



# THE GREEN MOUNTAIN GEOLOGIST

NEWSLETTER OF THE VERMONT GEOLOGICAL SOCIETY

Fall 2001

VOLUME 28

No. 3 & 4

**ANNUAL MEETING &  
Fall Field Trip  
October 20, 2001, 10:15 AM  
Middlebury, Vermont  
(see page 5 for details)**

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**THE GREEN MOUNTAIN GEOLOGIST**  
VERMONT GEOLOGICAL SOCIETY  
DEPARTMENT OF GEOLOGY  
UNIVERSITY OF VERMONT  
BURLINGTON, VERMONT 05405-0122

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Please send it to the Treasurer at the above address.  
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**PRESIDENT'S LETTER**

Dear Members:

April meeting had a wonderful meeting of student papers. The judges, Christine Massey, Alan Liptak, and Marjorie Gale had a difficult task in choosing the best papers presented. Dale Walker, COMPARISON OF EXHUMATION PROCESSES OF LOWER CRUSTAL GRANULITES IN FIORDLAND, NEW ZEALAND, won second place. Andrew Nichols, MINERALOGICAL EVIDENCE FOR HYDROTHERMAL ORIGIN OF THE BRANDON RESIDUAL FORMATION AND THE EAST MONKTON KAOLINS, won first place. Sharon Wilson, GEOCHEMICAL ANALYSIS OF SILURO-DEVONIAN MAFIC DIKES IN EAST CENTRAL VERMONT, won the Charles Doll Award for excellence in student-conducted geo-research. Congratulations to all who presented.

The executive committee and interested members had an animated conversation about the College Board and the possibility of an Advanced Placement (AP) geology course offering. The College Board will not proceed in developing this opportunity for high school students unless there is an interest both in high schools and university faculty members and professionals. If you have interest in registering your concern, visit the website: [www.collegeboard.org/ap/newssubjects/geology.html](http://www.collegeboard.org/ap/newssubjects/geology.html). This will bring you to a survey, which is important to the College Board to gather information.

In other discussion, the committee for the Advancement of Science will review research grants as part of the regular duties. There will be another attempt to have a winter meeting. This year, the location will be at Norwich.

Although I could not go, I hear the summer field trip was a good one. Thank you George Springston for sharing with the group. Thank you to the Nominating Committee for putting a slate of officers together for the fall election. Thank you Helen Mango for agreeing to serve as vice president for incoming president Ray Coish. Finally, thank you all for helping me to stumble along for two years.

Sincerely,

Shelley F. Snyder  
[ssnyder@mtab.k12.vt.us](mailto:ssnyder@mtab.k12.vt.us)

**EARTH SCIENCE WEEK  
October 7-13, 2001**

For a complete list of VT activities go to  
<http://www.anr.state.vt.us/geology/vgshmpg.htm>

Many thanks to all the VGS members, geologists, organizations and businesses that are participating in Earth Science Week this year. The annual event truly depends on the VGS for volunteer support and organization. Each year new groups join us to contribute to the effort to bring Earth Science to schools and the general public. Each year the demand for activities also increases. Below is the list of activities for Earth Science Week 2001, followed by our list of thanks to people who participated in planning and /or as volunteers.

Oct. 9- 11, Geologist-in-the-Parks at Groton State Forest, Button Bay, Branbury, Mt. Philo, Little River, Elmore, Townsend, and Lake Willoughby. Contact: Marjorie Gale, (802) 241-3608; [marjieg@dec.anr.state.vt.us](mailto:marjieg@dec.anr.state.vt.us)

Oct. 9, Perkins Museum Open House for Teachers  
 Geology Dept., UVM Burlington Campus (off Colchester Avenue); 2 p.m.- 4:30 p.m. Contact: Christine Massey, (802) 656-8694; [cmassey@zoo.uvm.edu](mailto:cmassey@zoo.uvm.edu)

