



PEDOLOGUE

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Editor's Comments

This issue of Pedologue is again be available from the MAPSS Web Site, <http://sawgal.umd.edu/mapss/>. Hard copies will not be sent unless, Del Fanning, the editor, df3@umail.umd.edu, 301-405-1308 is informed of someone who needs one.

I am very pleased that MAPSS is sponsoring a workshop-symposium/field trip on acid sulfate soils this year, September 15-16. As far as things that soil scientists can do to protect and improve “the environment”, education of engineers, developers, politicians, the environmental protection community, other soil scientists, and the general public about the dangers of exposing *sulfidic materials* to oxidation is one of the best things we can do. I italicize *sulfidic materials* to indicate that I am using the term as defined in *Soil Taxonomy* – the stuff that really does get acid when exposed to oxidizing conditions.

The acidity and associated release of aluminum and heavy metals to waterways from active acid sulfate soils is orders of magnitude worse than that from acid rain. However, our chances of avoiding the dangers associated with acid sulfate soils by appropriate engineering and management practices are good if the dangers are recognized prior to

land disturbance activities that may expose *sulfidic materials*. These are some of the kinds of things that our workshop should talk about and demonstrate, as well as showing the hazards and environmental damage that arise when the dangers are not recognized.

At the same time that I am thrilled that MAPSS is having the workshop/field trip, I am apprehensive that we will not be able to attract a sufficiently large number of paying attendees to make our efforts worthwhile. Regulations to control land disturbance/construction activities that address acid sulfate soil issues are not in place in the U.S. like they are for wetlands and hydric soils for instance. Thus engineers and others that should be knowledgeable about acid sulfate soils do not have legal or other incentives to learn about them – other than regulations that pertain to surface mining under SMCRA – the surface mining control and regulation act. The best that we can do for now is publicize the hazards and appeal to the professional pride of engineers and other professionals that we want to attract to our workshop. If we succeed to eventually get some regulations established, then we should get expanded work opportunities for soil scientists with acid sulfate soils training.

Soil scientists at the University of Maryland, at Virginia Tech, and with USDA NRCS have several new publications pertaining to acid sulfate soils that have come out recently or are in the pipeline to be published in the near future. I will list some of them along with a few others of particular interest below, as many MAPSS members may not be aware of them.

Entries pertaining to acid sulfate soils in Marcel Dekker Encyclopedia of Soil Science

I was privileged to edit and/or author the following entries on acid sulfate soils for the encyclopedia. The encyclopedia is on-line on the web at www.dekker.com, however there is a requirement to pay for either access to the whole encyclopedia or for specific entries, although a 2 minute peak at particular entries seems to be available for free. I have a hard copy of the encyclopedia, although some things have been added or changed since my copy was printed. I also have a few reprints of the entries of which I am senior author that I will give out while they last.

Fanning, D.S. (2002) Acid sulfate soils, definition and classification. *In* Encyclopedia of Soil Science. (R. Lal, Ed.) pp. 11-13. Marcel Dekker, New York. This one is short and sweet and gives current, including *Soil Taxonomy*, terminology for acid sulfate soils.

Fanning, D.S. and Burch, S.N. (2002) Sulfate and sulfide minerals. *In* Encyclopedia of Soil Science. (R. Lal, Ed.) pp. 1279-1281. Marcel Dekker, New York.

Melville, M.D. and White, I. (2002) Acid sulfate soils, management. *In* Encyclopedia of Soil Science. (R. Lal, Ed.) pp. 19-22. Marcel Dekker, New York. Melville and White are Australians. Dr. Melville visited Maryland a couple of times in recent years and gave seminars about Australian acid sulfate soils and how they are being managed

Rabenhorst, M.C., and Fanning, D.S. (2002) Acid sulfate soils, problems. *In* Encyclopedia of Soil Science. (R. Lal, Ed.) pp. 23-26. Marcel Dekker, New York. A quick review of some of the many problems.

