The Geologic Division Retirees Newsletter

Suzette Kimball
16th Director
U.S. Geological Survey

Number 71 **Fall 2015**

An organization of retirees of the Geologic Division, U. S. Geological Survey, who seek to keep in touch with each other and with their former Agency.

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Newsletter Editor	Bill Outerbridge	703-860-8537
Production	Dave Newman	540-212-3281
Directory Coordinator	Odette James	703-476-9738
References	Bob Tilling	volkno.rit@gmail.com

Address

Geologic Division Retirees
U.S. Geological Survey
953 National Center
Reston, VA 20192

Email Address

gdretirees@usgs.gov

From the President

On December 18, the Senate confirmed Suzette Kimball as 16th Director of the U.S. Geological Survey. It's great to have a scientist from our own ranks in that post and someone who is highly regarded for her humanitarian record as a manager. In an article preceding the Essays section we have included more information about Suzette and her confirmation. So hearty congratulations to her and best wishes.

In August there was digital release of a major publication of interest to most of you: *Minerals, Lands and Geology for the Common Defence and General Welfare, Volume 4, 1939-1961*, 704 pages. Cliff Nelson has produced a highly detailed, scholarly account of the Survey's work during that period. Although the publication is now online only, printed copies will be available in a few weeks. For those who wish to purchase the book, it will be available from Survey sales in Denver. I will try to pass along word of its availability when it is in stock. Copies will also be placed in libraries. Cliff has written an article about the volume in the Essays section of this newsletter.

Wally Hansen turned 95 on Nov. 7, so happy birthday to him. Over the years, Wally has passed on to me a large number of humorous anecdotes about Survey life, in particular stories about Charlie Hunt. So I'm including one of my favorites later in the newsletter with Wally as contributor.

John Keith

Treasurer's Report and Membership Statistics

This report summarizes the financial situation of the Geologic Division Retirees as of December 20, 2015. Because we have not yet paid for printing and mailing of the second 2015 newsletter, our income at this point exceeds our expenses. Our income and reserve at present are more than adequate for anticipated expenses during the remainder of 2015. Because we have a significant reserve, no dues increase will be necessary anytime soon. Our new printer produces the newsletters and directory at much lower costs than our previous printer, and as a result we lowered our dues a few years ago and we still have a considerable reserve at the new dues level.

Net worth, December 31, 2014	12,320.85
Income received in 2015 thus far	
Dues and contributions	
All Dues	2,143.00
Contributions	533.00
Total income	2,676.00
Expenses paid to date in 2015	
Dues notices (envelopes, postage, labels, ink)	318.62
Preparation and mailing of first newsletter and directory	2,059.81
Bank charges	4.00
Total expenses	2,382.43
Net increase in net worth	293.57
Net worth, December 20, 2015	12,614.42
Assets	
Checking account, Wells Fargo	12,584.42
Undeposited dues checks	30.00
Total assets	12,614.42

Notes:

Comparison with 2014: Thus far, the amount received for dues in response to the 2015 dues billing is $57 less than the total dues receipts for 2014, and the amount received as contributions is $161 less than received for 2014; thus, the total received at present is $219 less than in 2015. This decrease is desirable because we need to cut our reserve.

Membership statistics:

At the end of 2004, we had 579 members, at the

end of 2005 555 members, at the end of 2006 531 members, at the end of 2007 519 members, at the end of 2008 504 members, at the end of 2009 487 members, at the end of 2010 453 members, at the end of 2011 434 members, at the end of 2012 414 members, at the end of 2013 407 members, at the end of 2014 390 members, and we currently have 399 members. It appears that efforts to recruit members by our President John Keith are slowing and perhaps reversing the long-term loss of members. Approximately 107 of our members are currently Emeritus geologists with the USGS.

Odette James
Secretary/Treasurer

New Members

Charles Bacon
Walter Bawiec
Pierre Glynn
Peter Lyttle
Ken McGee
Carol Messick
Rachel Muir
Lindsay Nichols
David Russ
Janet Somerville Sachs
Richie Williams

Special News

Suzette Kimball confirmed as 16th Director of the U.S. Geological Survey

Suzette Kimball has led the USGS as Acting Director since Director Marcia McNutt resigned in February 2013. In January 2014 President Obama announced his intent to nominate Kimball as Director. The Senate Energy and Natural Resources Committee, chaired by Sen. Lisa Murkowski [R-AK], held a hearing on her nomination in October and took the opportunity to quiz her on a number of topics, including the National Volcano Early Warning System, 3DEP, water resources, especially in Hawaii, the shale gas boom and the Williston Basin, climate change, and hyperspectral mineral surveys. After the hearing and after the Committee had voted to send her nomination to the full Senate for confirmation, Senators Shelly Moore Capito [R-WV] and Joe Manchin [D-WV], Suzette's home-state Senators, spoke warmly in support of her nomination. She was confirmed by unanimous consent.

Interior Secretary Sally Jewell issued a statement: "I am pleased the Senate voted to confirm Dr. Suzette Kimball to this important leadership post in the Administration. As a geophysicist and veteran of decades in public service, Dr. Kimball is eminently qualified to lead the USGS. From mapping and LANDSAT satellite images used by people around the world, to helping communities understand and prepare for natural events such as flooding, earthquakes and volcanic eruptions, USGS plays a critical role for our Nation and the world. Dr. Kimball's commitment to providing impartial information on some of the Earth's most complex scientific systems will ensure that this important work continues. During her time at USGS, she has proven to be a collaborative leader as well as an effective advocate for science in guiding smart decision-making."

Suzette served as the Deputy Director from 2010 to 2013; as the Associate Director for Geology from 2008 to 2010; as the Director of the Eastern Region from 2004 to 2008; and as the Eastern Regional Executive for Biology from 1998 to 2004. She was previously Acting Director from January to November 2009. As Deputy Director, she had oversight over all USGS scientific and administrative functions; she also led USGS's international activities and represented all North American geological surveys on international mapping endeavors.

