GEOLOGY at SMU

An occasional newsletter for alumni and friends. December 2001

David Blackwell explores deep within earth

Geothermal energy, as old as Pompeii

By Maria Richards
Contributing Writer

Working in the SMU geothermal lab is a hot shot in the geothermal energy field. He is David Blackwell, holder of the Hamilton chair. He has been researching and teaching geothermal energy and the Earth's surface heat flow with much enthusiasm since the 1960s.

Being one of the world authorities on the subject, he has worked on various projects helping companies and governments to better utilize this natural resource, from North and Central America to Italy and Indonesia. With Ken Wisian, Jason McKenna, Maria Richards, Mark Leidig, Steven Burns and Tosan Ogharaerumi, research is flowing out rapidly with expanding applications.

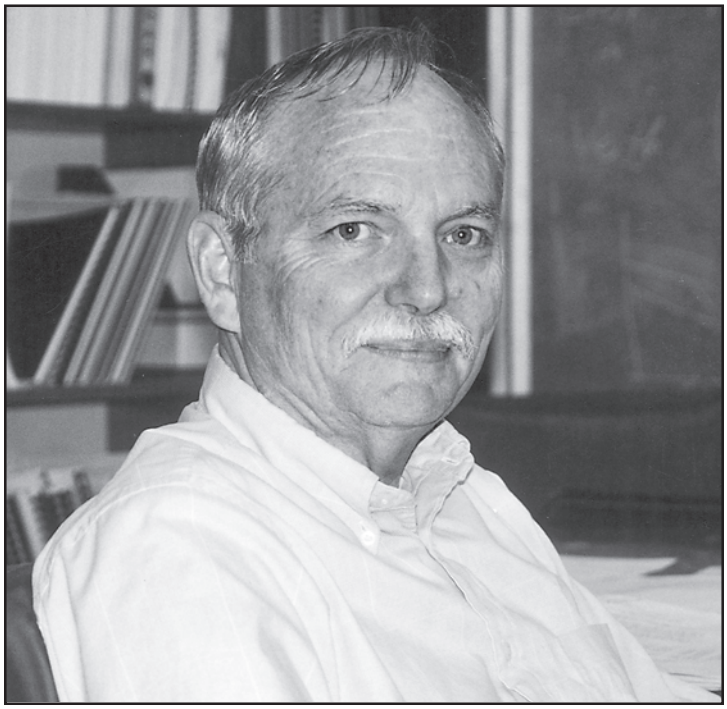
Some of the SMU Geology alumni, such as John Steele, Jim Williams, Will Gosnold and John Ziagos, and others will remember vividly all the temperature-depth logging of wells in the western states that took place in the 1970 – 80's. It's still going on each summer although with a narrower focus. Summer 2001's focus was in Idaho at the Idaho National Engineering & Environmental Lab (INEEL) site studying groundwater flow to predict the movement of contamination plumes. Geothermal sites and oil and gas fields in Nevada, Colorado and Kansas were also visited by Ken Wisian (Ph.D. 1999) and Jason McKenna (Ph.D. student). All of the past work is now part of an online database of geothermal sites that contains almost 6000 individual wells. As part of a Department of Energy contract, the Geothermal Lab has scoured the old files , and Dave has collected information from warehouses to contractors' basements to make as complete a database as possible (some interesting comments have been found on some of the old field log sheets). If you have any well information sitting in a box in storage and want to get rid of it, please send it our way.

GeoPowering the West

Is a new initiative by the Department of Energy to capitalize on the Earth's abundant geothermal resources

***Goals of GeoPowering the West*:**

- Provide 10% of the electricity needs of the western states by 2020
- Supply the electrical power or heat energy needs of at least 7 million U.S. homes by 2010
- Double the number of states with geothermal electric power facilities to eight by 2006.



For almost 35 years Hamilton Professor David Blackwell has had a long and fruitful association with SMU. Blackwell is a native of Dallas, and has studied geothermal energy all over the world. One of his recent grant requests proposes to measure underground temperatures in Costa Rica.

This online well information has become an important tool for those applying "Direct Use" geothermal energy. Geothermal waters ranging from 50 °F to over 300 °F are used directly from the earth to heat homes and entire communities, soothe aching muscles in hot springs and health spas, grow flowers, vegetables, and other greenhouse items year round; increase growth of fish, shrimp, abalone and alligators; pasteurize milk and fruit juices; and increase productivity of various industries, i.e., drying onions and lumber, and washing wool. Geothermal energy use is limited only by our ingenuity. For example, in Klamath Falls, Oregon, geothermal water is piped under roads and sidewalks to keep them from icing over in freezing weather. In New Mexico, pipes carrying geothermal water are installed in fields

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Chairman's Report

Energy and politics always mix

By Robert Gregory

Current events of the day owe much to the politics of oil. Regimes of the Middle East are financed from oil production; their original political boundaries were influenced by the distribution of oil. Western economies are based upon the reliance on cheap and readily available energy. History seems to be repeating itself with respect to the predictions of the late geologist M. King Hubbert.