Rabenhorst, M.C., Fanning, D.S. and Burch, S.N. (2002) Acid sulfate soils, formation. *In* Encyclopedia of Soil Science. (R. Lal, Ed.) pp. 14-18. Marcel Dekker, New York. A quick review of processes involved in the genesis of acid sulfate soils.

Chapters in books and meeting proceedings about acid sulfate soils and sulfide and sulfate minerals

Daniels, W.L. and Orndorff, Z.W. (2003) Acid rock drainage from highway and construction activities in Virginia, USA. *In* Proceedings, 6th International Conference on Acid Rock Drainage, July 14-17, 2003, Cairnes, Queensland, Australia (Ed. C. Bell) pp.479-487. (Australian Institute of Mining and Metallurgy: P.O. Box 660 Carlton South, Victoria 3053, Australia.

Fanning, D. S. and Burch, S.N. (1997) Acid sulfate soils and some associated environmental problems. *In* 'Soils and Environment' (Eds K Auerwald, H Stanjek, JM Bigham) pp. 145-158. Advances in Geocology 30, Catena Verlag, Reiskirchen, Germany.

Fanning D. S. and Burch S. N (2000) Coastal acid sulfate soils. *In* 'Reclamation of drastically disturbed lands' (Eds RI Barnhisel, RG Darmody, WL Daniels) pp.921-937. Agronomy Monograph 41, American Society of Agronomy: Madison, WI.

Fanning, D.S., Rabenhorst M.C., and Bigham J.M. (1993) Colors of acid sulfate soils. *In* 'Soil color' (Eds JM Bigham, EJ Ciolkosz) pp. 91-108. Soil Science Society of America Special. Publication 31, Soil Science Society of America: Madison, WI. This one is getting a little old, but is good for color criteria for identifying *sulfidic materials* in the field etc.

Fanning, D.S., Rabenhorst, M.C., Burch, S. N., Islam, K.R., and Tangren, S.A. (2002) Sulfides and sulfates. pp. 229-260. *In* J. B. Dixon and D. G. Schulze (ed.) Soil Mineralogy with Environmental Applications. Soil Science Society of America Book Series No. 7. SSSA, Madison, WI.

Journal Articles

Fanning, D.S., Coppock, D., Orndorff, Z.W., Daniels, W.L., and Rabenhorst, M.C. (2004 –accepted for publication in Special Issue of Australian Journal of Soil Research for papers presented at the 5th International Acid Sulfate Soils Conference in Tweed Heads, Australia) Upland active acid sulfate soils from construction of new Stafford County, Virginia, USA airport.

A poster version of this paper was presented at the 5th International Acid Sulfate Soils Conference in August 2002. This poster is presently on display in the basement of H.J. Patterson Hall of the University of Maryland In College Park. This is a story of a bad

acid sulfate situation from engineering construction by engineers who claimed they hadn't previously heard of acid sulfate soils.

Demas, S.Y., Hall, A.M., Fanning, D.S., Rabenhorst, M.C. and Dzantor, E.K. (2004 – accepted for publication in Special Issue of Australian Journal of Soil Research for papers presented at the 5th International Acid Sulfate Soils Conference in Tweed Heads, Australia) Acid sulfate soils in dredged materials from tidal Pocomoke Sound in Somerset County, MD, USA. This paper was presented by Alex Hall at the 5th International Acid Sulfate Soils Conference in Australia in August, 2002. It suggests, but does not prove, that drainage from these acid sulfate soils adjacent to Pocomoke Sound may contributed to fish kills in the Sound/River in 1997 and 1999. Newly formed ironstone was found where drainage under the dikes that contained the dredged materials entered Pocomoke Sound.

Kargbo, D.M., Fanning D.S., Inyang H.I., and Duell R.W. (1993) Environmental significance of acid sulfate “clays” as landfill covers. Environ. Geol. 22:218-226.

