PEDOLOGUE

Volume 33, Issue 1, 2022

Newsletter of the Mid-Atlantic Association of Professional Soil Scientists
Editor: Del Fanning, DelvinDel@aol.com or dsf@umd.edu
Assistant Editor: Barret Wessel, bwessel@umw.edu

PEDOLOGUE (ISSN 2641-662X) is published approximately quarterly by the *Mid-Atlantic Association of Professional Soil Scientists* in College Park, Maryland, USA. Issues are available online at www.midatlanticsoilscientists.org/pedologue

Editors' comments: **This document is the first issue of Volume 33 in 2022. See page 29, last page in this issue for comments about MAPSS field day etc. scheduled August, 2022.**

In this issue:

Calendar of some coming events

To Be Determined: Next MAPSS meeting. Likely an in-person field trip and annual meeting in August, 2022, see page 29. Virtual election taking place, see page 2, members must vote by March 31, 2022.

April 19-23, 2022. 2022 National Soil Judging Contest, Marysville, Ohio.

June 13-16, 2022. Northeast Soil Survey Work Planning Conference, University of Delaware, Newark, DE https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/ncss/?cid=nrcs142p2_053541 also https://ud-pcs.idloom.events/soil-survey-conference

July 31-Aug. 5, 2022. 22nd World Congress of Soil Science, Glasgow, Scotland, UK. https://soils.org.uk/wcss22/

Nov. 6-9, 2022. ASA-CSSA-SSSA 2022 Annual Meeting, Baltimore, MD. About | ASA, CSSA & SSSA International Annual Meetings (acsmeetings.org)

Nov. 21-26, 2021. 9th International Acid Sulfate Soils Conference, University of Adelaide, Adelaide, Australia. https://biological.adelaide.edu.au/acid-sulfate-soil/iassc/ A continuing check of this website indicates that this conference has been canceled again. It was originally scheduled for 2020, it is now scheduled to take place in Nov. 2022 or early in 2023.

Future articles etc.,

***Pedologue* needs articles, pictures, poems, cartoons, letters to the editor or other things soil scientists and/or other readers may be inspired to submit. Please submit such items to the editors (preferably to DelvinDel@aol.com, alternatively dsf@umd.edu). Be an author, support your newsletter! It's a way to promote your work, our community, and things we all need to know about soils and the environment.**

2021 MAPSS Officers:	Board of Directors
President Susan Lamb	Jim Chaconas to serve 1 year
Past President Annie Rossi	John Wah to serve 2 years
President Elect Ben Marshall	Jim Brewer to serve 3 years
Vice President David Ruppert	**Chairs of Standing** Committees
Treasurer Sarah Roberts	**Finance** Vacant
Secretary Jenwei Tsair	**Constitution and By-Laws** Gary Jellick
Member at Large to serve 2 years Gary Jellick	**Membership and Ethics:**
Member at Large to serve 1 year: Bill Effland	**Nominations** Annie Rossi
Ex officio Member Phil King	**Education and Public Relations** Delvin Fanning
	Certification Vacant

ELECTION OF OFFICERS FOR 2022. The following message from past-president Annie Rossi regarding the election that is taking place electronically has been distributed to the MAPSS membership by Secretary Jenwei Tsai. If you are a member, Vote by March 31. 2022 to have your vote counted

Dear MAPSS members,

As you are aware, we are holding our 2022 elections virtually this year. To vote, please go to: https://forms.gle/DhF39qaMKvaWbmEE8.
Please reply by March 31 to have your vote counted! We are electing a new Vice President, Treasurer, Council Member at Large, and member of the Board of Directors. The rest of the 2022 MAPSS officers will be as follows:

President: Ben Marshall
Past President: Susan Lamb
President Elect: David Ruppert
Vice President: TBD
Treasurer: TBD
Secretary: Jenwei Tsai
Member at Large: Gary Jellick
Member at Large: TBD
Ex officio Member: Phil King

Board of Directors: John Wah, Jim Brewer, TBD

As a reminder, annual dues can be paid to Sarah Roberts. Finally, we are planning a MAPSS field day and business meeting for this summer, so stay tuned for more information!