Before working at USGS, Kimball served at the National Park Service as the Southeast Associate Regional Director and Regional Chief Scientist from 1993 to 1998. From 1991 to 1993, she was Research

Coordinator in the Global Climate Change Program at the National Park Service; an Assistant Professor of Environmental Sciences at the University of Virginia; and Co-Founder and Co-Director of the Center for Coastal Management and Policy and Associate Marine Scientist at the Virginia Institute of Marine Science, College of William and Mary. Kimball served in the U.S. Army Corps of Engineers from 1983 to 1986 as a Coastal Engineering Research Center Chief and a Program Manager for Barrier Islands Sedimentation Studies. From 1979 to 1983, she served as a Research Coordinator and a Research Assistant at the Department of Environmental Sciences at the University of Virginia.

She received a Ph.D. in Environmental Sciences/Coastal & Oceanographic Processes from the University of Virginia (1983); an M.S. in Geology/Geophysics from Ball State University (1981); and a B.A. from the College of William and Mary. She has authored more than 75 technical publications on issues dealing with coastal ecosystem science, coastal zone management and policy, and natural resource exploration, evaluation and management. Her numerous professional appointments and offices include serving on the National Academy of Science's Institute of Medicine, Roundtable on Environmental Health, Research and Medicine; NAS Roundtable on Science & Technology for Sustainability; and U.S. National Committee for Geosciences of the NAS Board on International Scientific Organizations. Kimball has twice received the Presidential Rank Award for Meritorious Executive Leadership and the Secretary's Gold Award for Executive Leadership.

Essays, Anecdotes, and History

A History of the USGS and Nuclear Power Plant Siting

Jim Devine

The atomic bomb dropped on Hiroshima brought the world into the Nuclear Age. After the end of the war there was a major effort to use this great source of energy for peaceful purposes. The obvious choice was for generating electricity, and the potential for this was perceived to be endless. So the country embarked on a course of "energy so cheap that there would be no need to monitor it." The Atomic Energy Commission (AEC; later reorganized as the Nuclear Regulatory Commission, NRC) was charged to license and regulate this new industry and began to develop the rules and regulations for its use. An early application, in the late 1950s, for a construction permit by Pacific Gas and Electric (PG&E) was for a site at Bodega Head, California. The licensing process was moving along fairly well and a large foundation had been carved from the bedrock -- that is, until a citizen protest led by David Pesonen and others claimed that the site was located too close to the San Andreas Fault to allow for a nuclear plant to be built there. The story goes that Secretary of the Interior Stuart Udall offered the services of the USGS to the AEC to help answer the questions about the geology and seismology relative to this site. The USGS responded with a report authored by Manuel (Doc) Bonilla and Julius Schlocker that addressed the basic geology of the site and a statement for the record by Jerry Eaton on the earthquake risk. This opened the floodgates for heated debates as to how confident were the estimates for where and how much displacement could occur directly beneath the plant and started a consideration of ground shaking. More and more hearings were held, and more and more USGS scientists were dragged into the fray. In the end, the site had to be abandoned on the basis of the displacement potential within the foundation itself. This result was a bitter pill for PG&E, who had plans

to build as many as 10 such plants along the coast of California. The ground shaking issue would surface in later application hearings. Today that large foundation opening is called "the Hole in the Head."

After the Bodega Head debacle the AEC announced that no applications would be accepted if the site located within a few miles of an active fault. This took care of the foundation displacement issue, but the anti-nuclear community had found another issue to use in opposing nuclear power – earthquakes. From then on, this issue was put forth by those opposed to the plant at virtually every application hearing. As a result the AEC, with lots of nuclear engineers but no earth scientists, hired the USGS to help answer the geologic component of this issue and the U.S. Coast and Geodetic Survey (C&GS) to answer the earthquake component. Hank Coulter soon became the lead for the USGS, and Leonard Murphy for the C&GS. When the issue became more than just listing the earthquake history and required a much deeper analysis of the potential shaking, Murphy, who was the Division Chief with other management duties, appointed me to take over the AEC project. At the time, the late 60s, there was a spate of applications, and each site presented an entirely different tectonic setting, some similar to Bodega Head, but most quite different. With no ground rules or guidelines, each site analysis was a stand-alone decision and a time-consuming process. So the AEC established a rulemaking committee, consisting of a senior AEC official, Bob Minogue, Hank Coulter and me. For the next 3 years, between hearings on various sites, this committee, with a lot of outside advice, developed the procedure published as 10CFR [Code of Federal Regulations] Part 100, Appendix A. This rule established some order to the process and let the applicants know in advance how the geology and seismology aspects of an application would be considered and decisions made. This rule, with some modifications in later years, stood for the remainder of the application era. (There have been no new site applications since the mid-1990s.)

During those 30 or so years, the USGS geologists who served as the lead for the geologic analysis following Hank Coulter were Hank Waldron, Elmer Baltz, Frank McKeown, and Fred Houser. I remained the earthquake lead until nearly the end when Wendall Mickey took over, but all of us tapped many other scientists with expertise on a particular area or process for help.

There were 60-some sites reviewed, discussed, analyzed, and fought out in endless AEC/NRC meetings with the applicant and their hired guns, followed by public Atomic Safety and Licensing Board (ASLB) hearings, with Administrative Law powers, and interventions by public organizations complete with high-powered lawyers and, finally, by some individual citizens. By the way, some of these hearings proved to be great entertainment if you were not on the witness stand. I will describe here three cases that represent success, failure, and mixed results: Diablo Canyon, CA, Skagit, WA, and North Anna, VA.

After the failure of several site applications, PG&E settled on a site (Diablo Canyon) on the California coast (for a source of cooling water) north of Cambria that was sufficiently far from the San Andreas Fault to avoid the displacement issue and also away from population centers. By then PG&E had learned to start with high seismic design values to avoid lengthy fights on an issue that could be accommodated on the engineering side of the equation. So agreement was reached on the earthquake question with only a moderate amount of debate. The ASLB hearings were contentious, but findings were finally concluded. A Construction Permit was issued, and work proceeded for a couple of years. Then the USGS Marine Geology Branch came in with new data on the tectonic structures offshore from the site. These data really upset the applecart. Suddenly, we were

confronted with a new issue for which there were no guidelines. How does one evaluate a fault structure that one cannot see or rub your fingers along, or see the offsets and all the usual ways geologists study faults? This issue led to numerous NRC meetings, endless haggling, and more ASLB hearings. Public intervention was at its peak of skill, and lots of young, idealistic lawyers were willing to donate time and energy to stopping Diablo Canyon. In the end PG&E accepted much higher design values and set about modifying each and every Class 1 element of the plant, increasing the supports and beefing up piping, etc. where necessary. (A Class 1 component was any part that was included in the nuclear portion of the generating process.) Finally, after almost 20 years of effort, the issues of geology and seismology were finally accommodated and an Operating Permit was granted for Diablo Canyon Nuclear Plant. So, in the end one could say that the process, costly and cumbersome as it was, did actually work.