Oct. 10, Glaciers, Moraines and Meltwater: Alaska to Vermont  
 Larry Becker will present a slide show about glaciers and glacial geology, Skylight Conference Room, Agency of Natural Resources, 103 South Main St., Waterbury, VT. Noon - 1:00 pm. Contact: Larry Becker, State Geologist, (802) 241-3496; [larryb@dec.anr.state.vt.us](mailto:larryb@dec.anr.state.vt.us)

Oct. 9-12, Fleming Museum Tours  
 Special tours to examine geologic materials used in objects and exhibits at UVM's Fleming Museum. Contact: Chris Fearon, Fleming Museum Education Specialist, (802) 656-0750

Oct.12, Poster Contest Due Date with award ceremony on October 23  
 This year's theme is "Vermont Geologic Resources: What we use in our everyday lives!" Contact: Christine Massey, (802) 656-8694  
[cmassey@zoo.uvm.edu](mailto:cmassey@zoo.uvm.edu)

Oct. 13, Open House at OMYA's Marble Quarry \*\*

As part of the National Earth Science Week celebration, a special open house will take place on October 13th from 10:00 a.m. to 3:00 p.m. at OMYA's marble quarry. Modern mining equipment will also be available for inspection.

Contact: Alice Blount, (802) 770-7267; alice.blount@OMYA.com

\*\*Andy McIntosh will do a special tour for VGS on the 20<sup>th</sup> at our annual meeting.

Oct. 10 -27, On the Rocks: Geology Mini-Course

VINS North Branch Nature Center geology course for beginners will be taught by NBNC Educators Chip Darmstadt and Peter Watt and State Geologist, Laurence Becker. Fee: \$65.00 for members, \$75.00 for non-members. Contact: Nikki Parker, (802) 229-6206; nparker@vinsweb.org

Oct. 23, Earth Science Week Poster Contest Awards Ceremony at Perkins Museum, 5:00 pm in the Perkins Museum, Geology Dept., University of Vermont, Burlington, VT 05405-0122 (off Colchester Ave. near the Fleming Museum). Posters will be on display.

Contact: Christine Massey, (802) 656-1344; cmassey@zoo.uvm.edu

Earth Science Week planning kits are available from:

The American Geological Institute, a not-for-profit federation of 32 professional organizations in the Earth Sciences, at AGI, 4220 King Street, Alexandria, VA 22302 or by visiting the web site at [www.earthsciweek.org](http://www.earthsciweek.org).

The general public and Vermont teachers and students appreciate the efforts we are making to share our excitement and knowledge about Earth Science. Thanks to everyone for planning, volunteering, and being involved in Earth Science Week:

Laurence Becker, Alice Blount, Andy McIntosh, Ray Coish, Jon Kim, Carey Hengstenberg, Rob Farley, Shelley Snyder, Christine Massey, Kent Koptiuch, Ginger Anderson, Peter Gale, Jeff Hoffer, Rodney Pingree, Chris Fearon, Peter Thompson, Craig Heindel, George Springston, and Kristin Underwood.

## Vermont Geological Society Annual Meeting and Election of Officers

Saturday, October 20, 2001  
10:15 AM

Andy McIntosh, quarry geologist with OMYA, will lead a tour of the Middlebury quarry.

Meet at the quarry around 10:15 am. After the tour, we will meet at the Geology Dept. in Bicentennial Hall on the Middlebury College campus for the Annual Meeting and Elections. Absentee ballots are enclosed in this newsletter and need to be received by VGS Secretary Jeff Hoffer before October 19.

### Directions:

The OMYA Middlebury Quarry road is on US7, (southbound) 2.5 miles south from the *Middlebury Inn* and (northbound) 1 mile north of junction of 125/116 East Middlebury turnoff. The quarry road is on the east side of US7 between *Standard Register* and *Foster Motors*, and the green street sign is labeled *1975 Private Road*. Continue straight on this road past the first stop sign. The second stop sign is at the quarry. Please park where instructed.