Thanks for voting! Annie

DAVID R. VERDONE

By Del Fanning, DelvinDel@aol.com

The notice that David had died on January 14, did not reach me, or most other MAPSS members, until about a week after it happened and with the notice there was no statement of cause of death. I contacted Ben Marshall, with whom Dave worked in the Frederick, MD office of USDA NRCS by e-mail and learned that Ben had been away and was about to return from vacation, but he informed me that David had a heart attack while shopping at Walmart prior to a snow storm and that attempts to revive him by CPR by other shoppers etc. had failed, and he apologized for not spreading the word that Dave was gone earlier and he stated how shocked he was, like others were, by what had happened. Fortunately, the Donaldson Funeral Home in Laurel, MD already had a very nice obituary on the web https://www.donaldsonlaurel.com/obituary/David-Verdone , prepared with the Verdone family, that members participated in these events. However, I feel that David deserves more and continued recognition in Pedologue, thus this article and I invite others to submit written memories of David for Pedologue. Dave served as MAPSS President in 2017 and throughout his professional career he was one of our most active members.

I first came to know David in the 1980's when he was a student majoring in soils at the University of Maryland and I was his coach on UM soil judging teams, including for the National Soil Judging Contest hosted by Tarleton State University in Texas where he was the UM individual who placed the highest of any of our UM students in the contest, and he was the No. 10 individual in that overall contest, where Maryland was 3rd highest placing team. That was Spring 1989, the year he received his B.S. degree in May of that year.

To me it was amazing and wonderful that David ever got his B.S. at all, because I knew that during his degree program he had busted out of the program because his academic college courses grade average was for a time below what was acceptable for staying in the program. To continue as a student at UM he switched to the 2-year program in Applied Agriculture. While he was in the 2-year program, he sat back in some of the courses he had taken while he was in the 4-year-program and he retook exams in those courses that raised his grades from what they had been while he was previously in the 4-year program. That raised his average in the 4-year program such that he was accepted back into it. In the case of the AGRO 414 course, Soil Morphology, Genesis and Classification course, a 4-credit course for which I was the instructor, Dave, was the only student that ever took the course 3 times, raising his letter grade each time he retook the course, to a B, very close to an A, the final time he did the course in 1986. Whether he retook other courses and raised his grade in them as well, I don't know, but, overall, Dave was a success story and when he was our UM student that got the highest score of any UM student in the national soil judging contest at Tarleton State in Texas in 1989. I and his other instructors in his soil science program at UM were very pleased and happy. Some of us learned that Dave had a learning problem called dyslexia, which his family knew and was concerned about, as I confirmed by chatting with his grandmother at the visitation on January 27th.

Following Dave's graduation with his B.S. in 1989, Dave became employed with one of his fellow students, Chris Sledjeski, in the VA soil consulting firm Soil Tech in Chantilly, VA, a firm started by Chris's father, Bill Sledjeski, who got his M.S. in soils at UM back in about 1960. After about 1 year working for Soil Tech, David was hired as a soil scientist with USDA Soil Conservation Service, became NRCS, in Maryland, with whom he worked for the rest of his life. Dave worked with colleague Susan Davis in updating the soil surveys of Anne Arundel and Prince George's Counties in Maryland and more recently for several years in Western Maryland and elsewhere out of the current NRCS office in

Frederick, MD, with Carl Robinette and Ben Marshall and others, who attest to his valuable work and accomplishments with them.

The picture below of Dave, outside where he liked to be, was submitted by Ben Marshall, taken in August, 2017, in Montgomery County, MD.

When Dave was a student at UM in the 1980's, he lived at home with his parents, now unfortunately both deceased at their family residence near or on Adelphi Street, just north of campus. When going to the field at that time for soil judging practice or other field trips, Dave usually was the first student to show up for the event for which he commonly helped to find and load the digging and other equipment needed for the trip. In his collection of soil judging pictures Dr. Rabenhorst has many pictures of Dave with other team members. A couple of them are on the succeeding pages

The fall, 1985 soil judging team that participated in the NE Regional Contest in Rhode Island, individuals from the left were: Sherri Cave, Mary Spiro, Roy Turner, Carol Cordatti, Coach Del Fanning, Luane Vander Male (in back row), Assistant Coach Katie Hearing (in front), and David Verdone in hat and sun glasses.

Look below to see Dave with the Spring 1989 team that placed 3rd in the National Soil Judging Contest hosted by Tarleton State University in Stevensville, Texas.

