UNIVERSITY OF COLORADO

Department of Geological Sciences

NEWSLETTER

BRUCE F. CURTIS

1984

Dear Friends and Colleagues:

On behalf of the students, faculty, and staff of the Department of Geological Sciences at Colorado, I send our best wishes for success in this new year. 1984 is, for us, a year of major significance, a turning point in our history as a Geosciences Department. We hope that you will share this important event with us, and help in making it a success.

When I came to Colorado four years ago, it was with the specific aim of taking part in the development of a new and dynamic Geosciences program here--one based on the existing excellence of the faculty and educational philosophy that has always characterized the CU program. Our objectives were to modernize and diversify the Geosciences program, to improve academic standards, considerably upgrade facilities and equipment, to expand the core geology faculty so that we could offer our students a more complete education, and to balance our strong academic program against an expanded research effort in both applied and theoretical fields. It seemed like a huge undertaking at a time when the State and University were in an economic downswing, reflecting National trends. Yet we have largely succeeded, and we are on the verge of a major step into National prominence as a Geosciences program. 1984 could be that year.

As the last semester of my chairmanship winds down, I am pleased to report real progress toward these goals, and especially during 1983. Our growth and development would not have been possible without strong support from the University administration, from industry, and from you--our alumni. Especially it would not have been possible without the wholehearted support and extra efforts of this faculty and staff--one of the most talented and cohesive groups of individuals I have ever worked with. It is proper to offer public thanks to all of you at this time, and to let those of you who have enjoyed your academic years in Boulder know that those qualities which made it special to you are still here, and available to new generations of students. Please come back and see for yourself; you are welcome anytime.

Our progress toward developing an even better Geosciences program at Colorado can be measured in several ways. But nothing is more obvious than the excellence of our new faculty and their research and teaching programs. Each person added to our program since 1980--Chuck Stern (Petrology), Erle Kauffman (Paleobiology, Basin Analysis, Stratigraphy), John Andrews (Quaternary Geology, from INSTAAR), Roy Kligfield (Tectonics, Deformational Fabrics), Joe Smyth (Mineralogy), Mary Kraus (Sedimentology; Sedimentary Tectonics), Janell Edman (Petroleum Geology; Seismic Stratigraphy, Carbonate Diagenesis), and our electronics specialist John Drexler (Petrology, Fluid Inclusion Studies) brought with them established national or international reputations as active research scientists and talented educators. Each has shown strong dedication to building a better Geosciences program at Colorado. The addition of Bill Hay (Paleoceanography, Paleoclimatology, Continental Dynamics, Micropaleontology) as Director of the University of Colorado Museum, and the anticipated recruitment of an internationally prominent Quaternary Geologist as the new Director of the Institute of Arctic and Alpine Research (INSTAAR) will give our program added prominence. We are currently recruiting an isotope geochemist and a new geophysicist with expertise in geodesy, and have excellent candidates for both positions.

Of course, with personnel gains there are also the losses. The early retirement of Bruce Curtis and the resignation of Chris Harrison in 1983 robbed us of two of our most influential and highly respected faculty members, and left prominent voids in our program. We wish them both the greatest of success in the private sector. It is

an honor to have Bruce return each year to teach a course for us in Hydrology or the Dynamics of Underground Fluids. Whereas our faculty is now bigger and more diverse than ever before, there are still voids to be filled in fields like exploration geophysics, hydrology, environmental geology, metamorphic and carbonate petrology, clay mineralogy and Paleozoic depositional systems. We will continue to seek both University positions and endowed chairs or lectureships to fill these voids.

Curriculum development and academic standards have evolved considerably during the last two years. With our sophomore-level screening program before admission to the major we have been able to reduce undergraduate major numbers from nearly 400 in 1980 to an ideal number of 150 at present, and in being more selective we have increased student quality considerably. Simultaneously we have completely overhauled the undergraduate curriculum, increasing core course requirements, and upgraded all standards. Beginning this year requirements for the major beyond the introductory geology courses and math-physics-chemistry sequences include a three year sequence of: (1) Mineralogy, Petrology and Geochemistry; (2) Stratigraphy, Sedimentation, and Paleontology; and (3) Structure, Tectonics, and Geophysics plus field geology. In an attempt to balance our research efforts against the basic educational program in Geology, we have allowed our graduate program to expand considerably and have increased graduate course offerings by nearly 20%. Currently we have 201 high quality graduate students and are aiming for an average of 150. We find ourselves sorting through 300-400 applications/year, and competing well with the best schools for the best people. Were it not for the lack of competetive financing for good students at Colorado, we would consistently have our pick of the best. Expansion of the graduate curriculum has been greatly enhanced by assistance from Denver region scientists in industry and government who are helping us with specialty courses, and presenting a full spectrum of lectures in subjects at the leading edge of theoretical and applied Geology. Funding for these special courses is largely drawn from your contributions, and those of your companies, for which we are very grateful. In many areas of geology, our curriculum is now one of the most extensive and up to date in North America.

Technologically, we feel we are finally entering the 20th century in both teaching and research; it has been a long uphill struggle from the $1.5 million deficit in equipment we projected in 1980-81. We now have new microprobe, X-Ray fluorescence, scanning electron microscope, elemental analysis, ion mill, digital plotting, seismic processing, and aquatic systems laboratories in place, mainly developed during 1982-1983. We have rapidly expanded our computing and word processing capabilities. During 1983, the University administration selected Geological Sciences for receipt of special enhancement funds totaling $390,000 over 3 years for equipment and the development of new programs. Much of this has gone to making up critical shortages in teaching equipment. Whereas there are still many equipment needs, this has gone a long way toward giving us the same technical capabilities as other major Geosciences Departments.

New vigorous faculty, a greater balance between graduate and undergraduate training, greatly increased grant, contract, and industry support, and technological advances in the Department have greatly enhanced the production and quality of research at Colorado. Our research productivity has almost doubled in the last five years; among our works are many landmark papers in such diverse fields as rock mechanics, strain analysis, thrust tectonics, earthquake prediction, petrology, geochemical prospecting, groundwater pollution, sediment diagenesis, paleoceanography and paleoclimatology, mass extinction theory, basin modeling, soil genesis and the geology of the Arctic. Last year we increased our participation in national and

international meetings several fold, had two major society presidents, a best paper award, and for the fourth straight year were among the top five contributing universities to the GSA annual meeting. And we are just beginning to mature as a research department. In a full administrative review of the Department, completed in 1983, the Department of Geological Sciences was found to be vigorous, academically excellent, and prominent in research achievements. Only low funding levels, student crowding, and the totally inadequate campus facilities for Geosciences were identified as real problem areas; it is these problems that we hope to attack in 1984-85.

So it is with great pride that I report to you that Geosciences at Colorado is prospering as never before. Next year we will have a new chairman from among three excellent candidates (Profs. Spetzler, Runnells, Larson); Bill Bradley will stay on initially as associate chair and I will assume the fund-raising responsibilities for the one project that remains before Geosciences at Colorado can teach its great potential—a new Earth Sciences Building in which all geoscientists on campus can be housed together in adequate teaching and research space. So this is our turning point—our critical year. The old Geology building has been obsolete for our purposes for more than a decade; it is three times too small for our faculty and student body; there are no offices and labs for new faculty, and no room for graduate research, Geosciences at Colorado can attain greatness, but only if we have this facility. To get it we must raise pledges or donations in excess of $3 million during the next year. There are many ways you and your organization can help, subsequently explained in this newsletter. We need your support at this critical time as never before.

In closing, it has been exciting, rewarding, and a great honor to have served as chairman of this Department. I am indebted to all of you for your strong support, good advice, and friendship. My sincere thanks.

Sincerely yours,

Erle G. Kauffman

WE NEED YOUR HELP NOW!

Geological Sciences at Colorado has reached a critical turning point in its history. Developments of the last few years have brought us to the brink of international prominence in teaching and research. We have a new and more diverse curriculum, we are competing with the best schools in the country for the best students, and we have expanded our faculty significantly with some of the finest young scientists available in the fields of Petroleum Geology, Seismic Stratigraphy, Tectonics, Sedimentation and Basin Analysis, Mineralogy and Petrology. We will soon have new faculty in Isotope Geochemistry and Geophysics. In support of new faculty and new research programs, we have made a quantum jump in technological support, adding a microprobe laboratory, X-Ray fluorescence capabilities, elemental analysis equipment, a scanning electron microscope lab, a new seismic analysis unit, an ion mill, and aquatic processes laboratory for sedimentology and paleobiology. Word processing and computer facilities are now spread through our building. We have developed a fully modern, but expensive, teaching and research program at Colorado. Our new geochemistry and geophysics faculty will need even more sophisticated, and expensive, facilities.

Our remarkable development over the past few years would not have been possible without your financial support, and that of industry and the University. This generous financial support has allowed us to seek our potential as a great Geosciences Department at a time of economic decline in Colorado, and diminishing State support for education. Our immediate financial crisis is simply a crossing over of costs for the continued development of a dynamic geosciences program, and projected funds available from all sources—government, public and private for the coming years. It also relates to the fact that we must develop, this year, significant pledges of financial support for a new Geology building, or lose our highest priority new capital construction ranking and the expectations of University and State support for this much-needed facility.

If ever there was a time when we needed your maximum financial support for Geological Sciences at Colorado, it is 1984. With it, we will achieve our potential; without it, we will seriously flounder. We offer you several possible avenues for assistance:

The Earth Sciences Center. Our original concept of the ESC building was to provide a new and fully equipped facility within which all Earth Scientists at Colorado could be housed with their students and research programs. The present scatter of our people between two institutes on East Campus, and within four scattered buildings on the main campus, seriously prevents basic communication, and keeps us from developing new programs and from reaching our considerable scientific and educational potential. Our need for a new building is especially critical for the core geology program. The old Geology Building is in poor shape and is wholly obsolete for modern science education; this has been determined three times by campus review committees during the past decade, yet we are still here with a threefold increase in students and programs. There is no room for new faculty offices or development of critically needed laboratory space for sedimentology, petroleum geology, economic geology, rock mechanics, geochemistry, geophysics and environmental geology. Yet we have in place or are hiring this year new faculty in most of these important disciplines, and have many students committed to these programs.

There are no real opportunities to develop clean analytical laboratories in this building. Less than 30% of our large graduate student body have even basic work space in the Geology Building. Our present classrooms lack facilities for modern education. We must have a new teaching and research facility for Geosciences at Colorado.