In 1956, while working for Shell Oil, Hubbert made a prediction 15 years into the future on US oil production rates based upon two principles: conservation of mass and exponential growth of world economies. Following the lead of economic geologists such as D.F. Hewett and their analysis of the life cycle of metal production, Hubbert looked at the inventory of oil prone rocks in the United States and examined the rates of exploitation. In a graph of production rate versus time, Hubbert noted that the area under the exponential growth rate curve for oil production was equal to total production up to that time (see figure below). Oil from an oil field is a nonrenewable resource, so that at some time in the future, the rate of production would peak never to rise again. The total production curve looks like a bell shaped curve, "Hubbert's peak." Hubbert's 1956 prediction startled the oil business. He claimed that US production would peak, sometime around 1970; he was correct!

Unfortunately, the peak of US production and the transition of the US oil market from a primarily domestic market to an international market occurred at the time when the Arab states began to use OPEC to influence politics. The first Arab oil embargoes created major dislocations in economies all over the world yielding the "energy crisis" of the seventies, a time of gloom and doom predictions with respect to energy cost and availability. Soon after, OPEC lost pricing control when production from the North Sea, Alaska, Venezuela, and Mexico broke the ability of the Middle Eastern states to control world prices. Secondly, the currencies of the major oil states are tied to the US dollar and the strength of the world economy. Major fluctuations in oil prices serve neither side—producers or consumers—and as a result, oil prices have fluctuated between $10 and $40/barrel. When the price moves too high, western economies falter and alternative energy sources become more economic, endangering the future cash flow of the oil states. When the price moves too low, the economies of the oil states suffer, potentially leading to internal political unrest.

Hubbert made another prediction regarding total world oil production as well as predictions for other energy resources. The world is now coming up to the "Hubbert peak" for world oil production, and in terms of reserves, the Arab states are again approaching a position where they may be able to control world prices. As before, the same classes of pundits are lining up to interpret this event.

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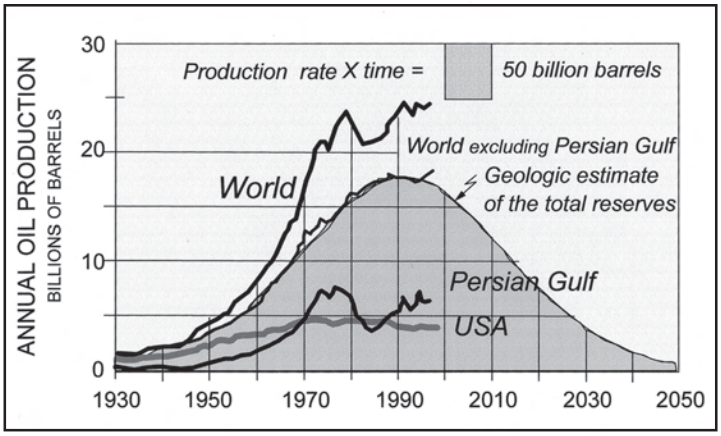
The US Geological Survey is now claiming that Hubbert once again underestimated the total world reverses in a new analysis of world oil prospects. After all, Hubbert's estimates are at least 30 years old (he revisited the problem in the 1970's). Previously, before the peak in US production occurred, the US Geological Survey produced the Zapp hypothesis: Hubbert was initially "wrong" because production was tied to drill hole length and all the US had to do to keep production going was to drill more holes. Obviously, the Zapp hypothesis failed.

Based upon experience in Texas, we know that technological advances have lessened the rate of decline in producing fields. This results in more recoverable oil. This new oil represents small incremental additions compared with the early rate of discovery of large fields. New estimates that increase the amount of recoverable oil rely on more efficient discovery of small targets. The rate of growth of proven reserves has slowed, consistent with Hubbert's ideas.

Free market economists predict that the market will always provide just as it did before. However this time there is no transition to a new *oil* market. Technology and prices cannot make a dry hole produce oil. Hopefully, market forces will encourage us to find alternative and economic energy sources soon. The growth of anthropogenic carbon dioxide in the atmosphere indicates this effort should be sooner rather than later.



