph.D., 1966.

Since January, 1969, has been Assistant Professor, Department of Geology and Geography, University of Nevada, Reno, Nevada 89507. Hsu is also a Mineralogist for the Nevada Bureau of Mines. His interests are in geochemical and mineralogical studies in the scheelite-powellite mineral series.

Edward W. Hudson, M. A., 1958.

Present address supplied by D. W. Hagen is c/o Texaco, Inc., 3460 Wilshire Blvd., Los Angeles, California 90005.

Gwendolyn Jensen, B. A., 1968.

Employed as a geologist with Cities Service Oil Company, 223 East Thousand Oaks Blvd., Thousand Oaks, California.

J. G. Johnson, Ph.D., 1964.

Department of Geology, Oregon State University, Corvallis, Oregon. Has recently received a grant from NSF to pursue work on a Lower and Middle Devonian biostratigraphic standard for western North America, mostly based on work in central Nevada. His now much revised thesis will appear in 1970 as Geol. Soc. America Memoir 121.

Henry E. Kane, Ph.D., 1965.

Associate Professor of Geology, Department of Geography and Geology, Ball State University, Muncie, Indiana 47306. Kane is presenting a paper on the "Late Cenozoic Geomorphology of the Lower Kentucky River Basin" at the SE section of the GSA in Lexington, Kentucky, 1970.

Philip Kern, Ph.D., 1968.

Assistant Professor, Department of Geology, San Diego State College, San Diego, California 92115.

Douglas C. Kinzle, B. S., 1968.

Airman First Class, U. S. Air Force, is a weather observer at Beale AFB, California, in a unit of the Air Weather Service that provides weather information for U. S. flight operations.

Dale S. Kunitomi, B. S., 1967.

Petroleum Engineering Associate for Department of Oil Properties, City of Long Beach, P.O. Box 570, Long Beach, California 90801. His work concerns the development of the eastern offshore portion of the Wilmington Oil Field, a study of and prevention of subsidence. Also is working on a master's degree in Geology in the evenings at the University of Southern California. Home address: 2033 San Anselme, Long Beach, California 90815.

Ernest B. Lian, B. A., 1949.

Senior Geologist, Marathon Oil Co., Box 2380, Anchorage, Alaska 99501. President of the Alaska Geological Society and working on subsurface study of the Kenai Group sediments of the Alaskan Cook Inlet Basin. He writes that many UCLA graduates are in the Anchorage area, including William C. Bishop (B. A., 1949, M. A., 1950), Clyde B. Cotton (1948), and Gerald Ganopole (B. A., 1948). Hope they will let us know their correct addresses there.

Donald R. Lindsay, M. A., 1952.

Staff Geological Engineer, Shell Oil Company, 1008 West Sixth Street, Los Angeles, California 90054. Current work concerns detailed geologic studies of oil fields and producing trends and computer applications to oil field Geology. Lindsay is a Registered Geologist, State of California.

Jere H. Lipps, B. A., 1962, Ph.D., 1966.

Associate Professor, Department of Geology, University of California, Davis 95616. Taught Marine Geology and Paleocology at Bodega Marine Laboratory in summer 1969, with about 30 students

from throughout the country, then participated in the Symposium on Ultramicrofossils, First North American Paleontological Convention, Chicago, talking on Silicoflagellates. He then joined the Glomar Challenger in Honolulu, carrying out studies of the calcareous nannoplankton and silicoflagellates for Leg 8 of the Deep-Sea Drilling Program. This leg crossed the equator, terminating in Tahiti. Following this two-month JOIDES cruise, he spent a month collecting shallow water foraminifera from French Polynesia, the Samoas, and Hawaiian Islands for ecologic studies. The winter quarter was spent teaching on the Davis campus, the spring quarter at Bodega teaching a joint U.C. Davis-Berkeley course on "Evolution in marine ecosystems." The experimental 15-unit course involved 5 faculty, 3 T. A.'s, and 40 students of Zoology, Botany, and Geology, and was reportedly a great success. Present research concerns the chemical composition of foraminiferal tests.

James Robert Livingston, B. A., 1967.