Dave Verdone, on the left with other National Soil Judging UM team members Steve Burch, Chris Slejeski, Kathy Mulholland and Coach Del Fanning, all standing. The individual at driver's seat of the van is team member Jennifer Cassells. The rented van was from the Dallas, TX, airport.

Maryland Soil Judgers Head to the 2022 Nationals

By UM Coach Martin C. Rabenhorst

The Maryland soil judgers managed a 3rd place finish among a field of 12 teams from 8 universities to qualify for a spot representing the NE region at the 60th National Soil Judging Competition to be hosted by Ohio State University next April. The entirely "fresh" team of judgers (no veterans) included three who made it among the top 10 individuals (Jack Murphy – 4th; Hayley Welzant – 8th; Madelyn Haines – 9th) to move ahead of Penn State (5th place) and the Univ. of Delaware (4th place), and qualify for the national competition. The University of Rhode Island finished in 1st place with Delaware Valley University close behind in 2nd place. Also participating were Bloomington University, Univ. of Pittsburgh Johnstown and Stockton University of New Jersey.

For Maryland and some of the other schools, this two year COVID period without soil judging meant that all previous judgers with experience had graduated, and all of this year's squad were first-timers. So while the Maryland judgers weren't crowding the very top of the leader board, they demonstrated considerable depth in the roster, with three finishing in the top 10, and an additional 3 in the top 20. This of course is a plus for the team, but also brings challenges for the coaching staff.

This year's contest (hosted by Delaware Valley Univ.) was held in the vicinity of Allentown, PA at the Rodale Institute where soils were formed in such parent materials as shale and limestone residuum, colluvium and Illinoian-aged glacial till. In the field, students mostly saw Alfisols and Ultisols (with an occasional Inceptisol), and had to address such issues as aquic suborders, skeletal particle size families and HTM (human transported materials).

The Univ. of RI also had three individuals among the top 10 and Delaware Valley had two, but the strength of their high scorers (in 2nd and 1st places, respectively), helped to carry these schools to the top. Ohio State University had been planning to host the National Competition in 2020 when COVID restrictions required that the event be cancelled, and last year there were no official soil judging contests held during the 20-21 academic year (although some schools participated in a virtual "soil judging" event in April). It is anticipated that approximately 24 teams from the seven regions around the country will be participating in the 60th national competition in late April 2022, where the Terrapins (who won the 59th competition in SLO California) currently stand as the defending national champions.

Editor's Note: A story about the virtual National Contest in 2021, mentioned in Marty's article above and Virginia Tech that won that contest by Jaclyn Fiola may be found in the Volume 32, Issue of Pedologue. For a picture of the UM team that participated in the 2021 NE Regional Contest, go to the following page.

Terrapin soil judgers qualify for the nationals – heading to Ohio. Front Row: Isabelle Dallam, Hayley Welzant (8th Place Individual), Sonya Matlack, Madelyn Haines (9th Place Individual); Back Row: Martin Rabenhorst (Coach), Jack Murphy (4th Place Individual), Mariano Dessardo, Lauren Wyatt-Brown, Jordan Kim (Asst. Coach), Ashlyn Hill, Jocelyn Wardrup (Asst. Coach).

MONOLITHS OF THREE GENITICALLY RELATED UPLAND ACID SULFATE SOILS FORMED ON GEOLOGIC TERTIARY-AGE SULFIDIC-GLAUCONITIC MATERIALS, ONE POST-ACTIVE WITH A SILICA-CEMENTED CAST SHELLS ZONE, OTHER TWO ACTIVE ON SCALPED LAND SURFACES, ONE WITH CALCACAREOUS SHELLS PRESENT, THE OTHER WITH SILICA CEMENTATION, AT SCALPED SURFACE. By Del Fanning and Ed Landa, corresponding author delvindel@aol.com or dsf@umd.edu .

The University of Maryland has the largest collection of monoliths of acid sulfate soils in the world, on display in the basement of H. J. Patterson Hall near the center of the College Park campus, interspersed with monoliths of about 100 monoliths of other soils collected from Maryland and other states and DC. The acid sulfate soils include potential acid sulfate soils, e.g. tidal marsh soils, active acid sulfate soils, e.g. on sulfidic dredged materials and on upland recently scalped land surfaces and on mine and other recently human-deposited spoils or landfills, and post-active acid sulfate soils, e.g. on glauconitic/sulfidic geologic materials such represented by Monolith 18 featured in this report, but also on other sulfidic materials as defined by *Soil Taxonomy*.