Modified from Campbell & Lherrere, Sci. Am. March, 1998.

In this issue of *Geology at SMU,* we look at energy and the environment. Our lead article highlights David Blackwell on geothermal energy. He has measured heat flow wherever he has found a hole punched into the crust. Page 4 highlights the year-old energy group at SMU-in-Legacy. Naresh Kumar contributes a summary of his environmental science seminar on prospects for oil reserves in the Anwar Reserve, Alaska. Robert Weimar exhorts geologists to get more involved in the national discourse on these important issues. M. King Hubbert has certainly influenced almost 50 years of discourse on energy. For more on M. King Hubbert see the Kenneth Deffeyes book entitled *Hubbert's Peak: the Impending World Oil Shortage.*

Alumna Barb Dutrow

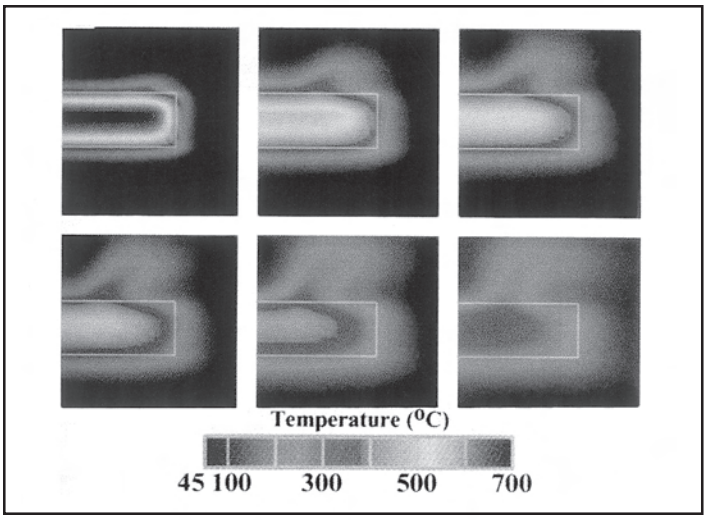
She's making computer models more accountable to nature

It's often a hard sell to get geology students to take more math. Barb Dutrow (M.Sc., 1980; Ph.D., 1985) seems to have a long-term relationship with things numeric. Working with the late Bob Slaughter, Barb measured the geometrical relationships of lamellae in tooth enamel from Pleistocene mammoths. From this, Barb moved on to metamorphic petrology for a Ph.D. with Mike Holdaway zeroing in on lithium in staurolite from polymetamorphic schist from Maine. Barb is now a very active member of the faculty at Louisiana State University, where she is using computers to simulate metamorphic textures in these rocks

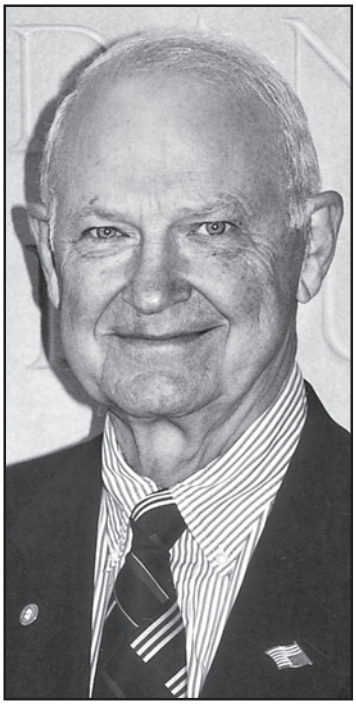
The Maine rocks are archetypal of regional thermal metamorphism induced by the intrusion of granitic magmas with exotic names like Mooselickmeguntic. Barb uses numerical simulation and computer visualization to reproduce the polymetamorphic textures recorded by the pelitic rocks of Maine. She solves a series of coupled partial differential equations involving conservation of energy, momentum and mass to model the movement of heat and fluid around the granitic plutons. The results of her finite difference solution to these equations (temperature & fluid flux) are then coupled to the physics of mineral nucleation and growth to reproduce the textures observed in the field. Barb varies parameters of the model (e.g. permeability) until she gets the best fit.

As petrologist Charlie Guidotti, University of Maine, noted at the recent Boston GSA meeting, "It's finally good to see computer models delivering output that looks like real rocks. That the person doing the modeling has a long-term relationship with the petrology shows in the results." If the models fall short, Barb will also hear about it at the dinner table, her husband Darrell Henry, also a professor at LSU, is another expert on Maine. She is now curating the best of SMU Emeritus Professor Mike Holdaway's Maine rock collection acquired over many field seasons.