This year is the most critical time in developing the Earth Sciences Center. We have confirmed highest ranking for new capital construction in the campus Centennial Development Plan. The renovation of Geology Building for other programs is second priority for the first time, strengthening our position. We have broken our original $19 million facility plan into three parts: a first and most critically needed building for the Core Geology program ($9-10 million); a second phase for a Solid Earth Geophysics and Environmental Geology wing ($6 million; CIRES Institute), and a third phase for the Quaternary Geology facility (INSTAAR Institute; $3 million). If we are to retain our priority ranking for construction of a new Geosciences complex on campus, we must demonstrate our ability to raise at least one-third of the initial cost, $3.3 million, from private and corporate sources, during 1984. With this in hand, matching University and State funding will be possible, and we can break ground by 1986.

We ask that you make or pledge a major contribution to the Earth Sciences Center fund this year, and help us in getting large corporate support, so that we can make this final step toward excellence in Geosciences at Colorado. Your contribution can be designated directly to the development of specific programs or facilities in this complex, such as Petroleum Geology, Geophysics, Geochemistry, Economic Geology, Stratigraphic and Paleobiologic Sciences, Quaternary Geology, etc. Substantial single contributions resulting in development of any single teaching or research facility in the new building will result in naming of that facility for the donor, or any company or individual designated by the donor. Your pledges may be spread out over 1-3 years if you wish; but we need those pledges soon. No pledge is too small, and we urge every alumni to make a specific extra contribution to this cause to show your support to our administration. But we critically need some large founder grants or gifts to get the ball rolling, and to help us approach the $3,300,000 mark this year.

Please help us as much as you can. We need the financial support of every alumnus in this effort.

Student Support -- There are about 200 graduate students spread through the CU Geosciences program. They are intelligent, hard-working, motivated students that are highly sought after by industry, government, and academia. Even though we are trying to cut this number down, the problem of supporting graduate students at even basic levels ($6000-7000/student/academic year) will always be with us. Only 25 can be supported through teaching assistantships, another 50 from grants and a few from industry fellowships. Half of our graduate students critically need your support for academic, research and field expenses. How about establishing a fellowship in the field of your choice, or work with your company to establish such a fellowship, for one of the best of CU's graduate students. The fellowship will be named for the donor(s), and you will receive a full report on the recipient and his/her program and achievements each year. All fellowships are given on an open, competitive basis to the best qualified students.

Equipment -- Whereas we are beginning to solve our $1.5 million equipment deficit projected in 1980-1981 through major infusions of University Enhancement funds, Industry gifts such as ARCO's Junior Faculty Development Grant, and alumni contributions, we are still left with major deficiencies for new programs. In particular, we need help in setting up a new Petroleum Geology program, in our Economic Geology program, in Stratigraphic Geology equipment, in field equipment, in Geophysics, and in Geochemistry. Major equipment pledges can be linked to your new building contributions.

Faculty travel and research. — The University normally provides partial funding for only one trip for faculty per year so that he/she can attend a professional meeting or do field work. Yet our faculty are very active in research and in great demand for participation in national and international meetings, all of which greatly benefit their teaching and research efforts. It is your gifts each year that provide the major funds for most faculty field research and travel. Do you have a favorite faculty member or program? Why not establish a research fund in our Department or through the CU Foundation for this purpose?

Faculty Chairs. — Through State and University restrictions on academic positions, we cannot expect to acquire new positions in Geology for some time now. Yet we still have important gaps in our core teaching and new programs to build, especially in applied aspects of geology. We need a good Exploration Geophysicist, another Petroleum Geologist of the Bruce Curtis caliber, Ground Water and Environmental Geologists, and a Metamorphic Petrologist for our economic geology program. A permanent senior chair in any of these fields, or other areas of interest, can be established at CU for one million dollars, a junior chair for $250,000-500,000, and a visiting professorship for top ranking people with an income of $35,000/academic year.

Lectureships and Seminars. — One of the greatest attributes of our new geosciences program has been our ability to attract top people from industry, government, and academia to come to the University of Colorado each year to present series of lectures, short courses, and seminars in the newest areas of theoretical and applied geology. This has allowed a 20% increase in graduate course offerings, as well as a series of unique opportunities for our students to become aware of the newest trends in the science. In some cases these courses and lectures are presented on a regular basis and become a normal part of the curriculum, for example courses and seminars in ore genesis, in palynology and paleobotany, in applied geochemistry of petroleum, in technical report writing for geologists, in coal depositional systems, and in sedimentary environments are all sponsored under this program. The special seminar and lectureship program was initially seeded by University funds with the understanding that the Department would eventually develop independent funding for it; that time has now come and we ask your help in keeping this important program going.

Your firm can subsidize a yearly seminar for $3,000 to $5,000 in contributions such as RPI, Colorado and Gustavson Associates of Boulder have done for us, as well as by donating the time and efforts of your scientific staff to lecturing. You can endow a yearly lecture in your name on any topic of your choosing for $500-1,000 per year. The cost of a single course taught by local geologists for us is $2500. Can you help us here?

Library Donations. — Our library is the core of our program of education and research. The University library budget for geosciences is less than half of what is needed for us to keep current in new books and journals of geology. Any amount of money donated to the library fund in Geological Sciences will help keep this valuable resource up to date.

A PORTRAIT OF BRUCE F. CURTIS, PROFESSOR EMERITUS

In this issue, Newsletter honors **Bruce F. Curtis**, who retired in 1983 from the Department and the University after 26 years of dedicated service, having spent more than a decade in the petroleum industry prior to joining our faculty. We use the term "retired" loosely, as he will continue to do some part-time teaching along with writing, consulting, and work with professional organizations.

There are ways in which Bruce is a rare species in the departmental family, and perhaps in the campus community. For one thing, he is a native Coloradan. For another, he had settled upon a choice of profession before he entered high school. The stork dropped Bruce off in Denver during the flue epidemic at the end of World War I. As a boy, he learned to love science, and to cherish the out of doors. The prospect of geology as a happy compromise appealed to him at an early age. A course in geology offered by a science teacher at South High School, where he was enrolled convinced him that he was on the right track.

Through family connections, he became interested in attending Oberlin College in Ohio. He wrote to Prof. George Hubbard, then Head of the Geology Department, regarding preparatory courses he should take in high school. He subsequently applied for and received a scholarship to Oberlin. With this and odd jobs for room and board, he managed to thwart the Great Depression.

In the summer of 1940, prior to his senior year, Bruce enrolled for a course in field geology at Science Lodge, the University of Colorado summer field camp west of Ward. The experience convinced him he should apply to the department for graduate work, provided financial aid could obtained. When he returned to Denver for the Christmas break, he came to Boulder to talk with P. G. Worcester, who was then department head, regarding the probability for admission and help. It was a fine December day, and Phil was on the golf course. Bruce intercepted him on the 10th tee and accompanied him for a few holes while they talked. The calibre of both Bruce Curtis and Phil Worcester is demonstrated by the fact that, resulting from this conversation, Bruce was awarded an assistantship.

In the summer of 1942, some six months after Pearl Harbor, he completed the M.A. degree in Geology and applied for admission to the Meteorology Program of the U. S. Army Air Corps. He was accepted for assignment beginning in November and meanwhile took temporary employment with the U.S. Geological Survey. Having dusted off his undergraduate courses in physics and differential equations, he attended Meteorology School at the University of California, Los Angeles, from November, 1942, to August, 1943, for intensive training in the dynamics of air masses as a basis for weather prediction. His room mate and fellow cadet during this interval was none other than Luna Leopold. For further training, he was assigned in the fall of 1943 to Lowry Field in Denver, where he flew practice weather missions in a B-18. At this point, the Air Corps decided that there were too many weathermen, and Bruce was reassigned to fighter control training at Orlando, Florida. This led to duty in the south and west Pacific for the remainder of the war.

Following his tour of military service, Bruce decided that it was time to seek employment as a geologist. He contacted Art Brainard at Continental Oil regarding job prospects. At that time, Conoco, in common with other companies, was short handed, and Bruce was hired on the spot. Two years later, an urge to return to academia for more training would not be denied. Having applied for and received a scholarship to Harvard, he resigned his position with Conoco (there was no academic leave in

those days) and headed east. He managed with the aid of funds he had saved, the G.I. Bill, and summer employment with Conoco to survive two years in Cambridge and complete the Ph.D. in 1949. He returned to Conoco in the position of Research Geologist and within a few years he became Regional Geologist for the Rocky Mountains with five regional offices and some 50 geologists under his jurisdiction.

Having reached at an early age an upper rung on the ladder of success, Bruce began to have second thoughts about what he really wanted to do with his life. He sought the advice of his trusted friends and former teachers at the University - Warren Thompson, Ernie Wahlstrom, and Phil Worcester. Growing out of these conversations came an invitation to join the staff. It must have been with some misgivings that in 1957 he decided to begin anew in a job that promised twice as much work for less than half as much pay, but greater satisfaction. Forthwith he resigned from Conoco and moved to Boulder. In the spring of 1958, he married and brought to Boulder Ruth Bachrach, another Conoco geologist, thus placing the company in double jeopardy.

When Warren Thompson resigned as Head of the Geology Department in 1960, the staff voted to join other departments on the campus in adopting a rotating chairmanship. The following year, Bruce became the first chairman, a position he held until 1967. This was a trying period of student unrest in the Department and the University. Following a collapse of the employment market in the earth sciences in 1958, enrollments in undergraduate geology courses were depressed and geologists displaced from industry returned in great numbers for graduate work, creating an imbalance that the Department was ill equipped to handle. Through this period of transition in departmental governance and academic functions, Bruce steered a steady course and laid the groundwork for development that ensued in the following decade.

During his chairmanship, Bruce became well acquainted with many scholars and administrators on the campus who came to respect his judgment and integrity. As a result, he found himself involved in numerous committee assignments at departmental, college, and university levels. The spectrum of these activities includes tours of duty on the Faculty Council and the Executive Committee of the Faculty Senate. The breadth of his talents and interests is reflected in the fact that for nearly two decades he served on the Artist Series Committee, struggling with limited budgets to bring world-famous artists to the campus.

Bruce continued a tradition established by Warren Thompson of maintaining close family ties with alumni. Early on, he nurtured the then fledgling Geology Foundation, which grew out of a fund drive for building renovation in the early fifties, drafting its constitution and rules for incorporation. In recent years, he served as chairman of the departmental Committee on Alumni Relations.