Theses and Dissertations

Burch, S.N. (1999) Optimum moisture and temperature for incubations to identify mineral sulfidic soil materials. M.S. Thesis, University of Maryland, College Park, MD.

Orndorff, Z.W. (2001) Evaluation of sulfidic materials in Virginia highway corridors. Ph.D. Dissertation, Virginia Tech, Blacksburg, VA. Looks at geologic formations with which sulfides are associated in VA.

Valladares, T.M. (1998) Estimating depth to sulfide-bearing sediments in the Maryland Coastal Plain: A Pedo-geomorphic approach. M.S. Thesis, University of Maryland, College Park, MD.

Bulletins, Leaflets aimed at general audiences and engineers etc.

Sammut, J. (1997) An introduction to acid sulfate soils. Quality Plus Printers, Ballina, Australia. Nice color pictures and pictures of fish kills. Is sometimes available on line for free. I don't particularly like some of the terminology used for acid sulfate soils.

Davis, Susan L. (in progress, draft recently reviewed) Identifying and managing acid sulfate soils in Anne Arundel County, MD. USDA NRCS.

Fanning, D. S. and Muckel, G. B. Acid sulfate soils (in progress, draft being reviewed at National Soil Survey Center for inclusion in a bigger publication that Gary Muckel is editing on Soils: Their Risks and Hazards).

New Members

Jim Brewer our hardworking Secretary/Treasurer who keeps track of our members has informed Pedologue of new members who have joined MAPSS in 2003 and 2004. They

are:

In 2003: Danielle Balduff, Karen Castenson, Cary Coppock, Eddie Earles, Julie Lieberman, Brian Needelman, Kevin Thomas, Robert Vaughn, John Wah, and Philip Zurheide.

In 2004: Rebecca Blank, Juliet Carton, Alexander Hall, Sagit Hall, Megen McBride, Rosalynd Orr, Rob Powell, David Ruppert, Mitchell Scott, Bruce Vasilas, and Beth Weisenborn.

MAPSS welcomes all these new members and is thrilled to have you aboard.

Maryland Soil Judging Team Heads off to National Soils Judging Contest

The University of Maryland Soil Judging Team and Coaches left on Friday, April 16, for the National Collegiate Soil Judging Contest, hosted this year by Illinois State University in Normal, IL. The contest will take place, April 19-23. MAPSS has made a donation of \$500 to help support the travel expenses of the team. The team will be one of 23 from across the nation competing to be No. 1 in the country.

Preliminary Information on MAPSS field trip on May 8, 2004

Jim Brewer has provided the following information.

We're planning a members' field trip on Saturday May 8th from 9am to 4pm. We will be looking at 4 soil pits in Baltimore County. At this time we're not sure of all the soil series we will be looking at, but they may include

Baltimore: Fine-loamy, mixed, mesic Mollic Hapludalfs

Captina: Fine-silty, siliceous, active, mesic Typic Fragiudults

Dunning: Fine, mixed, active, mesic Fluvaquentic Endoaquolls

Elsinboro: Fine-loamy, mixed, semiactive, mesic Typic Hapludults

Manor: Coarse-loamy, micaceous, mesic Typic Dystrudepts

Come out and enjoy discussions with your fellow members on these interesting soils. We will have soil pits open and particle size data for most of the horizons. Maybe our President will work up another "contest" for our enjoyment. The field trip will be on a local horse farm just outside of Owings Mill. We may have to car pool from Owings Mills to reduce auto traffic on the farm. We will keep you informed as to the directions and other information. The cost will be approximately \$10 per member for the box lunch (don't know exact cost yet).

Send contact information to Diane Shields

Diane Shields is collecting **contact information** (names, addresses, and preferably email addresses) for people, agencies, or consultants/engineers that should be notified about the upcoming **MAPSS symposium/field trip, Sept. 15-16, 2004, on acid sulfate soils.**

Please send any ideas or lists to Diane at dshields@bluecrab.org or at Diane.Shields@de.usda.gov; or phone 410-758-4852 (evening) or 302-678-4172 (day time); we hope to get notices out in early May.