This article continues efforts to recognize in Pedologue, this journal, officially the MAPSS Newsletter, individual soil monoliths of the overall UM soil monoliths collection, in this case three different ones, each collected in a different decade, each of which helps to recognize features or properties in the other two as well as contributing to an overall goal of understanding acid sulfate soils, a subject of our long-term interest, needed to understand the genesis of many soils in the world.

The three monoliths featured in this article are shown in Figure 1 , photo by Ed Landa, on the following page. Monolith 18 is in the middle of the three. Fanning claims it as his favorite monolith in the overall collection. It is the first one he was involved in collecting, in 1965, shortly after he was hired as an Assistant Professor in the Department of Agronomy in 1964, made at what was then called the UM Tobacco Farm, now the Southern Maryland Research and Education Center, near Upper Marlboro in Prince George's County, at a time before the term post-active acid sulfate soil started to be used, a soil we now think experienced big bang acid sulfate soil genesis early in its life, likely millions of years ago if the jarosite in it is as old as we think it is. Monolith 59, constructed in 1977, on the left was collected from a land surface created when the DC Beltway was built in the 1960.s. It displays soil material like that from which Monolith 18 formed, that one needs to go to about 10 meters depth at the Tobacco Farm to find. Monolith 115 on the right in Fig. 1 was collected in 2015 from another scalped land surface in Anne Arundel County. It has silica cementation in a zone at its surface that still contains sulfide minerals that helps to show that the silica-cemented zone with cast fossils of shells in monolith 18 very likely was cemented before the shells dissolved away to create the casts -- a long long time ago.

Fig. 1. Photo of 3 monoliths featured in this article, each described and presented in more detail in subsequent pages. Collection monolith No. 18, of a post-active acid sulfate soil, Annapolis fine sandy loam, from a cultivated field, note the thick Ap horizon, is in the center. Collection monolith 59, labeled Cat Clay, of an active acid sulfate soil collected from a scalped land surface within a cloverleaf of the Washington, DC beltway is on the left. On the right, is another active acid sulfate soil, monolith No. 115, from a roadcut on Rt. 426 in Anne Arundel County. It has silica-cemented horizons, still containing sulfide minerals at its surface that helps explain the genesis of a zone with silica cemented casts of shells in the Annapolis monolith.

UM SOIL MONOLITH NO. 18

By D. S. (Del) Fanning

INTRODUCTION

This monolith representing the Annapolis (soil series) fine sandy loam (surface-texture phase) was made in 1965 of a soil profile exposed in a hand dug soil pit shown in PICS 1, 2 and 4 in this document. In 1965, the Annapolis soil series was not yet recognized and the soil, at that time, was considered to represent the Collington soil series. Presently, in 2021, recognition as Annapolis is preferred over Collington because this soil belongs in a glauconitic soil mineralogy family in which the Annapolis series is classified by *Soil Taxonomy* (Soil Survey Staff, 2014) whereas the Collington series is not, as this soil profile has more than 20% glauconite in its control section.

An unusual aspect of the soil represented by this monolith is the silica cemented zone, shown as the Bqmj horizon (q for silica, m for massive cemented, j for jarosite concentration), containing seashell cast fossils, shown in more detail in PICS 2, 4, 5, 6, 7, and 8, which are not typical of either the Annapolis or the Collington, or any other soil series, although such silica-cemented features are found in places in some other soils. Silica cementation of soil zones can cause such zones to be recognized as *duripans* by *Soil Taxonomy*.

This document prepared by Del Fanning from other documents to provide information on this soil monolith of the UM soil monoliths collection

Monolith Name: Annapolis fine sandy loam

Monolith Label Copy:

Annapolis fine sandy loam
Typic Hapludult
Fine-loamy, glauconitic, mesic
Sulfide-bearing glauconitic marine sediments
Prince George's County, MD

Horizon	pH	cm
Ap	4.7	25
E	4.5	
EB	4.5	
Bt	4.6	50
Bqmj	4.2	
BC1	4.1	75
BC2	4.0	
BC3	3.9	100

Monolith Collected and Constructed by: Michael Tapper, James C. Patterson and Delvin S. Fanning, June 1965. Tapper was a Graduate Assistant, Patterson a student worker who previously had made monoliths with Dr. Gerry Bourbeau, Originator of the UM Soil Monoliths Collection, Fanning was an Assistant Professor; all in 1965 were in the UM Department of Agronomy of that time.