Bruce's teaching had to do mainly with the training of petroleum geologists, environmental geologists, and civil engineers. His courses included Geology for Engineers, Subsurface and Petroleum Geology, Geohydrology, Mechanics of Underground Fluids, and Geology of Organic Fuels. In addition, he assisted from time to time with the elementary courses and was involved in directing the work of several scores of graduate students, many of whom now occupy positions of prominence in industry, government, and higher education.

His membership in professional societies includes the American Association of Petroleum Geologists, the Rocky Mountain Association of Geologists, and the Geological Society of America, in all of which he has served on important committees and

held regional or national offices. He has been a frequent contributor of papers to the bulletins, guidebooks and symposium volumes of these societies. He has been widely recognized for his contributions in editing, having served as Associate Editor of Mountain Geologist, Associate Editor of the GSA Bulletin, and Acting Publications Editor for the Geological Society of America. Among better known volumes that bear the mark of his work are Natural Gases of North America (AAPG Mem. 9, 1968), Geologic Atlas of the Rocky Mountain Region (RMAG, 1972), and Cenozoic History of the Southern Rocky Mountains (GSA Mem. 144, 1975). The first is a monumental two-volume work which he co-edited with Warren Beebe. When Beebe was forced to step down because of ill health, Bruce nurtured the volumes to completion.

Apart from other duties, Bruce found time for a wide range of activities in professional and community service. He and Ruth also traveled extensively, mainly in western Europe and the southwest Pacific but touching on all of the continents except Antarctica. There is no doubt that his courses were enriched by these endeavors and that his students profited substantially as a result of them.

Bruce's departure leaves a major hole that will be difficult to fill, not only from the standpoint of quantity and quality of his academic pursuits, but also because of his close ties with the petroleum industry and with alumni and friends of the Department. His work has been characterized by his strong conviction that geology plays a vital role in human affairs, a notion that he acquired early and that runs like a thread through his career. I count it a privilege to have been one of his colleagues during the past quarter of a century.

Larry Warner

GEOLOGICAL SCIENCES IN CIRES 1983

The solid-earthgeophysics program in CIRES is currently built around four main research elements: theoretical studies in geophysics, geodynamics, observational seismology and laboratory geophysics. Faculty members from four departments, Geological Sciences, Physics, Mechanical Engineering and Astronomical, Planetary and Atmospheric Sciences, join with CIRES research associates and a large number of graduate students to form the scientific staff. Funds to support the research comes from a number of Federal agencies, especially N.S.F., U.S.G.S., NASA, NOAA and the Department of Defense.

The theoretical program has been directed mostly to research related to seismic source physics, nuclear test monitoring, the calculation of synthetic seismograms, and signal processing techniques. Other theoretical studies concern elastic wave propagation in realistic materials and problems of whole earth-dynamics. The problems of geodynamics under study included contemporary crustal deformation, especially in California, as observed by repeated gravity measurements, tilt observations and electronic distance measurements using the most advanced instrumentation. Another geodynamics project deals with the interpretation of the geoid anomaly in the Indian Ocean in terms of plate tectonics.

The observational seismology program operates seismic networks in the Aleutian Islands, Greece and Fiji-Tonga. The research interests span the Earth, from these places where instruments are operated, to Hawaii, China and, of course, many places in North and Central America. The main objectives of the program continue to be earthquake prediction, seismotectonics on local and regional scales, earthquake physics and earth structure. The laboratory research has produced important results on rock fracture and rock properties at high stress. The studies now emphasize observations of tiny "earthquakes" called acoustic emissions, as a means of getting new kinds of data about the faulting process.

Members of the CIRES solid-earth group attended many conferences and meetings to present their results, both in the U.S. and abroad. In particular, the Institute was well represented at the general assembly of the International Union of Geodesy and Geophysics in Hamburg, Germany in August.

CIRES continues to be the primary focus for most of the research by students in the Geophysics Ph.D. program. In addition, post-doctoral research workers come from many countries to join in the work and add to the richness of the educational program.

INSTAAR

INSTAAR now consists of approximately 18 voting "hard" and "soft" money faculty. This group supervises approximately 30 graduate students from EPO Biology, Geography, and Geological Sciences. There are about 14 graduate students with offices at INSTAAR who are working on PhD or MS theses through Geological Sciences.

INSTAAR has been in the process of upgrading its lab facilities. These will complement services available through other departments. In the last year a laser particle counter and XRD unit have been added, and ion chromotography and atomic absorption systems are presently being brought on line for use with water and sediment samples.

Research within INSTAAR is geographically widespread with field parties being active in Antarctica (biology); Alaska (Quaternary geology, plant ecology, and palynology), arctic Canada (glacial geology, marine geology, palynology), Spitsbergen (glacial geology, soils), Colorado (lake sediments, glacial geology), and the Mediterranean (terrace chronology and neotectonics).

In the Quaternary program the Amino Acid Geochronology Laboratory plays a key role. This facility is housed in INSTAAR and is directed by Dr. G. H. Miller.

FACULTY AND STAFF

John Andrews reports that for him the research highlight of 1983 was a 3 week research cruise on the Canadian Research vessel Hudson. "We left Thule, Greenland on September 17th and sailed across Baffin Bay to Cambridge Fiord, Baffin Island. This cruise was part of the Canadian sponsored Sedimentology of Arctic Fiords Experiment project headed by the Atlantic Geoscience Center, Halifax. In addition to Cambridge Fiord, they undertook detailed surveys in McBeth and Itirbilung Fiords. The University of Colorado's function in this project is to provide a late Quaternary framework of events in the fiords through an analysis of several 5-12 m piston cores. This work is being supported in part by NSF through the Division of Polar Programs. We are currently working on several aspects of the cores--this research involves graduates and some faculty. Topics being investigated include rock and paleomagnetic characteristics (with Ed Larson and Ann Jennings), foraminifera (Dr. Lisa Osterman), diatoms (Kerstin Williams), pollen (Dr. Susan Short) and mass physical properties (Dr. J. Kravitz, NOAA)--the other people mentioned are in Geology/INSTAAR".

John's research in "soft soft" rocks (i.e. Quaternary deposits) has been facilitated by 2 equipment grants from NSF. One was for a sub-bottom acoustic profiler that works in lakes and shallow seas to 120 m water depth. The other grant has enabled them to purchase a Rigaku XRD system with a Hewlett-Packard peak integrator, plus a laser-particle counter and grain-size analysis. This last piece of equipment is capable of measuring the grain-size of particles between 100-1 m range and provides absolute counts per ml.

John's teaching still focuses on glacial geology and geostatistics with advanced seminars on various topics of current research concerns.

INSTAAR is currently doing extremely well with an active group of "soft-money" researchers and an excellent cadre of graduate students--about 1/2 the total INSTAAR graduates are from the Geology Department.

Bill Atkinson -During the last two years, the program in economic geology has grown and matured. The numbers of students doing theses under Bill's supervision swelled to a record 25 in 1982, but since then he has held back admissions, and the number is now 18 (9 graduated in '82-'83). Eventually, he will cut back to about 5 students, to allow more time for research. The teaching program is based first on an introductory course in which a survey of types of ore deposits and processes are pre-

Bill has continued research on a variety of topics--he published a recent paper on a skarn-breccia orebody at Victoria, Nevada, and is working on a major publicatio on a porphyry copper deposit at Los Pelambres, Chile. Recently, his attention has turned to gold deposits--six of his students are working on gold theses, and he is re-examining the Gold Hill district near Boulder.

Peter Birkeland has had a busy 2 years. He has been teaching his usual courses (Introductory Geology, Quaternary Stratigraphy, and Soils), and this year he, Andrew and Bradley are co-ordinating a seminar on geomorphic applications to neotectonics. Pete recently has completed a revision of his Soils and Geomorphology book, which will be published this spring. He also has submitted articles on New Zealand and Front Range soil chronosequences, and some reviews of late Quaternary stratigraphy and soils with former students Bud Burke and Ralph Shroba. Pete's current thesis students are spread across the western states, and during the past summer he visited the Nevada Test Site to review field work by Emily Taylor on soils at the site as indicators of paleoclimate, and then continued on to the Sierra Nevada to assess the potential of a geomorphic-tectonic study by Margaret Berry. Late in the summer the soil-geomorph gang went on a Friends of the Pleistocene trip in Idaho. Pete had the honor of making the presentation of the Kirk Bryan Award at the national GSA meeting in Indianapolis. During the recent Christmas break he was invited to give an addres before the British Quaternary Association. While on that trip he took time to visit some soil pits and pubs around London, ski the trails and mountains of Norway, and give a talk at the University of Bergen. Pete's running, biking and skiing continue and as we are assembling the Newsletter for press he and others are preparing for th annual University ski races (the Campus Cops won last year!).

Bill Braddock continues to teach undergraduate and graduate courses in structural geology and field geology. His research activities are divided between studie of the geology of the northern Front Range and experimental rock mechanics. Geologi cal field work over the last several years has been mainly in Rocky Mountain Nationa Park. He plans to publish a U.S.G.S. map at 1:50,000 of the Park geology. Bill's rock mechanics experiments, which are financed by the Engineering Geology and Tecton ics Branch of the U.S.G.S., deal with the stress-strain relations of Pierre Shale at low to moderate temperatures.

Bill and Louise **Bradley** spent academic year 1982-83 on sabbatical leave in Wales. Home base was the west-coast town of Aberystwyth; professional home was the Department of Geography at the University College of Wales. Bill, along with col league John Lewin and some of John's hardy students, studied gravel movement on one of the local rivers. When gravel was not moving he visited some of the great geolog ical localities of the UK. Louise checked the pulse of Welsh handspinning and hand weaving. They returned in mid-summer, and by now have fully dried out, internally a well as externally.

This academic year, Bill is part-time teacher and part-time Associate Chairman wherein he provides invaluable help to Erle Kauffman in running the department. Some time also goes into preparations for the next biennial meeting of the American Quat ernary Association, to be held in Boulder in mid-August of this year. Bill, Pete Birkeland, John Andrews, and others are responsible for that meeting.

Departmental Office Staff. The departmental office continues to run smoothly owing to yeoman service by **Edith Ellis**, **Paulina Franz**, and our newest secretary, **Kay Fox.** These efficient, devoted, and dearly loved ladies are the people who really keep the department intact. They all send greetings to their alumni friends. Paulina was the envy of many of us last summer when she and her family took a

vacation trip to Europe. Along with much sightseeing, they visited a daughter whose husband is stationed in Naples, Italy.