### Open Letter To Ms. Snyder and the Members of the Vermont Geological Society

Thank you for your generous grant to offset the costs of thin section preparation associated with the completion of my Master's Thesis. These thin sections are vital to the success of my project and our understanding of the evolution of the Green Mountains. Thank you again.

Sincerely,  
Chris Lamon

## STATE GEOLOGIST'S REPORT Fall 2001

All of Vermont State Government and the Agency of Natural Resources (ANR) which includes the Vermont Survey are facing budget difficulties. At this stage, the Vermont Survey is holding its own because of federal sources from STATEMAP, the Federal Emergency Management Agency and some EPA dollars. The danger for the Survey is that other parts of the Agency have severe shortfalls and these programs are searching for funds. Our top administrators will prioritize projects and may shift dollars or even personnel, perhaps to meet perceived short term needs. If you care about the importance of geologic information to a range of environmental and resource issues, the time may soon approach when your voice should be heard. It never hurts to let the powers that be know how important geology is to our environment and economy.

*With the tragic events of September 11<sup>th</sup> our hearts go out to those that have lost relatives and friends. As the country recovers from the shock and grieves, it is our fervent hope that safety and security will be restored.*

### Surficial Maps Completed

Three surficial mapping projects funded through the cooperative agreement between the Vermont Geological Survey and the US Geological Survey STATEMAP program were delivered to USGS in September. This is our third year deliverable of surficial maps. Each of the three basic surficial mapping projects included an applied geology focus and addressed: landslide hazard in the Jeffersonville quadrangle; watershed studies for flood hazard mitigation in the Great Brook Watershed; and aquifer/recharge area identification in the Arlington quadrangle. All the projects are field-based and labor intensive, are original geologic research, funded through a competitive grant, and involve students working with professional geologists. The maps will be useful for development of groundwater supplies, seismic hazard assessment, slope instability assessment, sand and gravel resources, and general land use planning. The products contribute to the goals of our long range plan for mapping in Vermont.

In the Jeffersonville quadrangle, field work was conducted in the summers of 2000 and 2001, with maps submitted and digitized in the fall of 2001. In addition to geologists Stephen Wright and Jon Kim, three University of Vermont students (Matthew Guerino, Megan McGee, and Kristin Miller) participated in the project, one with funding through the AASG Mentored Field Study program. Products delivered were the plotted maps of digital files of the surficial geology, a preliminary hazard map, and a spreadsheet of pertinent well log locations and data.

George Springston and Lori Barg conducted surficial mapping and used both quantitative and qualitative methods of geomorphic analysis to assess the mainstem and tributaries of the Great Brook watershed in Plainfield, Vermont for hazard potential. They also presented a summary of criteria for defining erosion hazards in the Great Brook Watershed. The products delivered were plotted maps of the digital files of the surficial geology, a preliminary hazard map, and a well log database which provides sub-surface information.

The purpose of the mapping in the Arlington quadrangle was to provide reference information to be used for land use planning with resource management implications. The project focused on the surficial geology and hydrogeology. Alan Baldivieso, a student from Williams College, worked with the professional geologist David DeSimone. Products delivered were a plotted surficial geologic map of the digital files, digital database and plotted paper map of available water well and boring logs, and an Aquifer Recharge Potential Map and Carbonate Aquifer Piezometric Surface map. A report, written specifically for non-geologists, promoted "understanding the distribution of the surficial deposits in order to understand the land we place our septic systems in and the movement of water through the deposits to our water wells. With this better understanding, it is hoped that officials and residents of Arlington will appreciate the susceptibility of their landscape to possible contamination and will use the report and maps to guide future development in a way best suited to the local environment."