Soil Description, here below, was made at the time the soil monolith was collected from the field.

Description of the Collington, later reclassified as Annapolis, soil for which Monolith 18 of UM soil monoliths collection was made with horizon nomenclature as originally assigned in 1965

Profile Description of Collington fine sandy loam (Original description)

From University of Maryland Tobacco Farm

Ap, 0-11”. Pale brown (10YR 6/3) when dry to dark brown (7.5YR 4/2) when moist; fine sandy loam; weak, medium, granular structure: very friable: pH 4.7; abrupt smooth boundary.

A2, 11-17”. Brownish yellow (10YR 6/6 when dry to brown (7.5 YR 4/4) when moist; fine sandy loam; weak, medium, subangular blocky structure; friable; pH 4.5; clear wavy boundary.

A-B. 17-19”. Yellowish brown (10YR 5/8) when dry to dark yellowish brown (10YR 4/4) when moist; fine sandy loam in upper part to sandy clay loam in lower part; moderate, medium, subangular blocky structure; friable; clear wavy boundary; very few black concretions.

B2t. 19”-23”. Dark yellowish brown (10YR 4/4) when moist; sandy clay loam; moderate to strong, medium, subangular blocky structure; friable; pH 4.6; abrupt, irregular boundary – covers 50% or more of lateral area.

Bm. 23-28”. Olive (5Y 5/3) when moist and fossil casts of strong brown (7.5YR 5/6) massive; extremely firm; pH 4.2; clear-irregular boundary; a mixture of quartz and greensand with fossil casts

B3. 29”-35”. Olive when moist (5Y 5/3) and common, medium, distinct yellowish red (5YR 5/6) mottles: loam; moderate, medium subangular blocky structure; friable; pH 4.1; clear wavy boundary – horizon similar to Bm above except much more friable.

C11. 35”-38”. Light olive brown when moist (2.5Y 5/6) fine sandy loam; structureless to weak, medium, subangular blocky structure; very friable; pH 4.0; clear wavy boundary.

C12. 38”-46”. Olive brown (2.5Y 4/4) when moist and a few, medium brownish yellow (10YR 6/6) mottles; fine sandy loam; weak, medium, subangular blocky structure; very friable; pH 3.9; clear wavy to irregular boundary.

C2. 46-58”. Olive when moist (5Y 5/5) loamy fine sand; structureless to weak, medium, subangular blocky structure; very friable; pH 4.0; gradual wavy boundary.

C3. 58”-. Dark yellowish brown when moist (10YR 4/4) loamy fine sand; weak, coarse, angular blocky structure in place; pH 4.0; has an Fe pan at 70” depth with dark red zones in the pan.

<u>Area</u>: University of Md. Tobacco Farm, Prince George’s County, Md.

<u>Location</u>: 100’ east of south end of Ag. Eng. Flu curing barn.

<u>Native Vegetation</u>; grass

<u>Climate</u>: humid temperate

<u>Parent material</u>: glauconitic (greensand) Coastal Plain sediments

<u>Relief</u>: gently sloping:

<u>Slope</u>: 0-2%

<u>Aspect</u>: North

<u>Drainage</u>: well-drained

<u>Ground water</u>: none to 10’

Remarks: This profile was described and sampled (both loose and “undisturbed” samples were taken and soil monolith was made) by D. S. Fanning, M. Tapper, and J. C. Patterson, June 22, 1965.

See succeeding pages for this description revised according to current, 2020, horizon nomenclature and soil genesis concepts (including awareness now, but not when monolith was collected, that the soil is a post-active acid sulfate soil).

Some of the features of this soil, most notably the casts of shells in the Bqmj horizon, but also the sand-size glauconite pellets, show very clearly that the geologic sediments in which this soil formed were deposited on a sea floor under marine conditions. DSF, 2021.