John Drexler taught an Introduction to Electron Microprobe course in the fall along with correlating Geol. 201, a 2-credit lab course. In the spring he taught Ed Larson's course on Volcanology. John keeps the microprobe working and has been actively involved in getting the new X-Ray Fluorescence unit standardized.

Janell Edman, one of our new additions to the faculty, is teaching courses in Petroleum Geology and Seismic Stratigraphy, as well as various seminars pertinent to petroleum geology. Her seminar this year emphasizes basin analysis. Janell received her BS and MS degrees in Geophysics from Stanford University, and her Ph.D. in Geology from the University of Wyoming. She had 4 1/2 years of industry experience prior to joining our faculty. Janell's areas of expertise include diagenesis, basin analysis, and interpretation of seismic reflection data. Her current research involves maturation modeling in overthrust terrains and a basin analysis in the Green River Basin.

Don Eicher recently finished a small (200-page) book History of the Earth's Crust with co-authors A. Lee McAlester of S.M.U. and alum Marcia Rottman (PhD '77) of Exxon Production Research Company of Houston. It was published last December in paperback as part of Prentice Hall's Foundations of Earth Science Series. He is now revising History of the Earth, the earlier text that he co-authored with Lee McAlester. In research, Don has become interested in high-resolution foraminiferal stratigraphy in the western interior Cretaceous. High resolution Stratigraphy was developed by participants in D.S.D.P., particularly for the late Cenozoic. Don reports that in areas of very slow sedimentation and in sequences where climatic and circulation histories are complex, you need samples close together to pick out the nature of the changes. Preliminary extrapolations into the Cretaceous have been revealing. Fifteen years ago paleontologists took 10-foot samples mainly to see what was there. Now he says, we are dealing with an order of magnitude higher resolution to find out how faunas developed, how stable they were, and what they can tell us about paleocirculation and paleoclimate. The National Science Foundation is funding Don's work. During the year Don taught Historical Geology, Introduction to Stratigraphy, Micropaleontology and Ancient Sedimentary Environments.

Judith Harris, since last report, has changed her name (from Van Couvering). During the past year she has been finishing her work on African paleontology and paleoecology. She reports that the "finishing up" process may take a while because there are several fossils and ideas lying in wait, but for now Cenozoic Land Mammal Ages of Africa co-authored with John Van Couvering will be submitted to the Journal of the Geological Society soon. Also soon to be submitted is a paper discussing ethics and methodology in paleonanthropology (Human Origins, Scenarios and Ethics). She currently is working on a paper with John Van Couvering on the Geology and Paleontology of Rusinga Island, Kenya, which is nearly complete; and she has recently started a book on Women and Science, which will be a feminist analysis of the metaphysics, ethics, and epistemology of science.

Judith teaches all of the core undergraduate vertebrate paleontology courses. This year she taught part of Introduction to Paleontology (Geol. 341), Lower Vertebrate Paleontology (Geol. 447/547), Mammalian Paleontology (Geol. 448/548), and Mammalian Osteology (Mus. 449/549), as well as Women and Science (Women Studies 400) and Science and Ethics (A&S 160), a Farrand Hall Freshman Seminar.

Chris Harrison resigned his faculty position at C.U. last spring to accept a job at Geodynamics Corporation in Santa Barbara, California. We miss Chris and wish him well.

Bill Hay taught a graduate level course in oceanography and paleoceanography during the spring semester of 1983. He attended the conference of the Regional Committee on Mediterranean Neogene Stratigraphy on Principles of Paleoecologic Interpretation, held in Utrect in March, 1983. He also attended AAPG in Dallas in April, and the Geological Society of American Cordilleran/Rocky Mountain Section meeting in Salt Lake City in May. Bill has completed editing the Leg 75 Volume for the Deep Sea Drilling Project and is pleased to report that it will be published in 1984. During July he attended a Conference on climate change in Leningrad, and the First International Conference on Paleoceanography in Zurich. He presented two papers at the GSA Annual Meeting in Indianapolis in November. He has been appointed Co-Chairman of Section C6 (Marine Geology) of the 27th International Geological Congress, and attended the meeting of the Organizing Committee for the Congress in Moscow, November, 1983. He presented lectures at the University of Munich and the University of London on the trip back. During the spring semester of 1984 Bill is teaching an upper level undergraduate course in Oceanography and a graduate course in Marine Geology.

Erle Kauffman spent another busy but rewarding year as chairman and was successful in acquiring new faculty, new technology, and increased funding for the Department. He continued to teach a broad spectrum of courses in paleobiology and work with his 15 graduate students. As Vice President of the International Paleontological Association, past President and committee person of the Paleontological Society, organizer of its 1983 and 75th anniversary symposia and an AAAS symposium on mass extinction, as coordinator of the 4th North American Paleontological Convention to be held in Boulder (1985), committee person for GSA and SEPM, and Editor of Cretaceous Research, there was little time for research and field work. Several short field trips to Cretaceous basins of Wyoming, Colorado, and Utah were conducted with students, and research papers were finished and submitted on mass extinction theory, Precambrian Metazoan evolution, sedimentary and climatic cycles in Mesozoic rocks and their relationship to source rock development, high-resolution event stratigraphy and systematic paleontology. He received a best paper award from SEPM for work on Precambrian Metazoan(?) trace fossils from Wyoming. Erle gave invited lectures at four national meetings, numerous universities and energy companies, and regional geological societies in New Orleans, Houston and Denver. His term as chairman will end June 1, 1984 at which time he will begin field work in France and attend the International Congress in Moscow as a keynote speaker during the Summer.

Carl Kisslinger continues to direct the earthquake prediction project in the central Aleutian Islands, in close collaboration with co-P.I. Selena Billington. The project, funded by the U.S.G.S. as part of the National Earthquake Hazards Reduction Program, provides support for the operation of the Adak Seismographic Network and for research on regional seismotectonics and prediction methods in this typical subduction zone setting. In addition, he is directing two projects, again in cooperation with co-investigators, in the general area of seismic anisotropy, one in eastern China, the other in the Tonga-Fiji seismic zone. Results from these projects have been presented at various meetings, including the American Geophysical Union, the Seismological Society of America, and the General Assembly of the International Union of Geodesy and Geophysics, Hamburg, Germany, by various members of the research team.

On the teaching side, Kisslinger is continuing to work with Hartmut Spetzler on the first semesters of Our Dynamic Earth and Introduction to the Physics of the Solid

Earth. He is also responsible for the first semester of Earth and Planetary Physics, Seismic Wave Theory (with S. Datta), and Geophysical Instrumentation. He has succeeded Chris Harrison as chairman of the Graduate School Committee in charge of the Graduate Program in Geophysics.

Extracurricular activities include his tenth (and last) year as Foreign Secretary of the American Geophysical Union and member of the AGU Executive Committee. He was elected Vice-president of the International Union of Geodesy and Geophysics for a four-year term, beginning at the end of August, 1983. He served on two committees that enjoyed an opportunity to impact future Federal support of the geological Sciences, both under National Academy of Sciences auspices, one under the Board of Earth Sciences, directed toward NSF, the other under COSEPUP, directed toward the Office of Science and Technology Policy. He also worked with the Federal Emergency Management Agency of the national earthquake program. Foreign travel for the 1982 and 1983 included Japan (two trips), Ireland, England, Belgium, Austria, Germany (for IUGG).

Roy Kligfield travelled to Europe during June, 1982, to participate in an International Congress on Strain Methods in Rennes, France. Field trips to the Isle of Groix on Pretagne's southern coast provided spectacular exposures of blueschist facies rocks. This was followed by fieldwork in the Swiss Alps after which he was married in the Italian Alps. During July-August he visited the Canadian Rocky Mountains with a group from Johns Hopkins University. Together with G.H. Davis at the University of Arizona, Tucson, August was spent examining the basement terranes which make up metamorphic core complexes in southern Arizona. This is part of a National Science Foundation project to examine processes of continental rifting during the mid-Tertiary in basement rocks of Arizona. During June-July, 1983, he travelled to the Himalayas with Charles Stern and Dan Schelling to begin field work as part of a joint project with scientists at Wadia Institute of Himalayan Geology in Dehra Dun, India. He reports that their Basecamp at 14,000 feet elevation on the Gangotri Glacier demonstrated once again that even seasoned mountaineers suffer from the effects of too rapid arrival at high altitude! This ongoing project is aimed at deciphering the tectonic, structural and petrological evolution of the Himalayas in Garhwal, India and is supported by the National Science Foundation.

Roy and his graduate students now have the structural geology microcomputer system fully operational in the geology department. This facility provides students and faculty with interactive graphics capability, digitizers, and plotter for research infields of strain analysis, rock deformation, and cross section constructions. Miscellaneous field trips were undertaken throughout the year with students in the overthrust belt of central Utah.

Roy's activities for the AY included teaching a new course in Global Tectonics, an advanced structure course, and sharing the introductory undergraduate structure course with Bill Braddock. Roy together with Gary Couples of Amoco Production Co., has been busy editing the Division of Structural Geology and Tectonics (GSA) Newsletter. Together with John Ramsay (ETH Zurich), he was coconvenor of a GSA short course at the Indianapolis meeting entitled: "Strain measurement: techniques and tectonic implications."

Mary Kraus joined the faculty in the spring of 1983 as our new sedimentologist. She has offered three new courses this year: Introduction to Sedimentology, which is part of the revised undergraduate curriculum, Advanced Sedimentology for graduate students, and a graduate seminar on continental depositional systems.

Mary's principal research interests include the environmental interpretation of clastic sedimentary rocks, sedimentary tectonics, and paleoclimatic interpretation through alluvial paleosol studies. She is especially interested in the analysis of

Mesozoic and Cenozoic basins in the Rocky Mountain region. Last fall she spent two weeks examining Eocene-Oligocene sediments in the Western Desert of Egypt as part of an ongoing Duke University-Geological Survey of Egypt project. This summer Mary will continue studies of alluvial sequences in northwest Wyoming and in the Petrified Forest National Park, Arizona.

Ed Larson has returned to active duty in the department after being on sabbatical last year. He says that he found it a little difficult in September to get geared up for teaching again, but he is making the transition well. Last semester, Ed taught 101 and Paleomagnetism; this semester its petrology and volcanology.