Successful MAPSS winter meeting

The February 18 business meeting, with dinner and talk on soils and archeology by Dr. John E. Foss was a success. The biggest news was that three new honorary members were elected by the MAPSS membership. One of those elected was our speaker, Dr. Foss, who also is a charter member of MAPSS. John, who is an Emeritus Professor and former Head of the Department of Agronomy at the University of Tennessee, has served as President of the American Society of Agronomy. He is known to many MAPSS members as Professor of Soils at the University of Maryland and popular soil science teacher and coach of the soil judging team there, before he went on to become Head of the Soils Department at North Dakota State University in 1981.

The other two honorary members, Richard L. Hall and Dr. George P. Demas, were elected posthumously. Dick Hall, also a charter MAPSS member was a USDA SCS soil scientist in Maryland and Delaware throughout his career and for several years, near the end of his career, state soil scientist of Delaware. Dick was one of the first to routinely monitor water table levels in Maryland soils and his data and water table fluctuation patterns for soils of the Sassafras drainage catena in Worcester County, Maryland have been used over and over again by many MAPSS members and other soil scientists. Dick continued to monitor water table levels for some soils on the Shore even after he retired. Dick had a deep love of geology and rocks, the space program, as well as soils. Dick expired Oct. 16, 2003, after a long bout with cancer.

Dr. Demas was also a charter member of MAPSS. George served as USDA-SCS-NRCS field soil scientist in several Maryland Coastal Plain Counties and was in charge of the update of the soil survey of Worcester County at the time of his untimely death, apparently of pneumonia, Dec. 23, 1999. George served in several MAPSS officer positions, including president. As MAPSS newsletter editor he wrote soils fables for *Pedologue* about the characters Molly Sol and Clay. George earned his Ph.D. in 1998 at the University of Maryland with a dissertation entitled "Subaqueous soils of Sinepatuxent Bay, MD". His Ph.D. work earned him the coveted SSSA Emil Truog Award for the most outstanding dissertation in the country for that year. The subaqueous soils field that George pioneered continues to grow with expanded graduate studies in other states like Rhode Island and Maine as well as at the University of Maryland.

MAPSS is proud to announce the election of these new MAPSS honorary members to join those elected in the past, namely Roy Simonson and Del Fanning. Other goings on at the Feb. 18 meeting are recorded in the following pages in pictures contributed by Dr. Rabenhorst and his students.

Pictures to record goings-on at MAPSS meeting on Feb. 18, 2004



Happy hour and registration as the group gathers at the American Legion Hall in Crownsville.



MAPSS President Marty Rabenhorst calls the business meeting to order.



Honorary MAPSS member and newsletter editor Del Fanning gives an update on Pedologue and other things.



MAPSS President Marty Rabenhorst presents 2004 scholarship award to UMD student Rebecca Blank.



Everyone attentive during the business meeting?



MAPSS Past President Gary Jellick makes pitch for modifying constitution to establish a board of directors.



MAPSS members make their way down the buffet.



MAPSS charter member and newly elected honorary member, John Foss presents lecture on Soils and Archeology.

Soil Poems, Songs and Cartoon Characters

This blurb by Del Fanning

Do we have any soil poets or song writers in our midst? If anyone comes up with any good (dirty?) soil songs or poems, please send them to Pedologue. Pedologue will be pleased to publish the ones judged good enough for this esteemed publication. Perhaps MAPSS can collect some royalty funds from songs/poems by our members to support the installation of a monolith of Sassafras, our Maryland state soil, or of Greenwich, the Delaware state soil in the Smithsonian Museum of Natural History.