Soil Description made at the time the soil monolith was collected from the field, shown on previous pages, revised below by DSF, 11/14-15/2020 and subsequently to show current soil horizon nomenclature with which the monolith is presently (2021) labeled with Annapolis soil series name.

Profile Description of Annapolis fine sandy loam

From University of Maryland Tobacco Farm, currently known as UM Southern Maryland Research and Education Farm, off highway Rt. 202, near Upper Marlboro, MD.

Ap, 0-11", 0-28 cm. Pale brown (10YR 6/3) when dry to dark brown (7.5YR 4/2) when moist; fine sandy loam; weak, medium, granular structure: very friable: pH 4.7; abrupt smooth boundary.

E, 11-17", 28-43 cm. Brownish yellow (10YR 6/6) when dry to brown (7.5 YR 4/4) when moist; fine sandy loam; weak, medium, subangular blocky structure; friable; pH 4.5; clear wavy boundary.

EB. 17-19", 43-48 cm. Yellowish brown (10YR 5/8) when dry to dark yellowish brown (10YR 4/4) when moist; fine sandy loam in upper part to sandy clay loam in lower part; moderate, medium, subangular blocky structure; friable; clear wavy boundary; very few black concretions.

Bt. 19-23", 48-58 cm. Dark yellowish brown (10YR 4/4) when moist; sandy clay loam; moderate to strong, medium, subangular blocky structure; friable; pH 4.6; abrupt, irregular boundary – covers 50% or more of lateral area.

Bqmj. 23-28", 58-71 cm. Olive (5Y 5/3) when moist and fossil casts of strong brown (7.5YR 5/6) massive; extremely firm; pH 4.2; clear-irregular boundary; a mixture of quartz and greensand with fossil casts. The j subscript has been added because of the presence of jarosite as observed in some of the shell cast fossils in fragments of this horizon such as in PICS 9, 10, and 11 on pages 10, 11 and 12 of this file.

BC1. 28"-35", 71-89 cm. Olive when moist (5Y 5/3) and common, medium, distinct yellowish red (5YR 5/6) concentrations; loam; moderate, medium subangular blocky structure; friable; pH 4.1; clear wavy boundary – horizon similar to Bqmj above except much more friable.

BC2. 35"-38", 89-96 cm. Light olive brown when moist (2.5Y 5/6) fine sandy loam; massive to weak, medium, subangular blocky structure; very friable; pH 4.0; clear wavy boundary.

BC3. 38"-46", 96-117 cm. Olive brown (2.5Y 4/4) when moist and a few, medium brownish yellow (10YR 6/6 mottles; fine sandy loam; weak, medium, subangular blocky structure; very friable; pH 3.9; clear wavy to irregular boundary.

BC4. 46-58", 117-147 cm. Olive when moist (5Y 5/5) loamy fine sand; massive to weak, medium, subangular blocky structure; very friable; pH 4.0; gradual wavy boundary.

BC5. 58"+, 147 cm+. Dark yellowish brown when moist (10YR 4/4) loamy fine sand; weak, coarse, angular blocky structure in place; pH 4.0; has an Fe pan at 70" depth with dark red zones in the pan.

<u>Area</u>: University of Md. Tobacco Farm, now in 21st century called Southern Maryland Research and Education Center, Prince George's County, Md.

<u>Location</u>: 100' east of south end of Ag. Eng. Flu curing barn. Note by DSF, 11/14/2020. I am not satisfied with location description given here. It seems to me that the direction from the barn should be north, not east. Geographic coordinates of approx. location, where a new pit was made for field trip of

8th IASSC trip to this site was made in 2016 should be obtained. Geographic coordinates for another pit described by Wagner and Fanning in same general area were Approximately 38.858031 north and 76.779382 west as recorded in guide for Mid-Conference field trip for 8th IASSC.