During his sabbatical Ed worked on many of the unfinished projects that had accumulated over the years. He finished a few of them but also added a few new ones, so that the total remains about the same. He also managed to find time to get away to such exotic places as Alamosa, Colorado, Laramie, Wyoming, and Denio, Nevada.

A few months ago, to keep up with the times, Jim Munoz and Ed procured an IBM PC for their mutually shared office. Its somewhat addictive and sometimes they don't leave the office for days.

Ed is still into running, and he reports that he is working on perfecting helium-inflated lift shorts, to take out some of the painful pounding on the peds. He thinks they might even be good for field work.

Gifford Miller continues to oversee the operation of the Amino Acid Geochronology Laboratory at INSTAAR and keep up an Arctic Quaternary Geology program. In the summer of 1982 he went to the INQUA meetings in Moscow, USSR, followed by a museum collecting expedition to obtain marine molluscs from last interglacial sites across NW Europe, including an interesting four days in Poland. In the fall of 1982 Gifford organized a one-day symposium on Amino Acid Geochronology at the annual GSA meeting in New Orleans. Ed Hare (Carnegie Institute) and John Wehmiller (University of Delaware) were coorganizers; The Division of Geomorphology and Quaternary Geology sponsored the symposium. During the 1983 summer he returned to western Spitsbergen to continue studies on the Quaternary stratigraphy that were initiated in 1979. The field season in the Arctic was followed by a radical change in climate with a collecting program in Tunisia, N. Africa in late September when the Mediterranean is at its warmest. Marine pelecypods and terrestrial gastropods were collected from the stacked marine/eolianite/red silt sequences along the eastern coast of Tunisia. Midra, Charles Stearns (Tufts University) and Roland Paskoff (University of Tunis) joined in the field work.

The Amino Acid Geochronology Laboratory continues to receive funding to investigate the age of marine events and paleotemperature gradients across NW Europe, Svalbard, Baffin Island and the Mediterranean. Dr. Jan Mangerud (University of Bergen, Norway) spent the fall semester 1983 on sabbatical working in the lab on the European project. The lab now consists of two fully automated amino acid analyzers and a third manually operated system used to develop additional analytical capabilities. Mr. Dan Goter has been hired to handle the day-to-day operation of the laboratory and is responsible for a project to allow on-line data reduction through a new computer system.

Jim Munoz has had a busy year putting together the final draft of GEOCHEMICAL THERMODYNAMICS, a 600 page manuscript for a textbook which will be published by Benjamin Cummings in June 1985. Co-author on the project is Kirk Nordstrom, an old CU grad who is currently with the Water Resources Division of the USGS at Menlo Park. Jim ways this book differs from presently available texts in that it treats both low-temperature and high-temperature geochemical applications, contains a long

chapter on fundamental theory, and concentrates on problems related to the acquisition, compilation, and critical evaluation of thermodynamic data. The latter subject is perhaps the most unique contribution of the book.

As the book effort begins to wind down, Jim has returned to the laboratory to grow garnets stuffed with as much fluorine as possible. Such garnets are common in some hydrothermal ore deposits. Jim also is continuing his work on biotite geochemistry.

Chuck Stern passed another two uneventfull years teaching Natural Catastrophes, Cosmochemistry, Igneous Petrology, and Optical Mineralogy, punctuated with a trip to the Himalaya to study young Himalayan granites, as well as the usual annual trips to South America to study the recent volcanism. A lot of Chuck's time was devoted to family matters with the birth of Danielle, later renamed Paloma and now called Pimpo, and more recently the birth of Fransisca called Panchi. Chuck says Nico is very pleased to be a big brother and takes the job very seriously. Chuck still has time to drink a few beers now and then, but as his level of responsibility and the pace of his life has increased, his tastes have altered to include martinis—purely out of necessity, of course.

Peter Robinson has been having good luck finding interesting Eocene fossils in the Powder River Basin of Wyoming and hopes to continue working there on a larger scale. Among other things the collection indicates some kind of a refugium for fossil vertebrate taxa thought to have been extinct elsewhere, and possibly as a place for new taxa to emmigrate from as well. Mike Middleton finished his dissertation on the Paleocene vertebrates of the Denver Basin in May 83, and Allen Kihm finished his on the early Eocene mammals of the Piceance Creek Basin in December. The Vertebrate program is about to get an influx of new energy when Robert Bakker comes here next year. Old bones are everywhere.

Don Runnells continues his teaching and research in low-temperature and aqueous geochemistry, with emphasis on environmental problems and geochemical exploration for mineral deposits. He has several graduate students, working on problems associated with oil shale development, computer modeling of natural waters, disposal of uranium tailings, and the measurement and interpretation of oxidation/reduction parameters in natural waters. Funding for Don's research continues to come largely from the U.S. Department of Energy, with some support from the National Science Foundation.

Many of the students in Don's classes are obtaining a background in geochemistry to apply to their own special interests in diagenesis, mineral deposits, and weathering. Don also continues to teach Geology 103, which is introductory geology for non-scientists; Don says the course is a challenge, because so many of the students have an automatic dislike for all sciences. However, the occasional flicker of interest and discovery on the part of the students is a source of great satisfaction for him.

Professionally, Don continues to serve on the Council of the Association of Exploration Geochemists, and he is a member of the Editorial Board for the journal Chemical Geology. He attended the International Symposium on Exploration Geochemistry in Helsinki in September, where he gave a paper and chaired a workshop on hydrogeochemical exploration.

During the past couple of years, Don has also been involved in consulting for several companies and governmental agencies. His consulting work is chiefly in the application of geochemistry to pollution problems associated with mining, milling, and the disposal of nuclear wastes.

Joseph R. Smyth joined the faculty in January, 1983, as mineralogist. His teaching duties include undergraduate mineralogy plus graduate courses in advanced

mineralogy and crystal chemistry. Joe received his Ph.D. from the University of Chicago and has held research posts at Harvard University, The Lunar and Planetary Institute in Houston, the Max-Planck-Institute for Nuclear Physics in Germany, and at Los Alamos National Laboratory. He has taught previously at the University of Cape Town in South Africa and at Arizona State University.

Joe recently collaborated in development of a new technique for measurement of minor element distributions among crystallographic sites in minerals which has application to geothermometry of a wide variety of rocks. He has numerous publications on the mineralogy and petrology of the earth's mantle. He currently participates in a project with scientists at Los Alamos National Laboratory and Stanford Linear Accelerator Center to find natural mineral hosts for unusual stable nuclear particles left over from the 'Big Bang.' Such particles, called quarks or quark-atoms, are believed capable of catalyzing nuclear fusion reactions, and their discovery would lead to a breakthrough in controlled release of thermo-nuclear energy. His wife, Tamsin, is currently completing her Ph.D. in mineralogy at Arizona State University.

Hartmut Spetzler continues with an active teaching program on the undergraduate and graduate levels. Last fall he taught a course in the honors program, which he enjoyed tremendously. He found that the challenges are quite different when teaching the same basic material to a class of over 250 average students than when presenting it to 12 outstanding and highly motivated students. One of the highlights of the year was the attendance, together with his four PhD students, of the American Geophysical Meeting in San Francisco. Their presentations were very well received and the whole group was justifiably proud of their accomplishments. The senior members of the research group, Hartmut, Ivan C. Getting and Bruce Douglas, a recent PhD from Princeton, are redirecting their research efforts somewhat. Largely through the influence of Bruce and the interaction with Roy Kligfield and Joe Smyth, the group is diversifying and planning to get involved in some field work in porosity measurements using radioactive tracers, and also in determining the tectonic stress in the mantle through high temperature attenuation measurements of seismic waves in single crystals of olivine.

Last year (1983) Hartmut and 19 of his bicycling colleagues finished the annual Trail Ridge ride, which goes from Boulder via Estes Park and Granby to Winterpark and returns via Berthoud Pass, Black Hawk and Nederland to Boulder.

Jane Thompson 1901-1983

Long time associates of the department will be saddened by the death of Jane Thompson, widow of Warren Thompson, former Head of the department. Her death was preceeded by a long illness. She is survived by three sons, Pete, Tom, and Bob, all of whom are C.U. Geology alumns. All three and their families are now living in Boulder.

Ted Walker has just completed a term as President of SEPM, which he says was both fun and a great learning experience. Now he is glad to be back to teaching full time. Ted was the proud recipient of a Boulder Faculty Teaching Award last year. He reports that his diagenesis research currently is concentrating on feldspar alteration in sandstones. He says that he has never seen a rock that is more interesting or more complexly altered than our own Fountain Formation.

Max Wyss reports that the Hawaii data on crustal anomalies and changes relating to the 1975 (M_S = 7.2) earthquake and other stress pulses are almost inexhaustible. This year concurrent data on velocity and strain changes were published for the first time. It has definitely shown that closing and opening of cracks due to tectonic stress has changed the P-wave velocity. In addition, a very large change of amplitude attentuation for the P-waves which traverse the fault zone where cracks close

and open was discovered. This is the first time that anyone has made such an observation. Max says, "This puts us in a unique position to formulate a theoretical model for a cracked crust based on the three kinds of synchronous data: strain-, velocity-, and attentuation changes."

Max also reports that his projects in Greece are progressing satisfactorily: the seismograph network is operating and the NASA project to measure movements of tectonic plates in the Eastern Mediterranean is on track.

In addition to the above projects, the systematic study of seismicity patterns before large earthquakes is furnishing very solid results now. By computer algorithm most of the circum-pacific areas have been scanned for instances of seismic quiescence before large mainshocks, and the uniqueness and the false alarm rate for quiescence can now be systematically and quantitatively determined. The results of these projects substantially add to the understanding of earthquake processes and bring closer the possibility of earthquake prediction.

DEPARTMENTAL HISTORY TO BE WRITTEN BY LARRY WARNER

Larry Warner has been commissioned to write a history of the Department and would welcome contributions and suggestions from any source. If you have information on past events, alumni accomplishments, or any juicy tidbits that might be of interest, please send them in, marked for Larry's attention.