Barb also maintains an active program with a hands-on connection to rocks. She is currently documenting the compositional changes in tourmaline, a mineral that is very robust through the rock cycle. She recently visited Madagascar to collect prime specimens of the mineral. In her spare time, Barb runs marathons including such prestigious events as the Boston Marathon.



Effect of permeability on fluid flow & temperature around a sill.



H. Leighton Steward

H. Leighton Steward is honored as 2001 distinguished grad

Geological Sciences is proud of its distinguished alumnus H. Leighton Steward who received in October the SMU Distinguished Alumni Award for 2001. Steward graduated in 1959 with a B.A. in Geology. He is the former president and CEO of Burlington Resources. Currently chairman of SMU's Institute for the Study of Earth and Man he is also author of the best-selling book *Sugar-Busters Diet.* Steward recently served as Grand Marshall for the university's homecoming festivities. He divides his time between Texas, Louisiana and Wyoming.

Eminent geophysicist Charles Roland Wilson to be 2002 Jack Hamilton Visiting Scholar

Dr. Eugene Herrin has announced the 2002 J. H. Hamilton Scholar in Geophysics at SMU. Dr. Charles Roland Wilson, worldwide expert in infrasound research will be on campus the first week of February 2002. Professor Roland has spent the last four decades observing and modeling infrasound from naturally occurring phenomena such as the aurora borealis and volcanoes. He holds the title of Professor of Physics Emeritus at the University of Alaska in Fairbanks. "It's a great honor to have Dr. Wilson as our 2002 scholar and an outstanding opportunity for students and faculty to listen to this eminent geophysicists," said Eugene Herrin.

In 1997 retired Teledyne executive Jack H. Hamilton gave $1 million to establish an endowed visiting scholars program in geophysics at SMU. This generous gift brings the best and brightest scientists to the university.

Professor Emeritus Michael Holdaway will give prestigious Hallimond Lecture

SMU's own Professor Emeritus Michael Holdaway will travel to England in January 2002 to give the prestigious Hallimond Lecture at the Mineralogical Society Winter Conference. The three-day conference will be held at the University of Derby, in Derby, England. The conference theme for 2002 is Timing, Transition and Tectonics. Professor Holdaway's lecture topic is "*The current status of geothermobarometry in pelitic metamorphic rocks."* Also he will talk about the metamorphism in west-central Maine including a short summary of his work on the mineral staurolite. This one-hour lecture will be given on Monday, January 7. When not traveling the globe, Holdaway makes his home in Colorado.

At SMU-in-Legacy in Plano

Geology participating with private energy firms

Geologist Jere Jay of INNEX explains some of the details of this tectonic map of the western Sea of Okhotsk. GERL hosted an open house on Oct. 19 at the SMU-in-Legacy campus in Plano.

In the last few years, many major petroleum companies have exited North Texas. In the wake of their exit, a number of industry professionals are establishing new energy-related companies with projects ranging from e-business and software development to consulting to oil and gas exploration and development.

The Geosciences and Energy Research Lab, Inc. (GERL), located at SMU-in-Legacy in Plano and with ties to SMU's Geological Sciences Department, was created to assist in the establishment and development of these businesses. It offers shared services (facilities and support), assistance with financing, reduced fee consulting, and marketing business assistance.

GERL serves as a cooperative incubator to help foster companies during the startup phase. GERL is specifically focused on nurturing energy-related companies.

The companies are excited about the potential for interaction with professionals and students at SMU. "We would like to do something jointly with SMU, for example work joint projects with some of the staff and definitely get an intern in the near future," said Anil Chopra of Petrotel. INNEX has hired an SMU Geology student, Pete Kubik, to begin assimilating project data to organize ongoing exploration and development opportunities into their geologic mapping systems. Recently, Dr. David Blackwell and Dr. Steve Bergman from SMU's Geological Sciences Department met with INNEX to discuss their projects and ongoing research topics for Sakhalin Island and the Sea of Okhotsk in Russia.

Start-up Companies	Their Goals
Covetrix:	IT consulting & venture capital
Innex:	Hydrocarbon exploration & production
Petrotel:	Offshore oil exploration in India
PetrOptima:	E-commerce for energy industry
Quasitum:	Software applications for oil companies

"We hope to facilitate regular formal and informal exchanges like this, when we get together, we all learn how the academic and industrial demands differ as well as the similarities between our projects, which will develop into joint studies and other ventures."

"The facilities and the interaction with professionals from other companies within GERL allow our company to be much more effective than if we were operating alone," said Jay of INNEX Energy.