The Skagit, WA, case did not go so well. This proposed site, located in the Pacific Northwest, presented an entirely new set of questions from any that had been considered in the past. While on or near a major plate boundary, the region did not contain well-defined faults as in California. There were some medium to large earthquakes and also active volcanoes, but overall the region was poorly defined for NRC licensing purposes. This prompted a large effort to gather the necessary information. But the more we learned, the more complicated the picture became. Newly discovered or newly postulated faults were popping up both onshore and in the Puget Sound. To make matters worse, so little was known about each new fault that estimating its earthquake potential was not possible. As time went on, more and more geoscientists became involved; positions hardened, and collegial relationships were strained. The final outcome, after innumerable hearings, was the denial of a construction permit due to the degree of uncertainty in the understanding of the tectonic and seismologic setting of the site. This was a bitter experience for all involved.

The third site, one representing mixed results of the review process, is the North Anna plant in central Virginia. Dominion Power's plans called for two units to be built first, followed by two more at a later date. The hearings for the first two went fairly routinely, and a construction permit was issued after a few public hearings. All was fairly quiet until the foundation hole was opened for units 3 and 4. A structure that had been defined as a seam in the foundations of units 1 and 2 was found to have an offset in the new foundations. By NRC rules, this was now a fault and its earthquake potential needed to be determined. This presented a major problem for a variety of reasons: it appeared to be not more than a few kilometers long at most and had only inches of displacement; it had only a few feet of weathered saprolite covering it and that was judged to be only a few hundred years old (not sufficient to declare it an inactive fault); and finally, it was located in the foundation itself, raising the old issue of displacement directly beneath the plant (remember the Bodega Head issue). In the end the ruling was made that the permit for units 1 and 2 would stand. However, Dominion Power decided to postpone units 3 and 4 indefinitely. Today there is still consideration being given to a unit 3.

The rest of this story is, of course, the 5.8 earthquake that occurred August 23, 2011, about 11 miles from the plant. Some would argue that this event met or exceeded the Maximum Credible Earthquake for which the plant was designed. However, the plant shut down as designed; inspection following the event indicated that no damage had occurred to any Class 1, and the plant has been allowed to restart. Some of the dry casts containing old spent fuel rods were damaged, but no radioactivity of any kind was released. But nuclear waste is yet another story.

Volume 4 Evaluates The USGS During 1939–1961

Cliff Nelson

Planning for a comprehensive history of the USGS began in 1966, when Bill Pecora asked geophysicist Mary Rabbitt to end her tour as the Geologic Division's chief of publications and join his staff in the Director's Office. With the USGS centennial year only a baker's dozen years away, Pecora asked Rabbitt to begin work, whenever her principal duties allowed, on a history of the agency and have it ready for publication by the time observances were held in 1979.

Rabbitt, who joined the USGS in 1949, had published two history-related articles for the USGS' 75th anniversary in 1954. After settling in her new post, she began planning for and outlining a single-volume history of the agency. While doing so, she also completed articles in USGS scientific and general-interest publications for the centennial observations of (1) the 1869 voyage down the Colorado River by a team of amateur naturalists led by John Powell, and (2) the founding of Yellowstone National Park in 1872 that emphasized the contributions of federal geologist Ferdinand Hayden. In 1974, Rabbitt summarized her progress in chronicling and assessing USGS history in a general-interest publication entitled *A Brief History of the U.S. Geological Survey*.

Meanwhile, the external and internal reviewers of Rabbitt's draft single-volume history of the USGS encouraged her to enlarge it into a multivolume series. Eight thousand copies of Rabbitt's *Minerals, Lands and Geology for the Common Defence and General Welfare: Volume 1, Before 1879*, a title partially derived from the U.S. Constitution, were paper-printed and available in March 1979 in Professional Paper format and style as one of the agency's Special Books. The volume's subtitle, *A History of Public Lands, Federal Science, and Mapping Policy and Development of Mineral Resources in the United States*, further defined its scope. Pecora, appointed Under Secretary of the Interior in 1971, died during the following year, so Vince McKelvey, Pecora's successor as USGS Director to 1978, the year Rabbitt retired from the agency, wrote the Foreword to *Volume 1*. *Volume 2, 1879–1904* appeared in 1980, also in an 8,000-copy paper printing. When the 11,000 copies of *Volume 3, 1904–1939*, followed in 1986, they contained a Foreword by then-Director Dallas Peck. The USGS subsequently added these volumes to its online Publications Warehouse at http://pubs.er.usgs.gov/publication/800000, ***800002, and ***800003.

Rabbitt began the fourth volume, and also published *The United States Geological Survey, 1879–1979* as USGS Circular 1050 (1989), but left the new book unfinished when she died in 2002. Geologist Cliff Nelson, who joined the USGS in 1976 and thereafter aided Rabbitt's work, completed the new book as *Volume 4, 1939–1961*. Former Director Mark Myers continued his predecessors' tradition by writing the Foreword to *Volume 4*. In 2015, the USGS issued *Volume 4* as an e-document in the Publications Warehouse at http://dx.doi.org/10.3133/70142267. That site's Introduction to *Volume 4* contains live links to Volumes 1–3, Circular 1050, and Circular 1179 (2000). Circular 1179 reproduced Circular 1050 and also contained Renée Jaussaud's inventory of all documents accessioned through 1997 into Record Group 57 (USGS) in the National Archives and Records Administration's II facility in College Park, Maryland.

Volume 4 focuses on the United States and the USGS in success and failure during war and peace from the beginning of World War II in Europe to the end of the presidency of Dwight Eisenhower. *Volume 4*, like the earlier books in the series, places the nature and significance of USGS operations in mapping and the earth sciences in the wider context of national and international events. The new e-book also follows the earlier chronological rather than a thematic pattern, although themes are traced throughout the volume.