Native Vegetation; grass

Climate: humid temperate

Parent material: Glauconitic, sulfidic sediments of the Aquia Formation of Paleocene age

Relief: gently sloping:

Slope: 0-2%

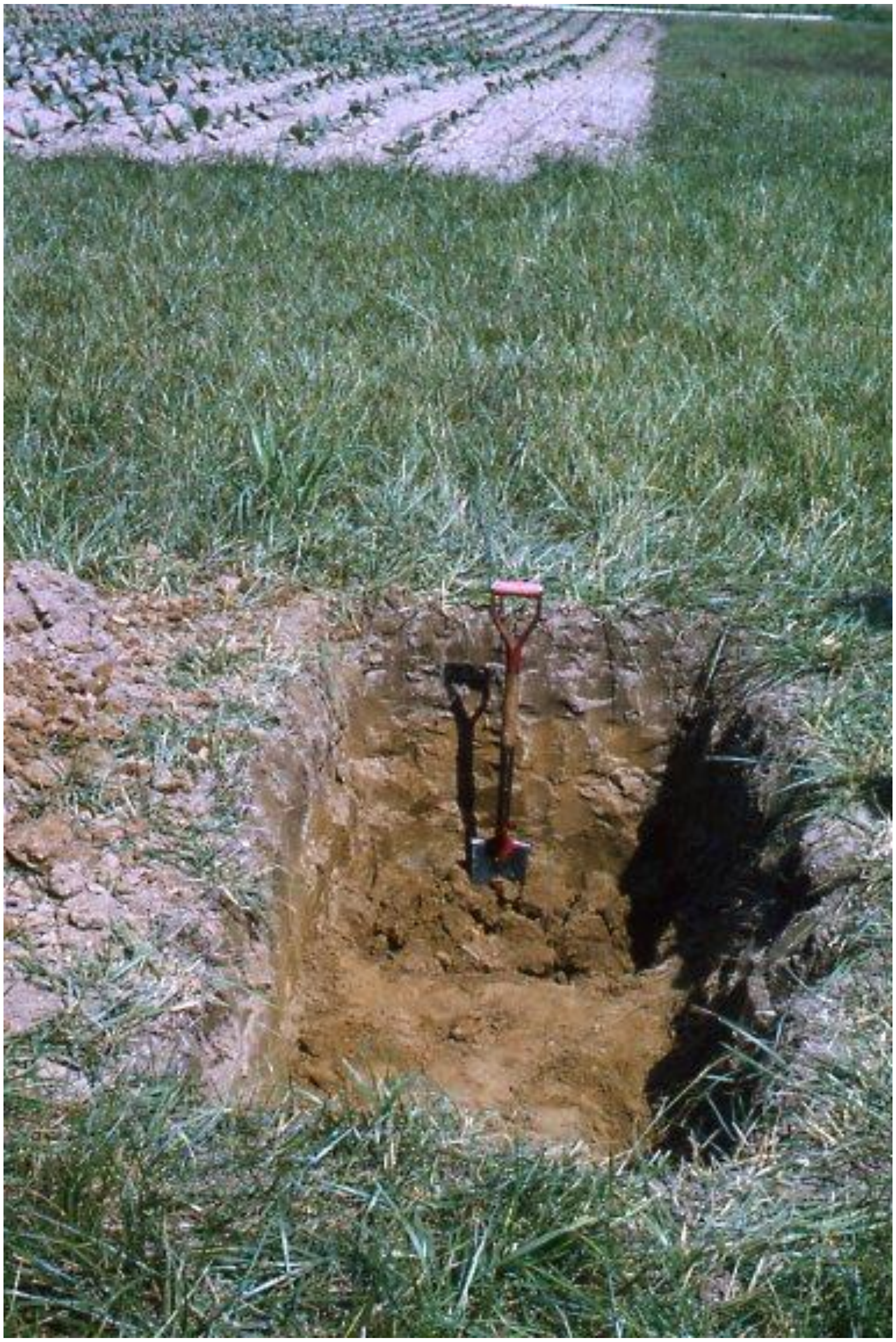
Aspect: North

Drainage: well-drained

Ground water: none to 10'

Remarks: This profile was described and sampled (both lose and "undisturbed" samples were taken) by D. S. Fanning, M. Tapper, and J. C. Patterson, June 22, 1965 and field collection of soil monolith took place on same day.