"Right now, the energy industry is behind other industries in e-commerce. We look forward to some sort of partnering with the E-Commerce center that will soon open here at the SMU Legacy campus," said Srinivas Bette of PetrOptima.

INNEX is pursuing a portolio of hydrocarbon exploration projects throughout the world. They provide expert exploration consulting both in the US and internationally, and some of their research projects include an innovative, cost-effective method of heavy oil extraction, a new frac/stimulation technique, and a new geochemical logging tool.

Like the companies in the incubator, GERL is actually a start-up company, as well. "This is the first time anyone has ever attempted to establish such a venture specifically for energy-related companies," said Bonnie Jay, Executive Director of GERL. For more information call Ms. Jay at 972-730-1022.

On October 19 GERL hosted an open house at the facility at SMU-in-Legacy for SMU geology students, faculty, staff and local alumns. A geologic "poster show" was presented, and undergraduate intern Pete Kubik discussed his duties at INNEX.

Geoscience & Energy Research Lab at SMU-in-Legacy

- 20 Geoscientists & Staff
- Projects in Indonesia, India, Syria, Turkey, Russia, and South America, & US
- Cooperative incubator for energy related businesses

Exploring for oil & gas Arctic National Wildlife Refuge (ANWR) in Northern Alaska

By Naresh Kumar
Contributing Writer

Dr. Naresh Kumar, president of Growth Oil & Gas, spoke to students and faculty on October 21, by invitation of the Environmental Science Program, Dedman College. The following is a summary of his remarks.

Since production from the North Slope of Alaska from the Prudhoe Bay Field began in 1977, it has contributed approximately 20 to 25% of the nation's daily oil production. Prudhoe Bay and some of the nearby fields are maturing and their contribution to the nation's supply will continue to decline.

It is certainly possible that production from ANWR could maintain North Slope's contribution to the nation's supply at current levels. While other parts of the North Slope (such as the National Petroleum Reserve Alaska) might provide additional reserves, ANWR coastal plain is one of the most prospective areas in the nation.

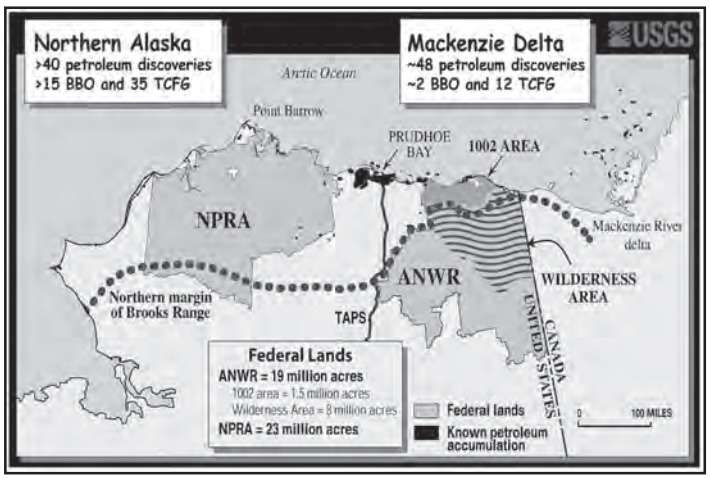
The Arctic National Wildlife Refuge was created by the Alaska National Interest Lands Conservation Act (ANILCA) of 1980, which set aside more than 100 million acres in Alaska as national parks, preserves, wildlife refuges, and wilderness areas. The refuge consists of 19 million acres, of which only 1.5 million acres in the coastal plain *can even be* considered for possible oil and gas exploration. This 1.5 million acre area is commonly referred to as the 1002 area.

Congress left the management of the 1002 area open because of its potential for oil and gas resources. In 1987, the Secretary of the Interior issued a report that concluded that the "area has a very significant potential to contribute to the national need for oil."

More recently, using new data and modern technology, the US Geological Survey (USGS) completed a new study of the ANWR 1002 area. The "Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998" report estimated mean technically recoverable oil at 7.7 billion barrels. At an average rate of 1.5 million barrels a day (approximate level of North Slope production today), that is a 14-year supply!

Significant advances in arctic operations technology allow for much less surface occupancy than was needed almost a quarter century ago for Prudhoe Bay and nearby fields. It has been estimated that production activities in ANWR would affect less than 1 percent of the 1002 area. In fact, with modern production technology, the surface facilities may occupy as little as 5,000 acres. Thus, the surface "damage" to the environment is expected to be minimal. Also, experience at Prudhoe Bay has shown that wildlife protection and oil and gas operations can certainly co-exist.