Did you know that soil songs (Rock 'N Soil) can be found on the web? Former MAPSS member, we need her back, Dr. Elissa Levine, at NASA in Greenbelt, MD, was instrumental in the establishment of the Globe web site that put together much information about soils and about projects for students to collect environmental data related to soils etc. The site has many soil songs. Elissa told me in a recent e-mail message that the site is now called the NASA Soil Science Education Web page and its url is <http://www.soils.gsfc.nasa.gov>

As an example of songs one can find on the NASA site, here is one by Erin, a third grader at the Environmental Awareness AIG Center in Smithfield, NC.

Soil is nice to have around,
It is part of the ground.

It helps trees to grow to produce oxygen
It should be everyone's friend.

It acts as sunscreen when the hippos roll,
It's a home to every mole.

I like soil and if you do,
Say, "I do! Do you?"

By way of history, soil songs started to be written and published by Dr. Francis D. Hole, Soils Professor at the University of Wisconsin, from whom I took a soil genesis course in 1960. Dr. Hole (with a name like Hole he had to become a soil scientist – his father was a geologist) and his students started the journal *Soil Survey Horizons* in the 1960's. It was initially published at the University of Wisconsin. After several years the journal was taken over by the Soil Science Society of America and SSAA continues to publish SSH. I subscribe, do you? Did you see my article in the spring 2004 issue on the University of Maryland Soil Monoliths Collection?

Dr. Hole, in addition to poetry and soils, had cartoons in *Soil Survey Horizons*. His principal cartoon characters were *Horizon Horace* and *Polly Pedon*. Dr. Hole, unfortunately for us, passed on to the next world, in 2002. Several of Francis's songs, both words and music, are on the NASA soils web site.

Jim Patterson, another former MAPSS member that we need back, who retired from the NPS (National Park Service) in 1998, told me of two other soils cartoon characters who apparently roamed over the urban soils in Washington, DC, where Jim worked at the Center for Urban Ecology. They were *Phil Dirt* and *Pete Moss*. Perhaps they helped Jim make all those monoliths of urban soils that are stored away somewhere in DC under the auspices of NPS.

I think we need to bring these characters back to life. Here is how a conversation between them might go if they came together to examine a highly compacted soil on the Mall in front of the Museum of Natural History (MNH) in DC. They are considering it as a candidate soil to represent Washington, DC in the coming new Soils Exhibit in the MNH.

Phil: I think this soil is a great candidate for DC soil, most soils in DC are in fill like this. This is the real dirt of this place, look these old broken bottles. I wonder if what was in them might have been consumed in the White House by one of the Presidents. Maybe a soil archeologist could figure that out for us.

Horizon: You call this soil? There aren't any horizons here, just some layers of different materials from the way the stuff was laid down when they filled Tiber Creek that used to be here. It's so dang dense that I bet the only way that plants survive on it is by unnatural daily watering by the Park Service.

Pete: I feel sorry for this soil, it badly needs some organic amendments like sewage sludge compost or something.

Polly: Perhaps some was added previously, or how else did this thin little A horizon get here. Look how it's thickness varies in kind of a repeatable fashion laterally

Horizon: I see the A horizon, but I don't think its thickness varies systematically laterally. However, I do now see some structural development below that A. There may even be a *cambic* horizon. Maybe this is a soil after all. Could it even be an *Inceptisol*.

Phil: I think we ought to jazz this thing up a bit. How about getting a contractor to bring in some more fill. Then the soil beneath can be a paleosol!

Horizon: That would be even more unnatural. If we must have the DC soil close to the museum, let's take it like it is, otherwise I say let's go to Rock Creek Park where there are some real natural soils.

Phil: The soils of Rock Creek Park don't represent the real dirt of DC. Stuff like this is extensive all over the city. More like it gets made every day. If we filled with some *sulfidic materials* we could even have an acid sulfate soil here and perhaps generate some nice yellow jarosite that could go in the minerals and gems section of the museum.