## Hazard Mapping

Following the successful studies in the Great Brook watershed, other hazard map projects are planned and/or underway. In the Third Branch of the White River, George Springston, Norwich Prof. Fred Larsen, Prof. Richard Dunn, and students Nathan Donahue and Fiona Johnstone are mapping the surficial geology. Lori Barg and UVM student Angela Rogers are collecting the fluvial data. With funding from the Vermont Survey, the White River Partnership, a local watershed group, provided volunteers trained by Lori Barg to perform rapid geomorphic assessments of some tributaries to identify areas for detailed study by the mapping team.

The Vermont Survey will receive funding from the Lamoille County Regional Planning Commission to do surficial geology and fluvial geomorphology studies of the Wild Branch of the Lamoille River for a landslide/riverine erosion hazard map.

## Arrowhead Lake Slide and Other Events

The Vermont Survey was contacted by Emergency Management in response to the Town of Georgia's concern over a slide at the north end of Arrowhead Mountain Lake. A house close to the edge of a failed block of fine sandy material is in danger and the residents have moved to another location. The failure plane near the house shows about eight feet of displacement. The length of this failure plane along the top of the bank is very significant in that it extends hundreds of feet in either direction. The Division was the first responder for the Agency of Natural Resources and consulted with Emergency Management (on site) concerning risks. Given the size of this failure plane further analysis would aid the Vermont Surveys' understanding of slope failure as it relates to developing hazard mapping concepts.

Other areas of slope instability visited include a failure that blocked Route 5 in Windsor, Slate Avenue in Northfield, erosion that in part contributed to the train derailment in Westminster, and the rockfall onto Rte 5A in Westmore.

## Summary of VGS Summer Field Trip – Saturday, July 21, 2001 Great Brook, Plainfield, VT

This sunny, humid day concluded with a discussion of sediment transport mechanisms while cooling our Teva™- and sneaker-clad feet in the Great Brook, south of Plainfield, Vermont. VGS sponsored the Summer Field Trip to this 14.2 square mile basin, hosted by Lori Barg of Step By Step and George Springston of the Vermont Geological Survey. In recent years, the Great Brook channel has responded to floodplain encroachment, channelization, and other human disturbances by incision, bank failure and widening, resulting in substantial infrastructure and agricultural losses [1]. Recently conducted mapping of the watershed's fluvial geomorphology (Lori) and surficial geology (George) has been funded in part by the Vermont Geological Survey, Dept. of Environmental Conservation and the US Geological Survey, National Cooperative Mapping Program. Results of the study are being utilized to prepare a slope instability and erosion hazard map for the watershed to support future planning and zoning and reduce flood damage and infrastructure losses.

The Great Brook watershed spans the Plainfield, Barre East, and Knox Mountain topographic quadrangles in Washington, Orange, and Caledonia Counties. The main channel is approximately 9 miles in length, draining lands from an elevation of 3352 feet to 712 feet above sea level at the Great Brook confluence with the Winooski River in Plainfield, Vermont.

The lower portions of the watershed (below an elevation of 960 feet) are predominantly occupied by lacustrine sands, silts and silty clays associated with Glacial Lake Winooski. Surficial deposits of the upper watershed include lodgment till with localized deposits of ablation till, ice-contact sands, and several occurrences of high-level glacial lake deposits up to 1300 feet and higher. Field trip **Stops #3 and 6** highlighted mass failure slopes providing exposures of lodgment till overlain by compact, varved lacustrine silt and silty clay, overlain by more lodgment till. These sequences, and others in the basin, appear to indicate at least a minor late Wisconsinan ice readvance [1]. Varves in these lacustrine deposits were measured at up to 1 meter in thickness!

George and Lori's study focused in part on the nature of the surficial deposits and their susceptibility to erosion under the hydraulic stresses imparted by anthropogenic disturbances in the basin. Weathered lodgment till and lacustrine sands were found to be highly erodible and subject to mass failure, while fine-grained lacustrine silt and silty clay are relatively resistant. Some slope failures seem to be associated with contacts between deposits with markedly different permeabilities. **Stop #2** (Fowler Pit) provided an example of highly-erodible soils: an ephemeral stream canyon developed in ice-contact silty fine sands (**see Photo**). Local farming operations have diverted concentrated flow off adjacent till slopes to the ice-contact sand deposits. In addition, active mining of sands from the Fowler pit at the base of the slope has served to reduce the base level. Severe headcutting and incision have resulted in the development of a canyon in the sand deposits, which is hundreds of feet in length, up to 200 feet across and nearly 80 feet deep.