Recent political events have shown that reliance on imports, especially from the volatile regions in the Middle East, may not be in our national interest. Although we do not expect to become self sufficient in oil, we need to develop all potential sources that are economically available within our own boundaries. Increased fuel efficiency, alternative energy sources, conservation *and* environmentally sound development of domestic oil and gas resources must all be the components that form a sound national energy policy.



Location map of 1002 area on the North Slope of Alaska. BBO = Billion Barrels of Oil, TCFG = Trillion Cubic Feet of Gas, TAPS = Trans Alaska Pipeline (US Geological Survey Map).

Professor Robert J. Wiemer 2001 recipient of the ISEM's Hollis D. Hedberg Award

By Louis Jacobs
President, Institute for the Study of Earth & Man

Robert J. Wiemer, recipient of the ISEM's Hollis D. Hedberg Award for 2001, presented a talk entitled "Natural Resources and the Needs of Society: The Gap Between Professionals and Those They Serve" to SMU's Geological Science's Friday Seminar.

His data demonstrated the reliance of the U.S. on petroleum for its energy, the escalating demand for energy, the decline in domestic production, and an increase in petroleum imports. Understanding these factors, he said, helps define significant problems to be faced by society regarding the maintenance of the American quality of life. Therefore, a deeper understanding among the general public is a prerequisite to satisfactory solutions.

Earth scientists, said Weimer, are knowledgeable about these subjects, but clear knowledge-based definition of the issues still falls short in the general public, forestalling solutions and rendering them even more difficult. According to Weimer, the transfer of knowledge to decision makers and the public is hindered by the positions taken by activist groups who hold extreme views on environmental issues, by the litigious nature of our society and a win-at-all costs legal system, and by a press that thrives on conflict rather than the presentation of information.

Failure to satisfactorily address looming problems confronting the energy industry will exacerbate those problems in the future. Thus, earth scientists have a major role to play in educating the public as to the realities of energy supply. Because of declining domestic supply, Weimer pointed out, the conservation of resources is important, in addition to finding new reserves.

The Hedberg Award is given in recognition of outstanding work in the energy industry and academia. Weimer is professor emeritus in Geological Engineering at the Colorado School of Mines.

Alternative energy explored through research projects at SMU

Continued from page one.

under planted rows of flowers and vegetables. This provides a longer growing season and overall faster growth with less expense than building a greenhouse.

When geothermal energy is discussed in schools, Yellowstone is often the example. Yet, because it's a National Park, no production of geothermal energy is done there. Many people don't realize that the United States is one of the world leaders in electric production from geothermal energy. There are 23 geothermal power plants in western United States and Hawaii. Existing electric production in California, Nevada, Utah and Hawaii is about 2800 megawatts. One hundred megawatts (MW) provide the residential electricity needs of a city of 200,000 people. The biggest geothermal plant in the world is The Geysers, north of San Francisco at Clear Lake.

Archeologists have found homes heated with geothermal energy as far back as in Pompeii; yet the first U.S. community space heating system wasn't developed until 1891 in Boise, Idaho (modernized in 1980). Today space heating, including geothermal heat pumps, is the largest growing direct use sector. In the western US, there are 271 communities with geothermal resources available for space heating on a community basis. 7.4 million people live within five miles of a geothermal resource that is not currently being used.

In 1999, an equivalent to saving 0.84 million tons of fuel oil per year was accomplished by homes with geothermal heat pumps in the United States. It's really a very easy concept; it takes advantage of this stable earth temperature of about 45 - 58 °F just a few feet below the surface to help keep our indoor temperatures comfortable. Circulated water or other liquids through pipes buried in a continuous loop (either horizontally or vertically) heats the air in winter and cools the air in summer. They don't need a large amount of land to be successful today. Geothermal heat pumps use very little electricity and are very easy on the environment. In the U.S., over 300,000 homes, schools and offices are kept comfortable by these energy saving systems, and hundreds of thousands more pumps are used worldwide. The U.S. Environmental Protection Agency has rated geothermal heat pumps among the most efficient of heating and cooling technologies.

Unlike geothermal energy power plants, shallow ground temperatures are not dependent upon tectonic plate activity or other high heat flow processes. Thus, geothermal heat pumps can be used to help heat and cool homes anywhere, including new homes or existing homes. Geothermal heat pumps are flexible in design to meet individual homeowner/business needs. Tap into the Geothermal Lab's resources and we'll help you get started by finding a local contractor.

If you are interested in more information related to this article we recommend the following web sites (start with ours at: **www2.smu.edu/geothermal**) or (www.igshpa.okstate.edu); (www.geoexchange.org); (www.eia.doe.gov).