In 2013, USGS managers discontinued Nelson's work on Volume 5, 1961–1982 (to the departure of USGS Conservation Division), just when he began turning his draft chronology into narrative analysis. Nelson retired in 2015 after *Volume 4* appeared. He knew then of no USGS plans to hire a replacement to complete Volume 5 or to do so by contract. Perhaps plans will be made in future years to have Volume 5 completed before the agency's sesquicentennial in 2029.

We Must Be Willing To Pay Price For Water

By Ron Walton

(Ron represents Comal and Guadalupe counties on the Edwards Aquifer Authority board of directors. His essays are published every other month in the New Braunfels, Texas Herald Zeitung, from which this is reprinted.)

We need to conserve our water, and conservation is an individual responsibility each one of us must take on. Every drop counts. Our local water utilities are the first source for us as we all use water from very important distribution systems in our neighborhoods. Most people in New Braunfels depend on the very effective New Braunfels Utilities (NBU) for their water supply. Those of us in the Hill Country depend on Canyon Lake Water Supply Company (CLWSC), which likewise meets our current needs. But is there sufficient quantity of water to meet our growing population needs, and how can we keep the price of our water to an equitable price amongst all our growing demands?

The price of water is based on supply and demand. Currently, our own Edwards Aquifer Habitat Conservation Plan (HCP) and our local Chamber of Commerce have a task force looking at quantity demands. I encourage citizens to get involved in helping to look at this issue. The first meeting was held May 7 at the New Braunfels City Hall. NBU has many ongoing conservation rebate promotion efforts that appear almost daily in this newspaper, including low-flow/usage toilets, solar films/screens to keep your home cooler (double rebates until May 31), drought-tolerant landscape promotions, permeable patio rebates and other incentives for landscaping.

I urge you to do what you can to conserve our water. Simple little things you can do include water catchment tanks to catch runoff to use for non-household needs. I use two tanks at my residence to collect water for non-household use. NBU also has incentives for conservation efforts. NBU and the city are considering the option of using recycled water to irrigate local parks and ballfields.

We must be willing to pay higher water rates to fund this type of conservation effort. Since the use of potable water required diminishes as we use recycled water, then we must be willing to pay for the cost of conserving the potable water, which does not bring revenue to NBU and in fact diminishes its revenue. All of our conservation efforts require us to be willing to pay the price so we have enough water in the future to meet our growing needs. One very expensive and unfortunate household loss of water is simple flowing of our water out of our faucets as we wait for hot water to flow. Water plumbing devices can be attached to your household plumbing to provide instant hot water or even just catching the cold water before it goes down the drain can help as this water can be used where needed for household use. CLWSC is holding "water needs week" to educate users on wise use of our water supply and conservation of our water. NBU has a very important ongoing study on storing water for future needs in underground storage systems, which diminishes the evaporation losses that occur in storing water in surface reservoirs. Again, this costs money and we must be willing to pay for these proposed, large expensive projects. But we still must be able to find the quantity of water we need from other sources. The addition of Trinity water wells hopefully will be able to boost the local supply.

I urge you to join the fight to conserve our water as our supply and lack of rainfall with growing needs continues to become a crisis. We must keep our springs flowing as we urgently need more water for our recreational use, which is the foundation of our tourist industry. I have just mentioned a few ongoing efforts here, but they all need your support and involvement to be successful. Education and informing citizens of how they can be part of solution is most important. Call on your local water suppliers; they are best source for help in conserving our water.

An Exciting Forty Years of Science with the U.S. Geological Survey

Richie Williams

Every geologist who has worked for the USGS for several decades can easily recall the colleagues, many no longer with us, with whom we worked or whose reputations were well-known to us, especially the extraordinary scientific accomplishments of so many of them. Some of the programs and achievements were extremely memorable. For example, the scientists in Astrogeology, under the leadership of Gene Shoemaker, produced pioneering maps of Mars and other planets and moons in the Solar System. Bill Pecora, a former Director, later Under Secretary of Interior (DOI) under Stuart Udall, with the help of many other USGS scientists, pioneered in mapping changes on the Earth from space, through leadership by the USGS/DOI, by establishing the ERTS Program (later renamed Landsat by NASA). Scientists in the Volcano Hazards Program predicted the eruption of 1991 Mount Pinatubo, Philippines. In hydrology research, Dave Moody served as editor of the now-defunct *National Water Summary*, arguably the most important annual USGS publication. Other hydrologists published the superb series Regional Hydrological Atlases. All of the above research by USGS scientists confirmed the agency to be an extraordinarily productive institution that has made significant contributions to the increase in geoscience knowledge for the benefit of the nation and the world. There are, of course, many other achievements that could be cited, but those are the ones that quickly jump to mind and with which I was very familiar during the course of my long career.

The above paragraph provides some context for this essay on my 25 years of involvement in using ERTS/Landsat images to establish a "baseline" for all the glaciers in the glacierized regions of the world. After the launch of ERTS 1 (later Landsat 1) by the USGS/DOI in 1972, many USGS scientists from all three scientific divisions (GD, NMD, WRD) took advantage of data from a new scientific instrument to map, monitor, and study changes on the Earth's surface from a global perspective. For example, Doug Carter and I edited and wrote "ERTS-1. A New Window on Our Planet," with a foreword by Director Vince McKelvey, in 1976 (USGS Prof. Paper 929). Ed McKee edited and wrote the pioneering "A Study of Global Sand Seas" in 1979 (USGS Prof. Paper 1052). After publication of Prof. Paper 929, I proposed a global "baseline" study and assessment of glaciers to John DeNoyer, former USGS Assistant Director for Research, then Director, EROS Program. Dr. DeNoyer was the first USGS manager to offer full support (staff and funding) for such an effort, and every USGS Director since that time, including Dallas Peck, Gordie Eaton, Chip Groat, Mark Myers, and Marcia McNutt provided unqualified support for the 11-chapter (volume) Glacier Atlas series and wrote the Forewords to each volume published during their respective tenures, at present (2015) a total of 10 volumes [http://pubs.usgs.gov/pp/p1386/].