STUDENT AWARDS

Students selected for the excellence of their scholastic and other qualities received some important awards during the past year. Funds from friends and alumni of the Department support many of these awards. Many excellent candidates were considered and the following students were selected in accordance with the prescribed conditions for the awards:

RMAG Pick (Senior) - given at RMAG luncheon April 29, 1982	**Lee Erickson**
Brunton Award (Senior)	**Thomas Lundy**
Estwing Pick (Junior)	**James W. Stafford**
Johnston Scholarship Senior)	**E. Anne Kirkpatrick**
Keith Marks Scholarship	**Margaret Berry**
Longley/Wahlstrom/Warner Scholarship	**Scott Werschky** **Patricia Corbetta-Glasscock** **Timothy Harris** **Cindy Winstanley**
Waldrop Scholarship	**Peter Mozely** **John Gould** **Nancy Brodsky**
Terry Brown Scholarship (first time offered)	**Claudia Johnson** **James Kirkland** **William Elder**
Watson Memorial	**Peter Swanson** **Daniel Ponti** **David Swanson**

THESIS STUDIES

Recently Completed and In-Progress

People interested in the Department often ask what things our current graduate students are working on. The following list, although not complete, gives a substantial sample of subjects of recently completed theses and of research underway. Among the diverse and interesting studies, alumni will probably find some they will want to read.

K. Albino:	The Holocene Glacial and Periglacial Record of Two High Alpine Valleys Near Devils Thumb Lake, in the Colorado Front Range (MS)
H. Amini:	Radiometric Dating, Paleomagnetism, and Petrology of Snake River Plain Basalts (PhD) (completed in December 83)
D. Axtell:	Electrochemistry of selenium (MS)
F. Baker:	Definition of Mechanical Dispersion as a Function of Saturation in Porous Media using a Pore Interaction Model (PhD)
S. Baker:	Holocene Palynology in North-Central Alaska (MS)
L. Barber:	Role of Sediment Chemistry on Sorption of Organic Solutes, Boron, and Ammonia in Contamination of Ground Water (MS)
L. Barlow:	Depositional Environments, Paleoecology & Event Stratigraphy, lower Niobrara Fm. northern Front Range, Colorado (MS)
M. Barton:	Depositional Environment of the Fruitland Fm in SW Colorado (MS)
R. Batt:	Ammonite and Foraminiferal Morphotypes and Their Relation to Paleoenvironmental Studies in the Western Interior Cretaceous (PhD)
D. Beeson:	Coal depositional systems of the San Juan Basin, Dominican Republic (MS)
L. Bercaw:	Gold Deposits of the Central Part of Mineral Ridge, Esmeralda County, Nevada (MS)
M. Berry:	Temporal Development of Soils on Slopes in Idaho (MS)
D. Bieber:	Geology and Reservoir Characteristics of the Cherokee Group in the Start Oil Field, Western Kansas (MS)
P. Billings:	Synthesis and Stability of F-bearing Garnets
T. Blair:	Palaoenvironments, Diagenesis, Regional Stratigraphy and Plate Tectonics of the Jurassic-Lower Cretaceous formation in Southeast Mexico (PhD)
J. Bode:	A Re-evaluation of the Gold Hill District (MS)
F. Boler:	Microcrack Source Parameters from Acoustic Emmission (MS)
R. Bowman:	Occurrence of Foreshocks in the Central Aleutian Arc (PhD)
J. Brigham:	Aminostratigraphy of Quaternary Sediments, Arctic Alaska (PhD)
J. Bush:	Quaternary Faulting-Neotectonics (MS)
G. Campbell:	Evolution of Lower Cretaceous Reef Structure: Competitive Displacement of Corals by Rudists (MS)
S. Cannon:	Recent Debris Flows in Utah (MS)
L. Chambers:	Sedimentary Environments and Diagenesis (area of interest) (MS)
P. Clark:	Glacial Geology of Northernmost Labrador (PhD)
P. Corbetta:	Geology of the Puzzler Mine, Clear Creek County, CO (MS)
J. Coss:	Depositional Analysis of the Fort Union Fm, Powder River Basin, Wy (MS)
J. Crespi:	Strain patterns in the basement rocks of Cordilleran metamorphic core complexes (PhD)
B. Crysdale:	A Fluid Inclusions Study of Diagenesis, Fore Reef Facies, Capitan Formation, McKittrick Canyon, New Mexico (MS)

G. Cruz: Seismotectonics of Central America (PhD) completed December 83

J. Davis: Paleomagnetic and Structural Study of Precambrian Rocks in the Front Range, CO (MS)

A. Davis: Hydrogeochemical Exploration for Mineral Deposits (PhD)

P. Dentler: Geology of the Cross Mine, Boulder County, CO (MS)

L. Deuth: Stratigraphy of the Middle Member of Coalmont Formation, North Park, CO (MS)

C. DiJulio: Mt. Burney, Chile (MS)

W. Dickinson: Carbonate Diagenesis, Tight Gas Sands, WY (PhD)

R. Diner: Study of Cretaceous Foraminifera (PhD)

R. Dubiel: Depositional Systems of the Upper Triassic Chinle Fm, SW Utah (PhD)

J. Eaton: Paleontology, Stratigraphy & Depositional Environments of the Campanian Masuk Member of the Mancos Shale, Henry Mountains Region, Utah (PhD)

M. Eberle: Iron Mountain Titaniferous Magnetite, Laramie Range, WY (MS) completed December 83

W. Elder: Cenomanian-Turonian (Cretaceous) Boundary Extinctions: The Paleobiology of an Anoxic Event (MS)

P. Ellerman: Diagenesis and sedimentology of Antarctic Hyaloclastites (MS)

E. Esmaili: Geochemistry of Waters from Oil Shale (PhD) completed August 83

E. Evanoff: Pleistocene Molluscs (PhD)

R. Felling: Geology of a Porphyry Molybdenum Deposit in Montana (MS)

F. Fleming: Cretaceous Palynology (PhD)

E. Forester: Paleoecology of Ostracods, Alaska Shelf (PhD)

S. Forman: Quaternary Glacial, Sea-level and Soil Development History of the Forelandsundet Area, Western Spitsbergen (PhD)

K. Francis: Deposits of SW Gold Hill, Colorado (MS)

D. Furbish: Stream Hydrology in Small Alpine Watershed, Co, Front Range (PhD)

K. Futa: Andean Volcanism (MS)

A. Geirsdottir: Cenozoic Glaciation, Iceland (PhD)

M. Gillam: Quaternary Soils and Terraces South of Durango, CO (PhD)

L. Glenister: Depositional Environments and High Resolution Stratigraphy of the Greenhorn Cyclothem Regression (Turonian; Cretaceous), Colorado Front Range (MS)

C. Gockley: Analysis of Mesoscopic Structures of the Twin Creek Limestone in the Absaroka Thrust Sheet Northern Caribou Mountains, Idaho (MS)

S. Good: (Probable) Fresh water molluscan evolution across the Cretaceous-Tertiary Mass Extinction Boundary (PhD)

J. Gould: Paleomagnetism and Petrology of the Steens Basalt (MS)

L. Gunderson: Structural Geology and Geochemistry of the Northern Reading Prong, NY (PhD)

E. Gustason: Transgressive-Regressive Cycles of the Dakota Formation in Southwestern Utah (PhD)

R. Harrington: Mt. Jefferson Caldera (MS)

T. Harris: Geologic Investigation at Round Top, Alaska (MS)

S. Haymes: Cretaceous Biostratigraphy (MS)

P. Hearty: Age of Mediterranean Raised Marine Deposits (PhD)

D. Hindman: Post Mississippian Unconformity of Williston Basin (MS)

K. Hon: Detailed Geologic, Petrologic, and Trace-element Study of the Lake City caldera, Southwestern Colorado (PhD)

J. Honey: The Evolution of Oxydactylus and Tanymykter (PhD)

D. Hovorka: Zircons of the Idaho Batholith (MS)

B. Howe: Paleoecology and Depositional Environments of Tepee Buttes, Campanian (Cretaceous) Submarine Springs, Colorado (MS)

Z. Huang: A Seismic Anisotropy Study on Eastern China (PhD)

S. Ihnen: Origin of Long-Wavelength Variations in the Earth's Gravity Field (PhD)

Carla Johnson: Structure and Strain Variation in the Little Grey's Anticline, Teton and Lincoln Counties, Wyoming (MS)

Claudia Johnson: Paleoecology, petrology, and Depositional Environments of Requienid (rudist)-dominated Lagoonal Biostromes, Middle Cretaceous, Northern Mexico (MS)

Kurt Johnson: Petrology and Diagenesis of Sands in the Upper Member of the Minnelusa Fm., Rainbow Ranch Field, Powder River Basin, Wy (MS)

D. Jones: Steen Basalts (MS)

S. Jones: Modelling of Sediment/water Interaction, Orinico River, Venezuela (MS)

A. Kihm: Eocene Mammals of Piceance Basin (PhD) completed February 84

J. Kirkland: Paleobiology and Depositional Environments of Greenhorn Cyclothem Across Northern Arizona (PhD)

L. Kost: A Paleomagnetic and Petrography Study of Clastic Dikes and the Cambrian Sawatch, Eastern Flank of Southern Front Range, Colorado (MS)

D. Kron: Miocene Mammals of Colorado Parks (PhD)

V. Lawrence: Tin-bearing Rhyolites, Indian Peaks area of New Mexico (MS)

W. Lawrence: A Geochemical Reconnaissance of the Gold Hill Mining District (MS)

P. Lea: SLate Quaternary Environments of the Nushagak Region, Southwestern Alaska (PhD)

M. Leckie: Micropaleontology of the Deep Eastern Atlantic (PhD)

C. Lee: Hornfels and Skarn, San Pedro Mine, New Mexico (PhD)

S. Lehman: Glacial History of Western Spitsbergen (PhD)

J. Leifer: Geology and Mineralization Near Washoke Canyon, Pershing County, Nevada (MS)

E. Lind: Glacial Geology of Part of Arctic, Canada (MS) completed December 83

D. Lidke: Structural and Stratigraphic Relations in an Area Containing a Possible Major Decollemont in the Fold and Thrust Belt in Southwest Montana (MS)

R. Lindberg: Measurement and Interpretation of Eh in Geological Settings (PhD)

M. Litaor: Alpine Soils in Green Lakes Valley, Boulder, Colorado (PhD)

L. Livingston: Interpretation of Cretaceous Sandstone Depositional Systems (MS)

B. Loeffler: The Polvadera Volcanics, New Mexico (PhD)

S. Maher: An Investigation into the Mechanisms of Crack Propagation in Rock Using Electrical Methods (PhD)

L. Marts: Geochemistry of Biotite Associated with Mineralization and Alteration at Jamestown, Co (MS)

R. McCullough: Mechanical properties of the Snowpack-Berthoud Pass (MS)

R. McGimsey: Petrography and Chemistry of the Precambrian Lavas in the Belt Group (MS)

C. Meertens: Tilt Measurements in Yellowstone National Park (PhD)

S. Minor: A Study of Late Cenozoic Deformation in the Northwestern Basin and Range Province (MS)

G. Mitch: Petrography and Depositional Environments of the Balmville Limestone (Trenton Group, Middle Ordovician), Southeast New York (MS) Completed December 83

P. Mozley: Petrology of Dakota Formation in Part of Colorado (MS)

D. Mruk: Syn. Depositional and Post Depositional History of Capitan Fm McKittrick Canyon, West Texas (MS)

S. Napier: Stratigraphy of the Niobrara Formation (MS)

ALUMNI NEWS

1921

Everett "Philip" Andrews died in March, 1983, in Boulder. He had a long and active life including geologic work with the Wyoming Highway Department, The Colorad Geological Survey and work in the mines of Mexico. For long periods between 1925 an 1958 he was a petroleum geologist with major oil companies worldwide, including the West Indies, Venezuela and Colombia.