News about our alumni

Alisa Winkler (Ph.D. 1990) is enjoying being a paleontologist, an anatomist, and a mom. Alisa is pleased to continue research on fossil small mammals as an Adjunct Associate Professor in the Geology Department at SMU. She is currently involved in projects in Kenya, Ethiopia, Texas (she needs something close to home!), and a new project in Uganda. Since 1990, Alisa has also been teaching Human Anatomy at the University of Texas Southwestern Medical Center at Dallas. **"The medical students assume that I have Ph.D in Anatomy, or an MD, and I love to shock them by telling them my Ph.D is in Geology! But there really is a connection between my research and my teaching, for the anatomy and functional morphology of humans can easily be applied to other non-human mammals."** Alisa and husband Dale (also a paleontologist at SMU) have two sons, Chris (9) and Dylan (5). Both boys love collecting fossils, and their sharp (and younger!) eyes make them handy to have in the field.

Tom Goforth (Ph.D. 1973) is the W.M. Keck Foundation Professor of Geophysics and chair of the Geology Department at Baylor University. He was a student of Gene Herrin at SMU and worked in the Geophysics Lab here until 1982. He spent five years with Schlumberger Oilwell Services prior to joining Baylor in 1987. At Baylor, he has continued his interest and research in earthquake seismology, as well as in applications of geophysics to the near surface. In 1995, he was selected Baylor's Centennial Professor.

Leslie Melim (Ph.D. 1991) is an associate professor at Western Illinois University in Macomb. She's been there for five years after spending nearly four years as a research associate at the Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Florida. Melim continues research on carbonate diagenesis, particularly in the marine realm. Additionally, she is working with several biologists on the geomicrobiology of cave deposits in the Guadalupe Mountains of New Mexico.

Steven Mueller (Ph.D. 1990) is working for the National Center for Atmospheric Research in Boulder, Colorado.

Alumni Update for SMU Geological Sciences Graduates

How about sharing some career news (also personal) about yourself for possible use in our next newsletter? A photo, too. And please update your address, telephone numbers, and e-mail address. We want to hear from you.

Name_____
Address_____
City_____State___Zip_____
Phone: Home_____ Work_____
E-mail _____

Please return form to:
Geological Sciences/Alumni
Southern Methodist University
PO Box 0395
Dallas, Texas 75275-0395

What's new with you? _____
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On a beautiful September afternoon a group of 1301 Earth Systems undergraduate students, taught by Professor John Goodge, took part in a field trip to White Rock Creek watershed in urban Dallas. Students, traveling by bus, stopped at four locations along the creek and sketched the sites as Dr. Goodge explored topics of urbanization, erosion problems and channelization of the creek.

Endowment by Grant Goodell inspired by the late Art Richards

By James Brooks
Professor Emeritus

Art Richards was a superb teacher of geology. A native of the Upper Peninsula Michigan (Marquette to be specific), Art did his undergraduate work at what was then the Northern Michigan College of Education, then went on for graduate work and the Ph.D. at the University of Michigan in Ann Arbor. Art was one who intensely disliked cold weather and often referred to Ann Arbor as, relative to the UP, being in the "Banana Belt." After the Ph.D., he taught briefly at the University of Texas in Austin. His teaching specialties were Mineralogy and Petrology. During World War II, Art worked with the Strategic Minerals Branch of the US Geological Survey. The Survey in those days was populated by a number of truly distinguished geologists such as Jim Gilluly, Tom Lovering and Tom Nolan. Art enjoyed working with such scientists, but equally with a fellow geologist named Claude Albritton. Claude and Art mapped the Goodsprings, Nevada Mining District and it was through this connection that Art ended up coming to SMU after the War. Another project of those days that was to have importance in his subsequent career was his assignment (with Arnold Brokaw) to map the Pine Grove canyon lead and zinc district in the Wah Wah Mountains in Utah.

H. Grant Goodell
(B.S. Geology, 1955)
Endowed "The H. Grant Goodell Endowment for Geological Sciences," $25,000
Dr. Goodell received a Ph.D. from Northwestern University
Retired from the University of Virginia
Scholarship is in honor of former professor Art Richards

For the first fifteen years or so that Art was in the department at SMU he taught Mineralogy and Petrology at the undergraduate and graduate level. During much of the decade of the fifties, Art was also department chairman. In 1957, 58 and 59, Art, in collaboration with Jim Brooks and Dave Clark, taught the Summer Field Course in the Wah Wah's, using the rather decrepit buildings of the abandoned mining operation in Pine Grove Canyon. The "veterans" of these experiences have an almost unlimited number of stories to tell about the experience they had with Art and his associates in the Wah Wah's. For Art was a very good field geologist as well as a very good and effective teacher – both in the classroom/laboratory or in the field. And, moreover, he had a great sense of humor that made even demanding tasks fun.