Jane Ferrigno and I were the series editors and contributing authors on one of the largest international projects initiated by the USGS. By December 2012, 10 of the 11 volumes of the Glacier Atlas had been published in print and online, including 9 geographic-region-specific volumes (1386-B–C, E–K) and one synthesis volume (1386-A, State of the Earth's

Cryosphere at the Beginning of the 21st Century: Glaciers, Global Snow Cover, Floating Ice [sea, lake, and river], and Permafrost and Periglacial Environments; http://pubs.usgs.gov/pp/p1386a/). Only one volume remains to be published, 1386-D, Glaciers of Iceland, with a 1:500,000-scale Map of the Glaciers of Iceland/Jöklakort af Íslandi. It is authored by Oddur Sigurðsson and me, and seven other Icelandic scientists who have contributed several topical sections to the volume. The series now totals more than 2,600 printed pages, with about 450 more pages estimated for 1386-D. Many U.S. and foreign scientists have written to us with comments on the importance and immense scientific value of the Glacier Atlas series.

By December 2012, 113 authors representing 61 scientific institutions in 24 nations had contributed to the 10 published volumes, the first global effort to establish a "baseline" for the areal distribution of glaciers on the planet. The 110 technical reviewers represent 79 scientific institutions in 20 nations.

The Glacier Atlas series spawned a companion project, Coastal-Change and Glaciological Maps of Antarctica, under the I-2600–A–W series [http://pubs.usgs.gov/imap/2600/], with analysis of satellite images by Charles Swithinbank, Scott Polar Research Institute (SPRI). To date we have published ten 1:1,000,000-scale maps, using Landsat and other satellite imagery, in print and online in association with the SPRI. One more map is in press.

There are very few scientific institutions inside and outside the U.S. government, domestic or international, that have the institutional culture to recognize and support publication of books, maps, and articles requiring years to accomplish. I feel quite fortunate to have worked for such an institution. The USGS was – and still is! – known as a highly respected and renowned premier Federal science agency because of the high quality of its publications and unequaled depth of knowledge by its scientists in many disciplines.

Memories of Tom Nolan

Al Miesch

Sometime in the early 1950s I was honored to be ordered to spend the Summer as field assistant to Tom Nolan, at the time Director of the Geological Survey. I spent the summer with Tom mapping parts of several areas around Eureka, NV. It was a wonderful experience for me, and I enjoyed being associated with Tom. It was a real honor. Many evenings were spent entertaining company geologists who were in the area; all wanted to seek advice from Tom regarding local geology, or just to meet him. Near the end of this assignment, Tom handed me some data concerning local exploration activity and asked me to prepare it for publication. I was glad to do so. When I completed the manuscript I turned it over for review. I had listed the authorship as "Thomas B. Nolan and Alfred T. Miesch." The reviewers' objection was that I should have been named the first author. I objected because of Tom's status as a geologist and his position in the world of geology. I knew that Tom would have no objection to the revised authorship – and of course, he didn't – but what an honor for a very young and inexperienced guy like me. I have admired Tom for a long time.

News from Members

Hank Berg: For about a decade, Judy and I have been picnicking at a USFS day-use campsite called "Banjo Bill," in Oak Creek Canyon north of Sedona, AZ. We stop there as we transit between vacation lodges in the canyon. In October, 2012, we were amazed to see that one of the restrooms--a reinforced concrete building--looked like it had been bombed. Half of it was missing, rebar stubs sheared off. While we were there, a USFS ranger showed up, who told us that a [basalt] boulder about the size of a VW Beetle had fallen from the canyon wall, bounced off Hwy 89 (big divot), and tore through the outhouse, coming to rest on the bank of the creek. Luckily, the "biffy" was

unoccupied. When we reported this to the lodge nearby, I ("the geologist") was commissioned (read, dragooned) to commemorate the event. Threatened with no dessert, I succumbed as follows:

LOOK OUT BELOW!
(dedicated to the Banjo Bill biffy-busting boulder)

I was born about a million years ago;
A smokin'-hot basaltic lava flow.
Conceived when great tectonic plates collide;
And I spread with stony pride
Atop a vast and colorful plateau.

Then time and wind and rain began to tell;
My noble rocky columns cracked and fell.
Tumbling into canyons far below,
Where unwary tours and hikers love to go.
And when they're least expectin',
I might decide to join 'em,
With a rumbling, tumbling, mighty awesome blow!

Kathleen Gohn: I retired from the USGS at the end of March – full of gratitude to the many scientists who taught me so much during my 34 years in editing, public affairs, and Congressional affairs. Since retiring, I've traveled every month – anywhere from three days to three weeks. A particular highlight was a September visit to New Mexico, where I met up with fellow retiree Sue Kropschot. We drove around the southeastern part of the state, visiting petroglyphs, White Sands National Monument, Carlsbad Caverns, and the UFO Museum at Roswell (a great place for stocking stuffers) before returning to Santa Fe for a few days. I was lucky enough to be there, rather than in light-polluted Reston, for the lunar eclipse, which was spectacular! I also enjoyed meeting up with retirees Susan and Gary Winkler there. I'm now looking forward to some peaceful months at home with husband Greg before starting the next round of travels.

Wally Hansen: When Charlie Hunt was mapping the Henry Mountains in Utah beginning in 1935, geologists were responsible for getting the correct geographic names on their maps. There was no equivalent of later systems to verify names. He went to the Post Office in Hanksville to ask about the name for the local river. The Postmistress was out, and a young woman clerk was the only staff. In answer to his question, she said, "The NICE people here call that the Muddy River." Charlie thanked her and went away, thinking that the answer did not seem quite right. He returned the following day when the Postmistress was back, and he asked her his question. She said, "NICE people?! There haven't been any nice people here in 30 years! We all call it the Dirty Devil!"

Jim and Ilene McNeal: London, Scotland, Ireland – our latest trip of a lifetime! At the beginning of September we left on a vacation that consisted of three parts. For the first part we were in London for four days. We did two daylong bus trips. The first included stops in Canterbury and the White Cliffs of Dover. So far as we could tell, the beach at Dover seemed to consist almost solely of cobbles of chert that could easily be seen in layers in the chalk of the white cliffs. The second day bus trip took us to areas northwest of London and included Oxford and Stratford-upon-Avon. We spent two days on our own in London, trying to see a few places that we hadn't seen on previous trips. The two highlights were the British Museum and Churchill's War Rooms. The War Rooms included a fascinating museum of Churchill. A must see, if you haven't.