Present address: 561 Pleasant Street, Long Beach, California 90805.

Richard Lung, A. B., 1954, M. A., 1958.

Chief Geologist for Robert Stone and Associates, Inc., 19720 Ventura Blvd., Woodland Hills, California 91364. Writes that he has been with Robert Stone since receiving his M. S., was recently accepted as a Registered Geologist and Certified Engineering Geologist by the State of California. Was co-editor (with Dick Proctor, UCLA M. A., 1958) of "Engineering Geology in Southern California," a special A.E.G. publication, October, 1966, and also has served as Secretary for the Los Angeles section of A.E.G. Home address: 600 North Gower Street, Los Angeles, California 90004.

Paul McGovney, B. A., 1938.

Present address: P.O. Box 399, Twain Harte, California 95383. McGovney is a Consultant.

Vernon E. McMath, Ph.D., 1958.

Formerly worked for Continental Oil Company, Ponca City, Oklahoma, but is now teaching at Chico State College. Home address: 146 McDonald, Chico, California 95926.

Mary McNeil, M. A., 1963.

Economic Geologist, Lockheed Aircraft International, 510 West Sixth Street, Los Angeles, California 90014. Mary is currently working on development programs in minerals and soils for foreign governments and the international lending agencies. She spent a year in the Sudan working on a transportation study that entailed clay stabilization and was involved in developing

mineral deposits in Latin America. An article on "Laterites" appeared in the November, 1964, Scientific American, and another on "Ecology in International Development on the Laterite Catenaes" is in press at the Natural History Press, New York. Home address: 3989 South Old Malibu Road, Malibu, California 90265.

Herbert Mann, B. A., 1950.

Senior Geologist, Shell Oil Company, 1008 West Sixth Street, Los Angeles, California. Transferred from Farmington, New Mexico, in 1968, and is currently province geologist on the Arctic Slope of Alaska. Home address: 720 El Medio, Pacific Palisades, California 90272.

Peter Marsh, B. A., 1958.

Present address: 967 Seaside Ct., Ventura, California 93003. Writes that until recently he was managing barite mines in Colombia for Milohem, Inc.

Robert F. Martin, Jr., B. A., 1958.

Agent, New York Life Insurance Company, 2801 West Sixth Street, Los Angeles, California 90057. Has been awarded a place at the Million Dollar Round Table each year in this profession and is currently working on a Chartered Life Underwriter (CLU) degree.

James M. Maxwell, B. A., 1958.

Chief Geologist, McCulloch Oil Corp., 6151 West Century Blvd., Los Angeles, California 90045.

Michael A. Murphy, B. A., 1950, Ph.D., 1954.

Professor of Geology, University of California, Riverside, California 92502. Research interests are in Silurian-Devonian stratigraphy and biostratigraphy of central Nevada. In May Murphy led a field trip of the International Commission on Stratigraphy, Committee on the Silurian-Devonian Boundary, to the Roberts Mountains area, which is being considered as a potential site for typifying this boundary.

Warren J. Nokleberg, B. A., 1961.

Geologist, U. S. Geological Survey, Menlo Park, California 94025. Has been with the Survey since completing his Ph.D. at the University of California, Santa Barbara.

Robert M. Norris, A. B., 1943, M. A., 1949.

Was promoted to Professor (1968) in the Department of Geology, University of California, Santa Barbara 93106. His sabbatical

year (1968-1969) was spent in part at the New Zealand Oceanographic Institution, Wellington, New Zealand, studying the sea floor sediments of the northwest coast of South Island. During the remainder of the year he worked with R. W. Jessup at the CSIRO Division of Soils, Adelaide, South Australia, on Cainozoic stratigraphy of the Lake Eyre region.

Jerome J. O'Brien, B. A., 1932.