The lower 5 miles of the Great Brook are dominated by active incision and over-widening, resulting in substantial geomorphic instabilities with more than 25 mass failures recorded in this study. "Floodplain encroachment and in-stream management practices in the lower part of the Great Brook shares a confined stream valley with the Brook Road, and thirteen narrow bridges cross the brook along this 5 mile length. According to Lori, the bridges are often narrower than the channel width at bankfull flow and generally cause the channel to be constricted. Following a large flood in 1973, the Brook was channelized using a bulldozer for an approximate distance of four miles upstream from Plainfield village. Results of this channelization were evident at **Stop 6** where the stream channel had been significantly modified to reverse natural meander patterns, and large boulders, possibly capable of grade control, had been selectively removed from the channel for use as rip-rap.

**References:**

1. Barg, Lori and George Springston, March 13, 2001, *The Influence of Land Use Change and In-stream Management Practices on Channel Evolution in the Great Brook Watershed, Central Vermont*. Poster Session presented at Northeast Section Meeting of the Geological Society of America, Burlington, VT.

**Submitted by:**

Kristen Underwood  
VGS Treasurer  
Oct. 3, 2001

*The Vermont Geological Society extends its thanks to Lori Barg and George Springston for contributing their time on a Saturday to enlighten and educate us on this Summer Field Trip.*

**Suggested Further Reading:**

Center for Watershed Protection, Aquafor Beech Limited, and Step by Step, September 1999, *Impact Assessment of Instream Management Practices on Channel Morphology*, prepared for Vermont Geological Survey.

Center for Watershed Protection, Aquafor Beech Limited, Lori Barg, and Robert Kort, September 1999, *Watershed Hydrology Protection and Flood Mitigation Project: Phase II – Technical Analysis: Stream Geomorphic Assessment*, prepared for Vermont Geological Survey.

Montgomery, David R. and John M. Buffington, 1997, *Channel-Reach morphology in mountain drainage basins*. GSA Bulletin, v. 109, no. 5, pp. 596-611.

Schumm, S., 1984. *The Fluvial System*. John Wiley and Sons, New York, NY.

Rosgen, D., 1996. *Applied Fluvial Morphology*. Wildland Hydrology Books, Pagosa Springs, Co.

Leopold, L., Wolman, M. and Miller, J. 1964. *Fluvial Processes in Geomorphology*, W. H. Freeman and Co.

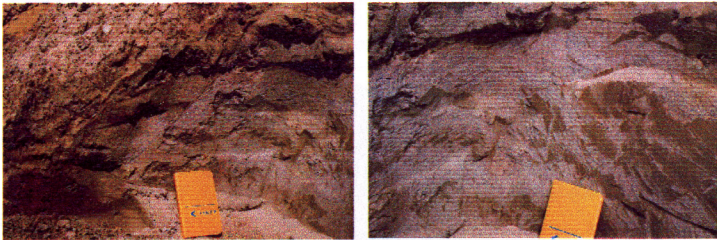


**Stop #1:** George Springston and Stephen Wright ponder a possible sediment-draped, ice-rafted boulder at the base of a mass failure developed in a sequence of interbedded lodgement till and fine-grained lacustrine sediments on the outside of a meander bend in the Great Brook. (Photo: Jeff Hoffer)