After a train ride to Edinburgh, Scotland, we had about a day and a half on our own. In that time before our 9-day tour started, we fell in love with Edinburgh. Our tour bus trip included the usual stops at various castles and cathedrals, some of each in ruins. Highlights included a stop at a distillery, the golf course at St. Andrews, a visit to a sheep ranch where the amazing herding capabilities of border collies were demonstrated, several historical battlefields, a drive

through and hike in the highlands of Cairngorm National Park (where the heather was in full bloom – spectacular!), Loch Ness (many Scots consider the Loch Ness Monster the best marketing ploy ever), and trip to the Island of Iona. Iona is the site of a 1500-year-old monastery where the Book of Kells was written. The one morning of rain we had was spent at a reproduction of a Scottish crannog, a circular 2500-year-old dwelling of wood built in the middle of a loch. Look up crannog online and you'll see pictures of where we were.

Geologically and personally, the highlight of Scotland was the chance to meet a graduate school roommate from Penn State, a geography prof. at Edinburgh University, and the trip he took us on to perhaps the most famous geologic outcrop in the world, Siccar Point. It was here that James Hutton, one of the founders of modern geology, saw an angular unconformity in 1788. This outcrop provided the basis for/confirmation of his theory of Uniformitarianism (Figure 1).

Starting in Dublin, another delightful city, but very different than Edinburgh, we spent 8 days circling the island. The tour included Dublin (and seeing the Book of Kells in the Trinity College Library), Waterford, Blarney Castle (yes, we "kissed" the Blarney Stone), the Ring of Kerry, Killarney, Galway, Londonderry, and Belfast. The geologic highlights were the Cliffs of Moher (700' high of Carboniferous black shale and sandstone, also an important seabird rookery) and the Giant's Causeway (basalt columns about 50 to 60 million years old).

We returned to London for our flight back to the US. We stayed in a motel room that was the smallest, yet most expensive, room we've ever had. It was claustrophobic! All in all a great trip significantly aided by only one-half day of rain for 25 days.

Figure 1: Siccar Point, Scotland

Memorials

Frank Milton Byers, Jr., died July 12, 2015 at his home in Longmont, CO. Frank was born in Moline, IL, on March 5, 1916. He graduated from Augustana Lutheran College and received his Doctorate in Geology from the University of Chicago. He joined the USGS in Washington, D.C., in 1941. There he met his wife-to-be, Virginia Beverly Pratt. They married June 10, 1945, in Denver. She preceded him in death in December 2006. His assignments in Washington during WW II included antimony, coal, and tungsten investigations in Alaska and Nevada. He was moved to Denver in 1949 and continued work on Alaskan projects until 1952 when he began field work in California, the Colorado Plateau, and Nevada (the Yucca Mountain Project). Frank retired from the USGS in 1980 but soon joined the Los Alamos National Laboratory where he was a full-time Research Geologist until retiring again in 1988. He continued to consult for the Lab and for the USGS in Lakewood until age 90.

Frank loved the outdoors and hiked thousands of miles across geological formations in his work. He was

a scout master and enjoyed hunting pheasants every year with friends. Frank was a devoted husband who cared for his wife for many years while she was in a nursing home. Survivors include four children, Dr. John Byers (Dr. Anat Levi-Zada) and grandson Ithamar; Carol Sandstrom (Ron) and grandchildren Erik and Erin; Dr. Hugh Byers M.D. (Danielle Levi Alvares) and grandchildren Julie Cordier (Yvan) and Jonathan Bayle (Jenny); Ardath Belzer (Terry) and grandchildren Anton and Brigitte. Great-grandchildren include Joachim and Eve Cordier and Noah Bayle.

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Don Grybeck, former Deputy Chief OMR, Alaska Branch Chief, and all-around rock-in-the-box Alaskan geologist, died suddenly of a heart attack on August 24, 2012, at age 76. Don, a Korean War army vet, graduated from the University of Alaska (Fairbanks) and Colorado School of Mines. He taught geology at UAF before coming on board with the USGS in Anchorage in 1975. His research comprised geologic mapping and mineral deposit studies that spanned Alaska, from the Brooks Range on the north, to the Seward Peninsula to the west (you really can see Russia from there!), to the southern tip of the southeastern Alaska panhandle.

Above all, Don loved finding and reexamining mineral deposits and prospects described in old (late 1800s-early 1900s) USGS reports. Finding these needles-in-a-haystack in the panhandle usually meant crashing through a half-century of near-impenetrable rain forest overgrowth, devils club and all. Don almost always found them, or what remained of them, and published many reports updating their geology and resource potential. He also loved collecting brass objects related to mining, and hunted for half-buried boilers, or whatever, for their foundry plaques, happily removing them for his collection.

In retirement near Puget Sound, Don was a popular speaker at various venues about pioneering USGS geologists in Alaska and shared his knowledge of Alaskan ore minerals with hobbyists in the Seattle area. He also created and, until his death, oversaw the Alaska Resource Data File (ARDF), an online USGS database describing the geology of the thousands of mineral deposits and prospects known in Alaska, an acclaimed resource for ongoing mineral exploration throughout the state.

Hank Berg

Norman Herz: I belatedly realize that Norman Herz died May 28, 2013. He was with the USGS full-time from 1952 to 1970 but was also a valued colleague of mine as a WAE employee in the years 1977-1988 with various aspects of work on the Roseland district of Virginia. He had also been a predecessor of mine as USGS titanium commodity geologist. Some of you may remember that his USGS work included six years in Brazil.

In 1970 Norm accepted a position with the geology department of the University of Georgia. Norm's obituaries aren't hard to find, but they focus on his archaeological geology work for which he is justly renowned. The words anorthosite, titanium, and Virginia don't appear in those reminiscences by his archaeological colleagues, but need mention here.

Eric Force

Ronald (Ron) Kistler, 83, of Atherton, CA, passed away peacefully on Thursday, October 30, 2014 at Casa de las Campanas in San Diego, CA. Born May 18, 1931 in Chicago, IL, he moved to Baltimore, MD, in his teens, then moved to the Bay Area in the 1950s and never left.