President, Colonial Production Company, 1434 Westwood Blvd., Los Angeles, California 90024. After leaving UCLA, he completed a degree in Petroleum Engineering (1934) at the University of Southern California; was Director, Office of Oil and Gas, Department of the Interior, Washington, D. C. (1961-1964); U. S. Delegate to NATO on the Petroleum Planning Committee (1961-1964); Director of Independent Petroleum Association of America; Past President of the Texas Independent Producers and Royalty Owners (1957-1958); and Director of the Society of Petroleum Evaluation Engineers. He is a Registered Petroleum Engineer in California and Texas, and Registered Professional Geologist and Petroleum Evaluation Engineer in California. In addition, O'Brien is a member of the API, AAPG, AIPG, AIME, and Society of Petroleum Engineers.

Robert H. Paschall, B. A., 1938.

Principal Appraiser, State Board of Equalization, Sacramento, California, supervising a staff of 20 engineers, foresters, and management analysts engaged in appraisal of oil and gas fields, mines, forests, and factories. He also teaches Physical Geology at Sacramento State College in the night school and is a member of the National Statutory Regulation Committee, American Institute of Professional Geologists. Home address: 460 Lovella Way, Sacramento, California 95819.

Gordon L. Pine, B. A., 1961.

Geologist, Shell Oil Company, Los Angeles. Pine obtained his M. S. and Ph.D. degrees from the University of Arizona (1963, 1968). Home address: 5759 Colbath Avenue, Van Nuys, California.

Sterling Pryer, B. A., 1958.

Present address: 25736 Punto de Vista, Calabasas, California 91302.

Jim Craig Roth, B. A., 1956, M. A., 1959.

International Staff Geologist, Occidental Petroleum Corp., 5000 Stockdale Hwy., Bakersfield, California 93309. Roth is chiefly responsible for the development of new exploration opportunities in the Eastern Hemisphere, Southeast Asia being an area of primary responsibility.

Allan E. Seward, B. A., 1958.

Present address: 27601 North Glasser Avenue, Saugus, California.

Jay L. Smith, B. A., 1959.

Vice President, Converse, Davis and Associates, Consulting Engineers and Geologists, P.O. Box 2268-D, Pasadena, California 91105. Research and consulting concerns the risk of ground displacement along faults. Three papers have been published on the topics of faults, earthquakes, and the siting of nuclear power plants; also has presented numerous papers at professional society meetings on these and other topics of engineering geology. Smith is the Organizer and Principal Lecturer for a UCLA Short Course each summer on "Geology in Engineering Practice;" Past Chairman, Association of Engineering Geologists; Member, Ad Hoc Landslide Committee of the City of Los Angeles; Member, Professional Affairs Committee (Engineering Geologists), State Board of Registration for Geologists.

Richard D. Stewart, A. B., 1949.

Vice President and Manager of Exploration, Union Oil Company of Argentina, Casilla de Correo 5396, Buenos Aires, Argentina. Stewart moved to Argentina from Thailand in 1968.

Robert M. Stone, Ph.D., 1955.

President of Robert Stone and Associates, Inc., 19720 Ventura Blvd., Woodland Hills, California 91364. The firm specializes in Engineering Geology and Soils Engineering investigations connected with both residential and commercial developments.

Ernest Floyd Trujillo, B. A., 1956, M. A., 1958.

Trujillo was employed at Beckmann Instruments in Fullerton, California, until his death, December 15, 1969, in an automobile accident on the fog-bound Santa Ana Freeway.

John H. Van Amringe, B. A., 1956, M. A., 1957.

District Exploration Manager, Union Oil Company of California, Lafayette, Louisiana. Stationed in New Orleans in 1964-1965, he was transferred to Lafayette in 1965. He was Second Vice President of the Lafayette Geological Society in 1969 and First Vice President in 1970. Present address: 408 Brentwood Blvd., Lafayette, Louisiana 70501.

John A. Van Covering, B. A., 1956, M. A., 1962.