**Stop #2:** Up to 200 ft wide by 80 ft deep canyon eroded into ice-contact silty fine sands by an ephemeral tributary to the Great Brook. Erosion of this gully was initiated in the 1970s resulting from concentrated watershed, including channelization and removal of armor, contribute to the instability" which is associated with the absence of channel-spanning bedrock control [1]. This lower portion of the flow from agricultural runoff and lowering of the base level through active sand extraction. Fowler Pit, Plainfield, VT. (Photo: Jeff Hoffer)





VGS SUMMER FIELD TRIP 2002

### Naturally Occurring Radioactivity in Rocks and Drinking Water

This summer the Vermont Survey began a bedrock geology project in the towns of Milton and Colchester in an attempt to understand the geologic conditions responsible for elevated radionuclides in numerous private wells. This study involves conventional mapping techniques coupled with 2- and 3-dimensional gamma ray spectrometer surveys, radiometric testing of water wells, and airphoto analysis. Jon Kim of the Vermont Survey and contractor Peter Thompson of the University of New Hampshire are the principal investigators. The ultimate goal of this investigation is to develop a radioactivity susceptibility map that will be useful at the town and regional planning commission levels.

### Hazard Presentations

The State Geologist, with support from VT Emergency Management, gave a paper at the annual conference of the Association of State Floodplain Managers in Charlotte, North Carolina. The presentation focused on scientific studies conducted or managed by the Vermont Survey as a base for flood erosion hazard mapping and storm water management.

Jon Kim gave a talk titled "Geologic Hazards in Vermont" at the 2001 NEIWPC Annual Meeting in February. This talk highlighted the Division's work with physical hazards such as landslides and erosion as well as geochemical hazards such as naturally-occurring radionuclides. Representatives of all New England states and New York were in attendance.

### Earth Science Education

The State Geologist met with the State Science Coordinator at the Department of Education on June 13. The purpose was to learn more about the earth science education standards in Vermont. The Survey is now more aware of how to approach schools when doing educational outreach and designing inquiry based concepts for field education. On June 15, the State Geologist met with Marcia Davis of the new Vermont Granite Museum of Barre to discuss the developing plans for the geology exhibit area. Ms. Davis requested a review of the plans and

asked the State Geologist to serve on the educational outreach committee for the Museum. This is consistent with the Vermont State Geologist serving as chair of the Association of American State Geologists Educational Committee and serving on the American Geological Institute Educational Outreach Committee. Such affiliation can help the Vermont Granite Museum when funds are sought to develop programs. Marjorie Gale received an achievement award from the Department of Environmental Conservation for her work coordinating the October 2000 Earth Science Week "Geologists in the Park" program. In June, Jon Kim gave a geologic training session at Lake Willoughby for State Park Naturalists who will be serving visitors to Vermont this summer.

### Background Geochemistry

On August 20-21 the Geology Division participated in a joint project with the Geological Survey of Canada at Belvidere Mountain to understand the geochemistry of ultramafic rocks which are associated with the asbestos deposits at the nearby mine. The geochemical analyses of samples taken will be conducted at the Geological Survey of Canada (GSC) labs in Ottawa and Quebec City and the data will augment the Geologic Division's background geochemistry database. Further collaboration is planned in the future. The Division is also cooperating on an age dating project with the GSC. Because of these cooperative efforts, the State Geologist serves on the Association of American State Geologist's International Relations Committee.

Submitted By,  
Laurence Becker  
Vermont State Geologist

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The Society gratefully acknowledges the generous contributions to the Student Research Grant funds received from the following members during the **second & third quarters of 2001**: Roger & Terry Thompson, Greg & Nancy McHone, and Sharon Strassner

Thank You!

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## THE CREATION/EVOLUTION CONTINUUM

by John Klimenok, Jr.

The creationism vs evolution controversy continues to be a major topic of discussion among lay people as well as professionals. Many think that there are only two points of view: (1) God created the universe and all life in it essentially the forms we see today in a period of 6 days not more than 10,000 years ago (creationism) and (2) life has changed gradually over billions of years by natural, physical processes (evolution). This dichotomy of thinking is in actuality too simplistic. There is a continuum of different views.