Ron attended Johns Hopkins University in Baltimore and received his B.S. in Geology. He became involved with the USGS as a summer field assistant with the Katmai Project in Alaska in 1953. On this assignment, Ron met Howel Williams, a professor at UC Berkeley, who invited him to attend the university as a graduate student. Ron was drafted into the Army, which delayed his arrival at Berkeley until 1956. Ron was the first Geology graduate student in the K-Ar Laboratory set up by Curtis, Evernden and Reynolds.

After receiving his Ph.D. in Geology, Ron came to the USGS from UC Berkeley in 1960 after completing geologic mapping and structural studies in the Mono Craters quadrangle of the Sierra Nevada. Ron's contributions to the geology and geochronology of the Sierra Nevada, the Salinian Block, and the Peninsular Ranges are mere samples of his monumental achievements not only in western North America, but throughout the world. Ron retired from the USGS in 1995, but continued as Research Scientist Emeritus, coming into the office daily until 2012 to ensure his work was transferred and saved from notebooks to computer. Known for his humility, quick wit, and humor, Ron was very approachable and often sought out as a mentor.

Ron is survived by his wife of 57 years, Joyce, currently of San Diego, CA; daughter Julie Schmidt and her husband, Marty, of Edwards, CO; son Bryan and his wife, Nancy, of Escondido, CA; grandchildren Grant and Kate Kistler of Escondido, CA, Erik Schmidt, Oakland, CA, and Caroline Schmidt, Berlin, Germany. Ron is also survived by his brother, Alan Kistler of Evanston, IL, as well as many nieces and nephews.

Jim Calzia and Bob Fleck

Dean Kleinkopf, February 1, 1926 – August 1, 2015
The national geologic community and the Tobacco Root Geological Society in particular have lost one of our long term and most distinguished members. Dr. Kleinkopf passed away in Henderson, Nevada, Saturday, August 1. A three-year cancer survivor, he fought a courageous battle with a positive attitude until the end. Dean loved his family, rocks, wine and spirits, pie, and traveling with his wife, Nancy, and stayed in good enough shape to hike the Grand Canyon at age 77.

Appointed to West Point, Dean then served in the Navy during World War II. Returning home, he earned a mining engineering degree from what is now the Missouri University of Science and Technology at Rolla. He received his PhD in Geology from Columbia University in 1955 and promptly accepted a position at Chevron Oil as an exploration geologist for petroleum in the Western United States and Alaska for ten years. In 1965, he moved his young family to Denver to work for the USGS at the Federal Center in Lakewood.

In September 1988, Dean married Nancy. Over the last 27 years, they spent many weeks abroad on adventurous foreign travels: Europe, Asia, Africa, even the Middle East. Dean remained a civil servant until 2000. After retiring, the couple built a home in Mesa, Arizona. His status changed to Emeritus Geologist when he joined the USGS Tucson office, adding his expertise for several years before uprooting and relocating to Nevada as a sincere retiree. During his 33-year tenure as a Research Geophysicist/Geologist, Dean worked overseas extensively, including Thailand, Bangladesh, Indonesia, and Saudi Arabia. He worked in many U.S. states as well, focusing primarily on geophysics in Montana, Idaho, and Colorado. He produced innumerable USGS publications, including professional papers, open-file reports, and aeromagnetic and Bouguer anomaly maps. He also worked extensively in the Belt, including older projects such as RARE II and the Upper Mantle Project. He studied the regional gravity and magnetic anomalies of the Stillwater Complex and contributed to Special Publication 92 produced by the Montana Bureau of Mines and Geology. His journal articles and abstracts were published in the Geological Society of America's *Geology* and *GSA Bulletin*, the American Geophysical Union's *EOS*, and the Tobacco Root Geological Society's *Northwest Geology*.

Service work for professional societies was important to Dean, who gave generously of his time and counsel. His many memberships included the American Association of Petroleum Geologists and the American Geophysical Union; he was certified by the American Institute of Professional Geologists and was elected President of the Arizona Section in 2004. He became a Fellow in the Geological Society of America, serving as President of the International Division in 2002-2003 and serving a 3-year term on GSA's Annual Program Committee representing the International Division. Dean was one of the first regular attendees of the Tobacco Root Geological Society, and rarely missed a meeting in its 40-year history. He made newcomers feel welcome, served on several committees, was elected President in 1987–1988, and then appointed to the Board of Directors in 1989. He received the Society's highest honor, the "Hammer" award, in 2004, and was granted Honorary Member status in 2010.

Dean was a believer in the benefits of supplements, which he took in large quantity daily. Health maintenance was important to him throughout his life. He also enjoyed walking, hiking and jogging when younger, and exercising at local gyms. He liked shirts with pockets, preferably two pockets, to hold his reading glasses, cell phone, and small notebooks, which he used for grocery lists (he loved grocery shopping), ideas, names and phone numbers, coded entries, etc. Dean Kleinkopf was a kind-hearted, knowledgeable, and compassionate man. He will be sorely missed by Nancy, his four children, twelve grandchildren, and a host of friends and colleagues.

From the Kleinkopf family

Robert Gordon Schmidt: The obituary for Robert Gordon Schmidt in GDR no. 68, the Fall 2013 newsletter, didn't mention Pakistan in his dossier, so Eric Force has provided additional information: Bob was known as Pakistan Schmidt around USGS hallways. Perhaps Pakistan should be in quotes, as his early '60s work was in countries known today as Bangladesh and Pakistan. In Bangladesh Bob worked in the Chittigong Hill tract, now in the media as a ship-breaking site, known then for its heavy-mineral deposits at Cox's Bazar. In today's Pakistan Bob worked on a porphyry deposit called Saindak in Baluchistan, now in the media as a dangerous place to spend time.