Pete: I say we go get the museum Associate Director, Robert Sullivan, to see what he thinks. He's the one who makes all the decisions around here anyhow. You were mentioning about artifacts that might have come from one of the former presidents. If we add some of today's sewage sludge or sewage sludge compost, we can say that the organic matter of this soil may have been contributed by President Bush or members of Congress, and they didn't have to raise anyone's taxes to do it. All they had to do was flush the toilette. I'll bet poop from those people would really make things grow.

Polly: I think a lady should have the last word here. This thing is supposed to be for educational purposes, isn't it? Why don't we ask Laura Bush, she's the real education person of the present administration? I'll bet she'll say the DC soil should come from the grounds of the White House. The DC soil survey shows Beltsville soils there. The lateral variation in the fragipan of that soil, the prism faces vs. the ped interiors, would provide an ideal pedon to represent DC.

Stay tuned for future developments as Phil, Horizon, Polly and Pete search for the best soil to represent Washington, DC in the Museum of Natural History.

Calendar of Some Future Events

Soon, Monday, April 26, 2004. 2pm Seminar at University of Maryland on monosulfidic black ooze and other aspects of acid sulfate soils and associated waters in Australia by Dr. Leigh Sullivan, Associate Professor at Southern Cross University, Lismore, NSW, Australia. The seminar will be in Room 1140 of the Plant Sciences Building (PLS 1140)

July 11-14, 2004. Northeast Branch American Society of Agronomy Meetings will take place at Rutgers EcoComplex, Bordentown, NJ. The meeting web site is <http://www.ecocomplex.rutgers.edu/nebasa/> There will be some interesting field trips available, of which a couple are mentioned here. On Monday afternoon, July 12, there is a Pine Barrens Soils Ecology Trip. It will include a visit to the Rutgers Cranberry and Blueberry Research Station. Some interesting soils to be looked at will include the green soil (mapped as Marlton) of which there is a monolith at the University of Maryland that has slickensides and also jarosite in deep horizons that show that the soils is a post-active acid sulfate soil. On Tuesday afternoon a field trip will look at the Ecocomplex that is built at a modern landfill that is still receiving wastes. “Participants will view how landfill gas is converted to energy, and visit integrated greenhouse, aquaculture, hydroponics, and vermiculture facilities – and view soil pits on the landfill cap and a newly excavated landfill cell that will expose acid sulfate materials.” On Wednesday, July 14, there will be an opportunity to visit the Selman A. Waksman Laboratory/Museum of Soil Microbiology – Waksman and his laboratory were involved in the discovery of many early antibiotics.

August 2-6, 2004. National Hydric Soils Workshop, Norfolk, VA,. Information on this workshop, submitted by Gary Jellick, stated that the purpose is to encourage dialogue concerning hydric soils and their relationship to wetlands delineation, mitigation, regulation and assessment and to expand this understanding between both the wetland and soil science communities. Further information should be available from Ralph J. Spagnolo, USEPA, Region 3, Environmental Services Division (3ES30), 1650 Arch Street, Philadelphia, PA 19103-2029. The e-mail address is spagnolo.ralph@epamail.epa.gov or phone 215-814-2718, or fax 215-814-2783.

Oct. 31-Nov.4, 2004. ASA-CSSA-SSSA International Annual Meetings with the Canadian Society of Soil Science, Seattle, Washington. Title-Summaries due May 3, 2004. See CSA News or ASA www.agronomy.org or SSSA www.soils.org web sites for details.

Coming MAPSS events

Sat. May 8, 2004: Educational-fun field trip for MAPSS members. Jim Brewer will be sending further information about this trip as an e-mail message to all MAPSS members in the near future. See some further information on this trip in an earlier section of this issue of Pedologue

Wed. Sept. 15 and Thurs. Sept. 16. Acid Sulfate Soils Workshop/Field Trip in Anne Arundel/P.G. County, MD area. We aim to attract engineers, regulators and others beyond the soil science community as well as soil scientists to this event.