The Creation/Evolution Continuum (information from the Reports of the National Center for Science Education, Volume 19, Number 4), with the most strict creationists on the left end and the most materialistic evolutionists on the right, can be diagramed as:

Flat Earthers>Geocentrists>Young Earth Creationists>Old Earth Creationists>Evolutionary Creationists>Theistic Evolutionists>Materialist Evolutionists.

There are several subcategories in the Old Earth Creationists, including: Gap Creationists>Day>Age Creationists>Progressive Creationists>Intelligent Design Creationists.

At the left end of the spectrum are members of the Flat Earth Society who believe, based on a literal interpretation of passages in the Old Testament of the Bible, that the earth is circular and flat, not spherical. This group has about 200 members and does not figure significantly in the movement for creationism and against evolution. Geocentrists agree that the earth is a sphere, but that it, not the sun, is at the center of the solar system. Both this group and the Flat Earthers believe that the heavens are held up by a dome (firmament in Biblical terms) and that waters above the firmament were the source of Noah's Flood. This group is also very small.

Most creationists are Young Earth Creationists whose founder and leader is Henry Morris, recently retired president of the Institute of Creation Research (ICR). This group rejects most modern physics, chemistry, geology, and astronomy. They believe that the earth is



between 6,000 and 10,000 years old and that God created all forms of life in six days, essentially in the form we see them today. Humans are a special creation by God and macroevolution never occurred. Some do accept microevolution to explain minor differences between some species. Most of the creationist literature is from the ICR and this group is at the forefront to get creationism into the public classrooms on an equal footing with evolution. Creationists disbelieve evolution because it does not explain every detail of life's origins and development and because it is contrary to what is contained in the Book of Genesis.

Old-Earth Creationists accept the ancient age of the earth and the universe, but they believe in a God who was and is personally involved in the creation of the universe. There are several sub-groups of Old-Earth Creationists. Gap or Restitution Creationists, formed during the latter part of the 18th century, think that there was a large span (gap) of time between Genesis 1:1 and 1:2. That is, there was a pre-Adam creation that was destroyed prior to Genesis 1:2 after which God recreated the world, including Adam and Eve. This accommodates an old earth, but with God as the creator. Day-Age Creationism, which was more popular in the 19th century and the beginning of the 20th, accepts both modern science and the Biblical creation story by saying that the six days of creation were not literally 24 hour periods of time, but rather indeterminate lengths of time which could be in the millions of years. They see a rough parallel between evolution and Genesis where plants appeared before animals and humans were created last.

Progressive Creationists are the majority of the Old-Earth Creationists today. One of their defenders is Dr. Hugh Ross of Reasons to Believe ministries. An astronomer who obtained his PhD at the University of Toronto, Dr. Ross accepts the reality of the Big Bang and believes that it is direct evidence of the creative power of God. However, modern biology is essentially not part of this belief system. This group thinks that God created a "kinds" of animals sequentially at different times and that the fossil record is an accurate representation of paleontological history. Evolution does not occur, except within a "kind", which roughly corresponds to a Family. This corresponds to microevolution where the processes of mutation and recombination, natural selection, genetic drift, and speciation occur. For example, the

cat "kind" had enough genetic variability to "evolve" into lions, tigers, and house cats. The apparent Cambrian explosion is evidence of Special Creation by God. God, then, is seen as acting through natural law as well as through direct intervention.

The most recent form of Old-Age Creationists are the Intelligent Design Creationists (IDC). This group descended with little modification from William Paley's *Argument from Design* in 1803. Simply put, proof of an all-powerful creator/designer can be found in the order and purposeful design in the world. Paley's example was the watch, the existence of which required a watchmaker who had a design in mind. Another example was the vertebrate eye which he felt was "too complex to have evolved by chance". Although some microevolution is accepted by this group, mutation and natural selection are not because they believe that even the simplest life forms are too complex to have formed by accident or chance. This conclusion requires an intelligent designer - God. Many of the same arguments used by Young Earth Creationists are used by this group and Biblical beliefs are disguised by the use of questionable science.