1928

Reuel L. Boss (MA '28), after 33 years service with Gulf Oil Corp., retired an returned to southeast New Mexico where he has established a consulting practice. Hi publications include: The Arrowhead Pool of S.E. New Mexico, Bulletin #18, New Mexico State Bureau of Mines and Mineral Resources.

1932

Andrew F. Bateman writes that he retired in 1977 from the U.S. Geological Survey in Lakewood, Colorado. He fondly remembers his CU Alumni trip down the Danub in 1979 and has more recently returned from Greece, The Netherlands, and Belgium. His retirement residence with wife, Anilee Lewis Bateman, is in Charlotte, North Carolina.

1936

Howard H. Lester (BA, '36) is the recipient of the Rocky Mountain Association of Geologists 1983 Explorer of the Year Award. The Newsletter has learned that Howard has played a major role in the discovery of about 2.4 billion barrels of oil and 2.6 trillion cubic feet of gas. Congratulations Howard, on both your achievements and your award.

1937

Don Freeman Tobin (BA, '37) went on to receive his J.D. degree from St. Mary's University in San Antonio in 1943 and is now president of both the Rio Bravo Royalty Co. and the South Texas Gas Company in San Antonio. He married Peggy Portwood in 1942 and has 8 children and 5 grandchildren. His home is in Bandera, Texas.

1947

Ralph L. Langenheim, Jr. (MA '47) is Professor of Geology at the University of Illinois. He spent the fall semester of 1981 serving as a consultant to the Central Geological Survey of the Republic of China, Taipei, Taiwan. The work was done under the auspices of the International Executive Service Corps, an organization that send consultants, mostly business types, to 'Third World' places on an all expenses paid basis. The group specializes in sending retired people, plus a smattering of self-employed, to remote places on a volunteer (i.e. tax-free) basis. Ralph's work consisted of evaluating the mapping program in metamorphic to submetamorphic mountai terrain, advising on training, and generally doing all sorts of stuff requiring a good command of English. Twenty-six days were spent visiting educational and research organizations and business enterprises involving geology and in reconnoitering the mountainous 2/3 of the island. This included a five-day pack tri to the top of Yushan (4,000 M) as well as four traverses by road across the high mountains. Our thanks to Ralph for sharing this interesting trip with us.

1951

John Masters (MS, '51) is the subject of very complimentary article on his oil and gas finding abilities in the August 1979 issue of Reader's Digest. Congratulations, John.

1951

Robert L. Sutton, we're sorry to report, died in 1982. He was a geologist with the U.S. Geological Survey, Branch of Central Environmental Geology at Flagstaff, Arizona. He had been a graduate student during 1951-1953. Newsletter was informed that he had had a long battle with cancer.

Donald H. Whitebread (MA '51) has reported a change of address. He is now with the US Geological Survey in California and lives at 873 Persimmon Ave., Sunnyvale.

1952

George Newmarch (BA, '52) is also in California. He is an engineering geologist with the Department of Water Resources in Sacramento. His MS degree in Public Administration was received at State University in Sacramento in 1976 and in 1980 his "Subsidence of Organic Soils in the Sacramento, San Joaquin Delta" was published by the California Dept. of Water Resources.

1953

Leo J. Wanek (MA '53) retired from Mobil Oil in April, 1983 after nearly 30 years with the company. Mr. Wanek's geologic experience was primarily in the Rocky Mountain Area, having spent time in company offices in Grand Junction, Elko, Nevada; Sacramento, Durango, Casper, Oklahoma City, and for the past 10 years in Denver. He will be at home at 610 E. Davies Avenue, Littleton, Colorado.

Gail Van Hine Young (Mrs. George C., Jr.) (BA, '53) retired in 1955 from the California Co. (now Chevron) to raise a family. She is now with the University of Denver Research Institute, Office of International Programs, in Denver. Two of her 3 daughters are CU students at Boulder. She says, "It's difficult to believe that 30 years have gone by since graduation -- difficult, that is, until you get a letter from your CU student daughter, who writes, 'I studied in the Geology library last night, Mom. Who knows? I may have sat in one of the same chairs you did. Lord knows, they looked old enough!'"

1956

William G. Weist, Jr. (MA '56) was transferred in May, 1982, to the Office of Surface Mining Reclamation and Enforcement at Brooks Towers in Denver.

1957

Norm Rowlinson (MA '57) is Manager of Petrolinson S.A. in Bogota, Columbia. This is his own consulting firm and last year they celebrated their twentieth anniversary year. Early in that experience most assignments involved geologizing; however, in recent years the clients seem to want to take advantage of his two decades of business experience in Colombia, which explains why the typical "customer" is likely to be an independent oil company organizing its first-ever exploration effort in the country. Norm says, "Gracias a Dios, my little outfit hasn't felt any of the effects of your recession -- yet."

1958

William D. Allan (BA, '58) is the Manager of Information Services for the Kaiser Foundation Health Plan of Colorado. Bill is married to former CU student Pat Gamble, and they have two children. Their son, Scott, was a 1982 honors graduate in Electrical Engineering and Computer Science at C.U. In his spare time Bill coaches on the staff of the Colorado State Youth Soccer Association.

Dallas Jackson (BA, '58) is research geophysicist at the Hawaiian Volcano Observatory on Kilaueo Volcano. The Jacksons have two sons in college in Hawaii and a daughter in high school. He writes that he spent 1982 in France and on the Isle de la Reunion, Indian Ocean, as a visiting professor with a position at the University of Clermont-Ferrand II. He invites former acquaintances to stop by the observatory to renew old friendships.

John A. Randall (MS, '58) and his wife and daughter are living in a mountain cabin in Guanajuato, Mexico. John teaches classes in geology at the Mining School of the University of Guanajuato and also consults in groundwater and mineral exploration. He reports that his work has taken him from the deserts of southern Peru to the tundra of northern Canada.

Jim and Teena Bennett **Sandstrom** (BA, '58) are living in Moline, Illinois, where Jim is the owner of Sandstrom Products Company, manufacturing paint, lubricants and adhesives. Teena, a CU graduate and former cheerleader, teaches business psychology at a local community college and travels around the country conducting seminars on a variety of subjects. Their family includes a son (Jay) who graduated from the University of Arizona and is now living in Denver, and a daughter (Julie) who is a sophomore at Northwestern University.

1960

Richard F. Holm (BA, '60) is Associate Professor of Geology at Northern Arizona in Flagstaff. His Ph.D. degree was gained at the University of Washington in 1969. He was on Sabbatical in 1981 to study ignimbrites on the North Island in New Zealand. He also observed volcanic features in Hawaii and Tahiti on the way out and back.

Donald McGregor Mann, (MS) we're sorry to report, died this Spring. Newsletter extends to his family our belated sympathy.

1961

John O. Maberry (BA, '61) just completed a 7-year hitch as Program Manager of USGS' Energy Lands Program, during which he supported the studies of CU graduate students Evanoff, Gillam, Harden, and Reheis. He writes that he is now "just" a geologist looking at coal resources of northern West Virginia. His MS degree in Geological Engineering was received at the School of Mines in Golden in 1968. He was married in '61, divorced in '78, remarried in '79. One son is in Lakewood High School and the other a UNC student at Greeley. His official title is Research Geologist, Branch of Coal Resources, USGS, Reston, VA.

Thomas E. O'Connor (MA '61) wrote to us from Houston. He was Chief Geologist, Gulf of Suez Petroleum Co. (the largest producing company in Egypt), from 1974-79. In 1979-1980 he was Regional Geologist for Amoco International Oil Company, in Africa and the Middle East Region. He joined Aminoil USA as Manager, International Exploration and Domestic US New Ventures, and was promoted to Vice President of International Exploration in July, 1981. Tom's wife was killed in an auto accident in Cairo in March of 1976. He remarried in April, 1977. His five children are Kevi (18) David (16) Amy (16) Shelley (13) and Tammey (4).

Waite R. Osterkamp (BA, '61) added a Chemistry degree in 1963 to his Geology degree at CU then went on for a MS at the University of Arizona in 1970 and a PhD in 1976. He's a Hydrologist with the National Research Program, Water Resources Division of USGS in Reston, Va. He is single with children ages 11 and 13.

1965

Paul Goldberg went on to his MS and PhD degrees at the University of Michigan, 1968 and 1973. He is Senior Lecturer at the Institute of Archaeology, Hebrew University in Jerusalem. His work involves the use of micromorphology to sort out geogenic from anthropogenic factors of sedimentation at prehistoric sites.

1966

Saleh M. Billo (MA '66) flew from Riyadh Saudi Araabia to Canada twice last summer to present papers at the AAPG meeting in Calgary and the I.C.S. in Hamilton, sponsored by K.S.U. (ran into Ted Walker and R.W. Tillman at I.C.S.). His papers dealt with the petroleum geology of the Arabian Peninsula.

1968

Fred Barnard (PhD '68) was promoted in January, '82, to Exploration Manager in Mexico for Anaconda Minerals. Congratulations, Fred! In addition to the job, he tries to keep rein on his 2 growing off-spring: Adam (5) and Alexandra (3). Wife, Nancy, proofreads for CSM publications department. Home base is still Golden. Other alums will be glad to know he visited "quasi-glum" Bob Kulstad in the Dominican Republic in October '82. All this plus serving as Adjunct Prof. in UCB Geological Science Department, helping Bill Atkinson with his Minerals Exploration course, keeps him out of mischief, except for the time he "fiddles with his kimberlite pipe."