In the latter part of his career Art began teaching more introductory geology courses, as well as becoming more heavily involved in academic counseling of undergraduate students. In all of these activities he was equally effective and was uniformly held in affection and high regard by all his students.

No narrative on Art Richards would be complete without mentioning his sense of humor – and particularly his propensity for punning. Punning came naturally to Art and flowed effortlessly in all his classes and lectures. Any student who took even one course with him will still talk about his puns. For example, in talking about coal, "there's no fuel like an old fuel." And on and on - the best puns flowing naturally in the sentence, in no way contrived.

He took a deep interest in all his students and was universally loved and respected by them. What the Department of Geological Sciences is today is in no small part due to the values and standards set by Art Richards.

Geological Sciences Faculty, Southern Methodist University

David D. Blackwell, Hamilton Professor, Ph.D., Harvard. Geothermal studies and their application to plate tectonics, especially of the western United States; energy resource estimates and geothermal exploration.

John W. Goodge, Associate Professor, Ph.D., UCLA. Continental tectonics, as approached by petrology, structural geology and thermo-chronology. Petrologic and tectonic evolution of North American Cordillera and Ross Orogen region of Antarctica.

Robert T. Gregory, Professor and Chair, Ph.D., California Institute of Technology. Stable isotope geology and geochemistry, evolution of earth's fluid envelope and lithosphere.

Vicki L. Hansen, Professor, Ph.D., UCLA. Structure, tectonics, geomorphology, earth systems, and terrestrial planet evolution.

Eugene T. Herrin, Shuler-Foscue Professor, Ph.D., Harvard. Theoretical and applied seismology, solid earth properties, computer analysis of geophysical data.

Louis L. Jacobs, Professor, Ph.D., University of Arizona. Director of Shuler Museum of Paleontology, and President of the Institute for the Study of Earth and Man. Vertebrate paleontology, evolution.

A. Lee McAlester, Professor, Ph.D.,Yale University. Marine ecology-paleoecology, evolutionary theory, Paleozoic geology, petroleum geology.

Brian W. Stump, Albritton Professor, Ph.D., University of California, Berkeley. Seismology, earthquake and explosion source theory, regional wave propagation, seismic and infrasonic instrumentation and data acquisition, and mine related seismicity.

John V. Walther, Matthews Professor, Ph.D., University of California, Berkeley. Experimental and theoretical aqueous geochemistry, fluid-mineral surface interactions, kinetics of dissolution, and mineral solubilities as a function of temperature, pressure and solution composition.

Crayton J. Yapp, Professor, Ph.D., California Institute of Technology. Stable isotope geochemistry applied to the study of paleoclimates, paleoatmospheres, and the hydrologic cycle.

Adjunct Faculty

Steve Bergman, Adjunct Assistant Professor, Ph.D., Princeton University. Tectonics of sedimentary basins, surface processes, volcanology, geochronology and hard rock petrology.

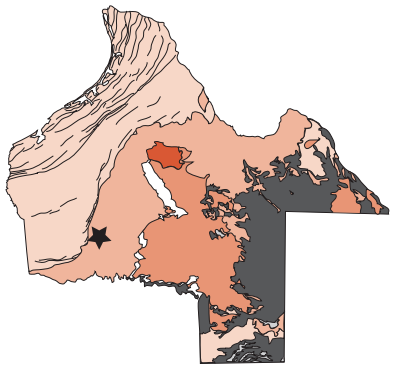
Anthony Fiorillo, Research Associate Professor, Ph.D., Pennsylvania. Curator of Paleontology, Dallas Museum of Natural History.

Bonnie F. Jacobs, Adjunct Assistant Professor and Chairman of the Environmental Science Program, Dedman College. Ph.D.,University of Arizona. Paleobotany of Tertiary deposits of Africa, application of pollen analysis to Cenozoic geological and environmental Problems.

Douglas H. Oliver, Research Assistant Professor, Ph.D., Southern Methodist University. Structural geology, tectonics, and economic geology.

Alisa J. Winkler, Research Associate Professor, Ph.D., Southern Methodist University. Mammalian paleontology, anatomy.

Dale A. Winkler, Adjunct Associate Professor and Associate Director, Shuler Museum of Paleontology, Ph.D., University of Texas at Austin. Paleontology. paleoecology.



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