Although most IDCers are not scientists, there are a few scientists who are considered sympathetic to this group. Lehigh University biologist, Michael Behe, who wrote *Darwin's Black Box*, introduced the phrase "irreducible complexity". This refers to processes or structures in cells or organisms, such as the blood clotting cascade or the rotor motor of a microorganism's flagellum, which he thinks cannot be separated into individual components that function by themselves and, therefore, cannot be explained by the gradual process of natural selection. He concludes that these complexities can be explained only by a special creation and that they are proof of the existence of an intelligent designer.

Peer reviews of Behe's publications have pointed out flaws in his reasoning concerning natural selection and have been highly critical of his conclusions. One obvious rejoinder is that, although at this time we do not understand how these complexities came to be, we may understand in the future how they did evolve naturally. While Behe, himself, is not a creationist per se (he believes that the earth is billions of years old and that natural selection can account for much of life's diversity), others, like Phillip Johnson, a professor of law at the

University of California, use currently unexplained aspects of the origin of life to promote creationism in his book, *Defeating Darwinism by Opening Minds*, in an attempt to debunk evolution.

Evolutionary Creationists and Theistic Evolutionists are very similar in their beliefs. Both accept the notion that God uses evolution to "create" the universe according to his plan. Both accept the revelations of astronomy, geology, and biology in terms of evolution by natural selection, up to a point. They do vary from each other in the amount God intervenes in the process of evolution. Evolutionary Creationists tend to be more conservative Christians while Theistic Evolutionists are usually mainstream Protestants. The latter view is also the official position of the Roman Catholic Church which believes that humans did evolve from simian ancestors, but that God introduced the human soul.

At the other end of the continuum are the Materialist Evolutionists. When the term "evolution" is used, it is usually this group being referred to. Here, the approach to understanding the universe and life in it is through methodological materialism which invokes natural causes involving matter and energy. People who accept this idea separate science and religion as two distinct entities. This view is neutral to religion and supernatural agents because they are outside the field of view of this group. They may exist, but they are irrelevant. Philosophical materialism, however, proposes that the laws of nature are all there is; no supernatural entities exist. Modern science, as most think of it, uses methodological materialism. Atheists accept philosophical materialism, but it is not a prerequisite to do science. Some Materialist Evolutionists do believe in God.

Where do place yourself on the Creation/Evolution Continuum? Do you feel that evolution is unacceptable to a religious person or can there exist a separation between science and religion? How do or can religious beliefs affect or interfere with scientific thought and research?

## VGS TREASURER'S REPORT

September 17, 2001

Dear President and Board:

The financial condition of the Society remains strong. Please see the attached Income Statement for the period January 1, 2001 through September 17, 2001. The checking account balance is \$3,194.04 as of September 17, 2001. All bills received by me have been paid and are reflected in the above balance. I welcome feedback and suggestions from the Board and membership.

Sincerely,  
Kristen L. Underwood

### Income and Expenses 1/1/01 through 9/17/01

#### INCOME

Total Dues	\$773.00
Dues-Family	\$120.00
Dues-Institution	\$0.00
Dues-Member	\$645.00
Dues-Student	\$8.00
Interest	\$11.78
Publications	\$22.00
Student Research Grant Contributions	<u>\$305.00</u>

TOTAL INCOME \$1,111.78

#### EXPENSES

US Post Office (stamps, GMG Distribution)	\$85.40
Minuteman Press (GMG Publishing)	\$279.20
Earth Science Week Poster Awards	\$0.00
Research Grant Awards	\$347.60
Student Awards (VGS Spring Mtng)	<u>\$155.00</u>

TOTAL EXPENSES \$867.20

TOTAL INCOME - EXPENSES \$244.58