George G. Simpson (Honorary Sc.D. '68) reminds Newsletter that he attended undergraduate classes at CU in '22 and '23. He retired from Professor of Geosciences, University of Arizona, Tucson, in July, 1982. His PhD was received at Yale in 1926, and at age 80 he has been the recipient of 15 honorary degrees in addition to the one received at CU. He has 745 publications to his credit, with 2 books and 3 papers in press. He says, "Like Westion Taylor, I studied at CU with George Crawford, and Worcester. Also paleontology with Tieje and later with Lull and Dunbar at Yale." Here's hoping you are enjoying that retirement, George! Home is still in Tucson.

1969

John Small, Jr. (PhD '62) wrote to us from Oslo informing us of an address change to England. You can write to him c/o IEDC Service (U.K.) Ltd., Lower Mill, Kingston Road, Ewell, Surrey, KT 17 2AF, England. The move occurred in October, 1982.

1971

Darrell Kirk Nordstrom (MS '71) left the University of Virginia in August, 1980, for his new job as Geochemist with the Water Resources Division, USGS, Menlo Park California. He received his PhD from Stanford in 1977. He has published a review of pyrite oxidation in a book on Acid Sulfate Weathering and has over 20 publications in scientific journals and books. His work on acid mine water geochemistry and the geochemistry of deep granitic groundwaters in Sweden resulted in an invitation to work for 6 months in Sweden at several potential radioactive waste disposal sites.

1972

Paul Carrara (MS '72) is working for the USGS in Lakewood. His current assignment is Quaternary Geology - Glacier National Park, Montana.

Stephan M. Johnson (BA, '72) is Chief Geologist for Lithologic Research Company in Golden, Colorado. He writes that he is not married yet and that his company is looking for contracts.

Patricia J. (King) McMillan (MA '72; BA '69) has a new position as geophysicist for Chevron Geosciences in Denver. She's taking classes at CSU (and TA'ing again)—mainly in computer science, statistics, and civil engineering in addition to geology. She hopes to make contact with other alums at Homecoming, 1984.

Bill Page (MS '63; PhD '72) is working for Woodward-Clyde Consultants in San Francisco. In 1978 he married Kathy Wasser and in '81 they adopted a Colombian infant son, Evan Alexander. During the last four years his work has been applying Quaternary Stratigraphy and geomorphology to solving problems of active faults, tectonics, and erosion in tropical Colombia.

1975

James McCalpin (MS '75) is now setting up a program in Geomorphology and Quaternary Geology at Utah State University in Logan after having been County Geologist for Jefferson County, Colorado, from January to July, 1982. He went on to get his PhD at the School of Mines in December '81. Newsletter congratulates Jim on the "Best Student Paper Award" at Rocky Mountain USA Meeting in Bozeman, Montana in May, 1982. His talk was titled "Quaternary Geology and Neotectonics of the Northern Sangare de Cristo Mountains, Colo."-Colo. School of Mines Quarterly, 1982.

Mike Perkins (MS '75), in December '82, was transferred from Anaconda Minerals to ARCO Oil and Gas in Denver. He recently published "Epithermal Gold Mineralization in the South Mountain Volcanic Dome, Summitville, Colorado" in Proceedings of Symposium on Genesis of Rocky Mountain Ore Deposits, Changes with Time and Tectonics; Published by Denver Region Exploration Geologists (DREGS).

Patty Rubick (BA '75) got married on the south rim of the Grand Canyon in September. Our best wishes to you, Patty. She went on to Northern Arizona University to work on depositional environments/sedimentology — this after 6 years in the mining industry.

1976

David Kunovic (BA, '76) changed companies in January, 1981, from Union Texas Petroleum to Staff Geologist at the Apache Corp., Denver. His present work is with Creteceous sands in the Powder River Basins, Wyoming, and the D-J Basin of Colorado and Nebraska. He has recently published in R.M.A.G. Oil and Gas Fields of Colorado and Nebraska.

David Murangari (MS '76) was promoted to Deputy Director, Geological Survey of Zimbabwe, Harare, Zimbabwe. From August, 1980 until December, '82, he was a regional geologist with the Geological Survey doing free consulting for small-scale miners who are numerous in Zimbabwe. Dave reports that, on the whole, mining in Zimbabwe is small with the majority of companies employing 150 or fewer people. He spent June-August, 1982 participating in Cyprus Crustal Study Drilling Project in Nicosia, logging lots of "snake-rocks" (ophiolites).

Barbara Smith-Townsend (MS '76) left Conoco Minerals in December of 1981 to return to school. She became the mother of Alexandra Gibson Townsend in August, 1982. Now working for the city of San Antonio as a geologist in the Aquifer Protection office. Duties include monitoring and alleviating typical urban geological problems pertaining to the water supply in a rapidly growing community developing on a karst watershed and aquifer. Education of the populace is the biggest problem she faces. Barbara reports that Alexandra is not as problematical..... "She's walking, talking, and taking over the house."

1977

Bill Nesse (PhD '77) and wife, Marianne, sent an announcement of the birth of Erik David Nesse, born February 14, 1983. Congratulations, Bill and Marianne!

Wayne R. Premo (BA, '77) is working toward a MS degree — topic, "U-Pb zircon geochronology and geology of the Sierra Madre Range, Wyoming." The abstract was published in the 1982 GSA Abstracts with Programs. Wayne married Valerie A. Williams (BA '79 at CU) and they have one child, Crystal, 1-1/2. They planned to move back to Denver in the summer of '83. Are you here, Wayne? Newsletter would like to know.

1978

Stephen B. Mabee (MS, '78) is Geologist/Associate at Sesaki Associates, 64 Pleasant St., Watertown, Maine. He continues to work with a multi-disciplinary consulting firm in Watertown and is presently engaged in site feasibility studies, sewage disposal siting, coastal structures and foundation design, and construction supervision. His work area now extends from Green River to Kuwait.

Rodney J. Noah (BA, '78) was promoted to full performance level Geologist with U.S. Minerals Management Service (formally U.S.G.S.) at Casper, Wyoming, Casper District Resource Evaluation. He's married to Michelle, and has resided in Casper the last 3 years. He's co-author of 3 USGS Open-File reports on coal geology of Wyoming.

1979

Michael Cormier (BA, '79) is a Consulting Geologist at Darita Enterprises, Cody, Wyoming.

Bruce Fuller (BA '79) potash exploration geologist with PPG Industries - Kalium Chemicals Division in Denver, says he spends not nearly enough time in the field doing well-site work including supervision of coring and logging programs. The rest of his time is split between the lab and office where he has been doing lots of core photography, core descriptions, sample preparation, and the usual subsurface work in the office.

Arch Johnston (PhD, '79) is Director of the Tennessee Earthquake Information Center, a state agency at Memphis State University. He has published an article on the New Madrid Seismic Core in Missouri in the Scientific American (April '82)and 1 Nature paper with Max Wyss on earthquake precursors. He recently installed and operates the southern Appalachian seismic network - one of the largest in the eastern United States.

1980

Scott and Glenda **Burns** (PhD,'80) and their two children now live in Ruston, Louisiana, where Scott teaches at Louisiana Tech. University. Scott reports that they are adapting well to the southern culture, but they still miss the mountains. They return to Colorado each summer while Scott teaches at the LTU field camp near Hot Sulfur Springs.

Fred Hawkins (MS '80) was promoted to geologist, Seismotectonic Section, U.S. Bureau of Reclamation, Div. of Geology, Denver. He has been studying Quaternary faulting near existing dams in California, Nevada and Utah (along with Larry Anderson, Alan Nelson and Lucy Piety). Fred and Wendy Stout were married in Connecticut in January and are at home in Boulder.

1981

Jennifer (Smith) Askey (BA, '81) is working with a disseminated gold project in Nevada and industrial minerals in the Green River Basin of Wyoming in her job as geologist with Minerals Exploration Department of FMC Corp, Denver. She was married in May '81 to David Askey, a CU grad.

1982

Debbie Harden (PhD, 82) sent Newsletter an announcement of the birth of Daniel Reid Sarna-Wojcicki on May 4, 1983 - weight 7 lb. 1 oz. Congratulations, Deb!

Vance Holliday (PhD, '82) is taking a one-year appointment at the Department of Geography at the University of Wisconsin in Madison, teaching soils and geomorphology courses. He ran a successful Friends of the Pleistocene field conference at the Lubbock Lake archeological site this spring, and found a new FOP cell in the process!

GIFTS TO THE DEPARTMENT

Gifts from alumni, from friends and from business play an increasingly important part in Department finances. This is especially true in times when direct support from the University and from government sources is being cut back. The funds from gifts go principally to student scholarships or other student aid, for special equipment needs, to help bring outside lecturers to the department and to help the Earth Science Library.

Many alumni may have received mailings from the College of Arts and Sciences over the past few months, seeking financial help. Alumni of Geology can "kill two birds with one sstone" by contributions to the College (of which Geology is a part) with the designation that the gift is intended for Geology. The A&S campaign features "giving clubs" with special recognition and communications which may be appealing to many of our alumni.

Special Geology Department Gift Accounts whose purposes alumni may wish to support with a special designation are:

W.O. Thompson Graduate Research Fund (thesis research grants)
W.O. Thompson Memorial Lecture Fund (invited speakers)
George and Anna Garry Fund (faculty)
Bartram Memorial Fund (Earth Science Library)
T. Keith Marks Scholarship Fund (Scholarship)
Henry Waldrop Memorial Fund (Scholarship)
W.W. Longley Scholarship Fund (Scholarship)
E.E. Wahlstrom Scholarship Fund (Scholarship)
L.A. Warner Scholarship Fund (Scholarship)
Unrestricted Gifts Account

The Department most sincerely appreciates the many generous gifts we have received.

New Fellowships

The parents of Terrence L. Brown (BA, 1980) have established a memorial fellowship in Terry's name which will be awarded annually to an outstanding graduate student in the field of stratigraphy and paleobiology.

Mrs. R. P. Lockwood of Glenwood Springs, Colorado, has provided for the establishment of the Robinson Peale Lockwood Fellowship in Geology.