Formerly with the U.S.G.S. Ground Water Branch (1960-1962), then with Moore and Taber Engineering Geologists (1964), Heavy Metals Technology, Inc. (1964), at Los Angeles City College (1965),

U. S. Army Corps of Engineers (1965), California Division of Water Resources (1966). Now a Geologist, Centre for Prehistory, P.O. Box 30239, Nairobi, Kenya. He is also currently completing his Ph.D. at the University of Cambridge, Geology Department, Downing Street, Cambridge, England (expected to be completed September, 1970) with his dissertation concerning the Geology and K-Ar dating of Miocene volcanics in East Africa. Other research interests concern the geology and K-Ar dating of Tertiary marine and nonmarine faunal zones in central Europe, including those based on planktonic foraminifera. He expects to begin working on new, undescribed "Pliocene" vertebrate (hominid)-bearing deposits in central Kenya this summer. A recent publication, "Miocene stratigraphy and potassium-argon ages, Rusinga Island, Kenya," *Nature*, London, v. 221, p. 628-632, was jointly authored by J. A. Miller. At Cambridge until September, a "permanent" address is that at 19162 Valley Drive, Villa Park, California 02667.

Wm. Randall Van Schmus, Ph.D., 1964.

Assistant Professor of Geology, University of Kansas, Lawrence, Kansas 66044. Van Schmus is actively interested in the geochronology of Precambrian rocks of Michigan, Wisconsin, and Ontario and in the mineralogy and petrology of meteorites. Numerous publications in the past half-dozen years have appeared in *Science*, *Jour. Geophys. Res.*, *Jour. Geology*, *American Mineralogist*, *Geochim. Cosmochim. Acta*, and *Earth Science Reviews*. He also authored "Mineralogy, petrology, and classification of types 3 and 4 carbonaceous chondrites," in P. M. Millman [ed.] *Meteorite Research, Proc. of Symposium on Meteorite Research, Vienna, Austria, 7-13 August, 1968, Reidel, Dordrecht-Holland (1969)*.

John W. Warme, Ph.D., 1966.

Assistant Professor of Geology, Department of Geology, Rice University, Houston, Texas 77001. Principle research is a study of submarine bioerosion of clastic terrigenous rocks by invertebrates, Warme's work in California now being extended to the calcareous rocks of the Gulf and Caribbean. Has worked in California during the summers, including teaching at Bodega Marine Laboratory of the University of California. Publications appearing recently have been in the *Veliger*, *American Zoologist*, and the *Proceedings of the International Conference on Trace Fossils (Liverpool)*. Field trips have been to Bermuda, Georgia, and the Grand Canyon. He is to lead the SEPM Post-Convention Field Trip after the Houston Meeting, April 1-3, 1971. States that he is at present working with Scuba under water and hopes to graduate to submersibles to really get down to his subject.

Elbert R. Wilkinson, A. B., 1955.

Associate Oil and Gas Engineer, State of California, Division of Oil and Gas, 830 North La Brea Avenue, Inglewood, California

90302. Was transferred from Santa Maria, California, when recently promoted to his position of Associate Engineer in the Offshore Unit of the Division of Oil and Gas in Inglewood. Work involves oceanography, marine geology, and marine drilling technology, as well as the preservation of the marine environment.

James J. (Jerry) Williams, B. A., 1955, M. A., 1957.

Senior Staff Geologist, Occidental Petroleum Corp., 5000 Stockdale Hwy, Bakersfield, California. After leaving UCLA, he worked for Marathon in California and Alaska (1956-1962), Oasis Oil Company of Libya (1962-1966), Occidental of Libya (1966-1969), and is now with Occidental Petroleum as a Geological Coordinator for Europe, the Mediterranean, and East Africa. Was editor of "South Central Libya and Northern Chad," a guide to the geology and prehistory (1966); and "Augilz Field, Libya, Depositional Environment and Diagenesis of the Sedimentary Reservoir, and Description of the Igneous Reservoir," SEG-AAPG Stratigraphic Case Histories Volume, is in press. The latter was also presented at the Pacific Section Meeting of the AAPG in Bakersfield, March, 1968, and appeared in the Geology and Archeology of Northern Cyrenaica, Libya (1968). "The Idris 'A' Bioherm Second Oilfield, Sirte Basin, Libya, its Commercial Development, Regional Paleocene Geologic Setting and Stratigraphy" (with C. R. Terry) appeared in the Exploration for Petroleum in Europe and North Africa, Proc. Joint Meeting AAPG and Inst. Petroleum, Brighton, England, June, 1969. Home address: 1236 Fairway Drive, Bakersfield, California.