Patricia L. (nee McCanney) Schuster passed away peacefully at home in Golden on November 15, 2014. She was born June 2, 1930 in Minneapolis and in 1951 joined Northwest Orient Airlines as a flight attendant. In March 1954, she met Bob Schuster, a passenger on a Seattle-Chicago flight. Northwest flight attendants were discouraged from dating passengers, but Pat made a happy exception. They married in February 1955. Pat accompanied Bob to Purdue University where their four children were born, then to the University of London, back to Purdue as a faculty wife, then on to the University of Colorado and the University of Idaho. In 1974 the Schusters moved to Golden where Bob joined the USGS as a research geologist. For 40 years Pat happily supported him in his frequent professional travels. She was an avid reader and especially appreciated trips to Europe and to England and Ireland, where she visited the sites of some of her favorite novels. In 2014, Pat and Bob continued their travels, cruising the Rhine-Danube Rivers, driving to Scottsdale with side trips to the Grand Canyon and to see the fall colors on the Durango-Silverton Narrow Gauge Railway, and finally to the annual GSA meeting in Vancouver, BC, where she visited with many old friends.

Pat and Bob were happily married for 60 years. She was a gracious and loving wife who found great pleasure in her 4 children, 5 grandchildren, and 2 great-grandchildren. She was easy to get along with, had a great personality, and was loved by all who knew her. She will be missed.

From The Denver Post, November 20, 2014

David Benjamin Stewart, of Reston, died on April 12, 2015, of complications following a fall.

Dave Stewart was born July 18, 1928, in Springfield, VT. His interest in minerals was sparked by a mineral shop near his family's vacation home in Sumner, ME. The shop owner introduced Dave to Harvard geology Professor Cliff Frondel, and Dave entered Harvard as a geology and chemistry major in August 1947. At Harvard, he earned an A.B., an A.M., and finished with a Ph.D. in 1956. His Ph.D. research focused on the granite of Deer Isle, ME. His time in Maine, first as a summer resident, then as a budding geologist, began his life-long love of seafood, birds, and the geology of coastal Maine.

Dave's entire career was with the USGS, though he had brief details and sabbaticals elsewhere. He began as a summer field assistant in 1948 and was hired as a geologist in 1955, at which time he moved to the DC area. He was a DC-area resident until his death.

The breadth of Dave's scientific interests was remarkable. Between 1955 and 1975, he established a laboratory that did high-pressure and high-temperature experiments on minerals. He performed experimental studies of feldspars and studied the formation of lithium-rich pegmatites. He was a NASA Principal Investigator between 1972 and 1975, studying

feldspars from the moon. He was generally considered one of the world's leading experts on feldspars.

During Dave's mid-career, he worked on radioactive waste management. Between 1977 and 1980, he studied the chemical interactions of radioactive waste, rock, and brine to help determine conditions in radioactive waste repositories, studies necessary for the safe disposal of such waste. In 1978-1980, he established a program for USGS geologic research into radioactive waste topics. In 1980-1981, he was detailed as Deputy Executive Director and Policy Analyst for High-level Radioactive Waste to the State Planning Council on Radioactive Waste Management (established by President Carter). There he helped define the concept that became the basis for siting radioactive waste repositories. As technical advisor to the President's Office of Science and Technology Policy in 1978-81, he had a lead role in assessing the technical status of repository technology.

Throughout his career, Dave carried out geologic field studies of coastal Maine and synthesized geophysical, geochemical, and field data to determine the structure and history of the Earth's crust in Maine and bordering Canadian provinces. Most of his field studies were carried out between 1967 and 1971. He began the synthesis phase of his work in 1981 and completed it as an Emeritus geologist with his geologic map of Penobscot Bay in 1998 and his last paper, published in 2008. Between 1982 and 1987, he coordinated USGS efforts in a collaborative project (with the Geological Survey of Canada, the Maine Geological Survey, and numerous universities) to carry out geophysical studies in the region. Between 1987 and 1993, he organized a collaborative project with US and Canadian earth scientists and computer experts to synthesize the data and formulate a prototype Geographic Information System that could be used for synthesizing earth-science data in any region.

Dave retired in early 1995 with a Senior Executive Service grade of ST-02. After retiring, he continued research as a USGS Emeritus geologist until late 2007. In 2004-6, he collaborated with others from the USGS, Naval Research Labs, and the Smithsonian Institution in preparation of the map "This Dynamic Planet: World Map of Volcanoes, Earthquakes, Impact Craters and Tectonic Plates." This map is the most widely distributed of all USGS maps ever published.

Dave had a powerful intellect. He could quickly perceive central issues and think meaningfully at all scales. He had a commanding presence. These characteristics led to recognition at many levels. He was an invited speaker at many symposia and a member of many committees that rendered scientific judgment. In 1966, he received the Mineralogical Society of America's Award for an outstanding scientific publication by a young scientist. In 1976-1980, he served as Chief of the USGS Branch of Experimental Geochemistry and Mineralogy, directing that Branch's research program. He served as president of the Geological Society of Washington in 1972 and of the Mineralogical Society of America in 1987-88. He received the Department of the Interior's Distinguished Service Award in 1981. In 1981, he was one of two finalists nominated by the National Academy of Sciences for consideration as Director of the USGS.

A message of condolence from one of Dave's friends refers to him as a "legendary character." He did not suffer fools easily and at times initially came across as gruff, but this attribute was offset by a quick wit and disarming self-deprecation. He was an unabashed punster. He was a warm and loyal friend, welcoming and hospitable, and an attentive mentor to many younger colleagues. He always looked for the best qualities in others. Whatever he did, he did well. He was passionate about growing dwarf conifers, drinking good wine, and especially birding. In 1959, Dave began a long association with the Brooke, VA,

Christmas Bird Count, established by USGS scientists in 1947 and one of many such counts sponsored by the Audubon Society. In the mid-1980s, Dave took over as organizer of that count, continuing until 2007. On birding or geologic outings, he was easily recognized by his broad-brimmed Australian hat, his Icelandic wool sweater, and the binoculars around his neck.

Dave is survived by his wife, Odette B. James, also a USGS retiree, three children, Diane Stewart Strodel (Richard Strodel), Douglas Stewart (Jodie Beckman) and Jeffrey Bricmont Stewart, two grandchildren, Jack and Lindsay Strodel, his sister Lillian Stewart Walker, and his former wife Dorothy Stewart. His half-sister, June McGreevy, preceded him in death, as did his parents, William Franklin Stewart and Melba Adella Graves Stewart.

Odette B. James

Other Recent Deaths

Paul Beauchemin
Bill Cobban
Robert D. Miller
Dorothy Outerbridge
Howard Pohn
John C. Reed, Jr.

Pubs will return in next issue


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