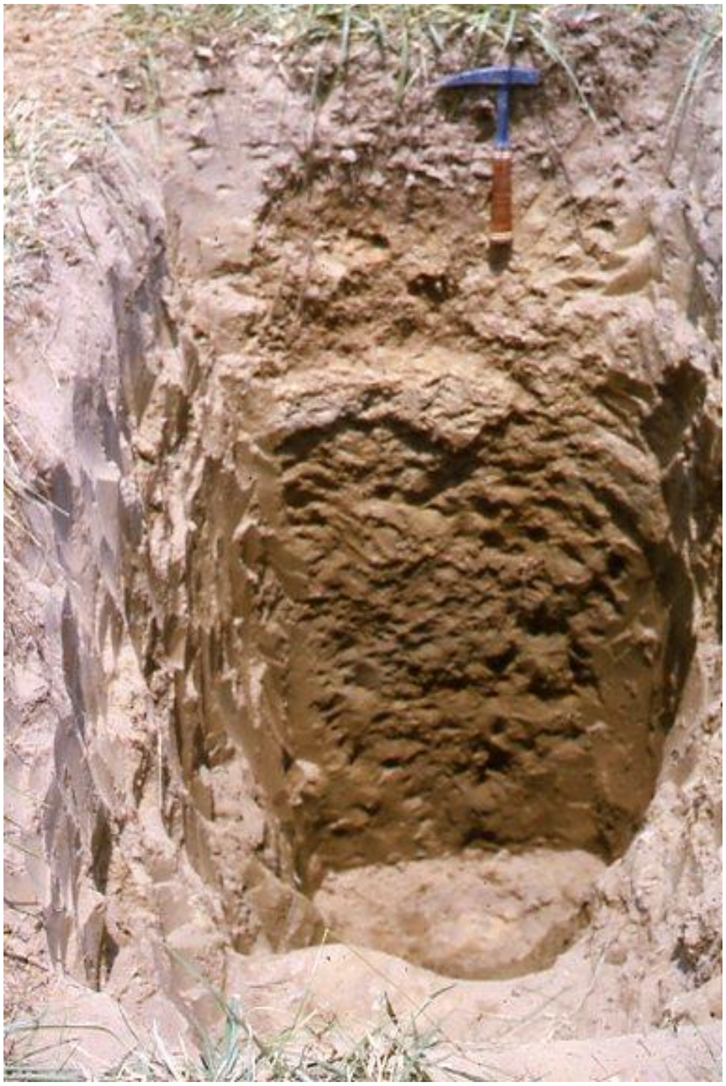
Pictures: See subsequent pages.



PIC 1. Profile in field location of soil sampled as Collington in June, 1965, on UM Tobacco Farm, now (2020) called Southern Maryland Research and Education Center, reclassified in 21st Century because of changes in concept of Collington soil series as Annapolis for which monolith 18 was made in 1965 by Mike Tapper, Jim Patterson and Del Fanning. Fossil casts of shells in the profile are shown in more detail in subsequent pictures.

PIC 2. Silica-cemented zone with casts of shells protruding from soil pit wall in what has become designated as the Bqmj horizon are shown within the soil profile in the field. A large block of this zone (see PIC 5) was taken back to Fanning's lab/office, a picture of which is displayed in Fig. 3 and the zone in monolith is pictured in Fig. 2 of Fanning et al. (2010) paper.

PIC 3. Individual standing in field of UM Tobacco Farm near where pit for monolith's profile was dug and examined in July 1965 in view looking north toward the main buildings on the Farm at the time the monolith was collected.



PIC 4. Another view showing profile pictured in PIC2 to a greater depth. Geologist's hammer gives scale. The deeper horizons were called C horizons in 1965, but they are now considered BC horizons or maybe more appropriately Bw horizons. Jarosite occurs in this post-active acid sulfate soils in the BCqm horizons and in a few other places in the BC horizons that continue down to a depth of about 10 meters where the underlying *sulfidic materials* of dense Cgsi horizons are encountered (si subscript indicates the presence of sulfide minerals, such as pyrite, in the soil material composing the horizon. Commonly a water table is perched on the top of this deep dense zone. Ground water from this zone was used as a water source on the farm. Fanning remembers that sinks in the men's room used to have red iron "oxides" on the porcelain of the sinks and commode that probably came from oxidation and hydrolysis of ferrous sulfate in the water that was piped from the ground water to the sinks. Water in the house-office building on the farm today comes from public water piped to the building. There are health issue concerns about drinking ground water from acid sulfate soils because the sulfide minerals that undergo oxidation can releases sulfur and iron from the sulfide minerals into the water and also other elements such as arsenic that can be detrimental to humans and other organisms.

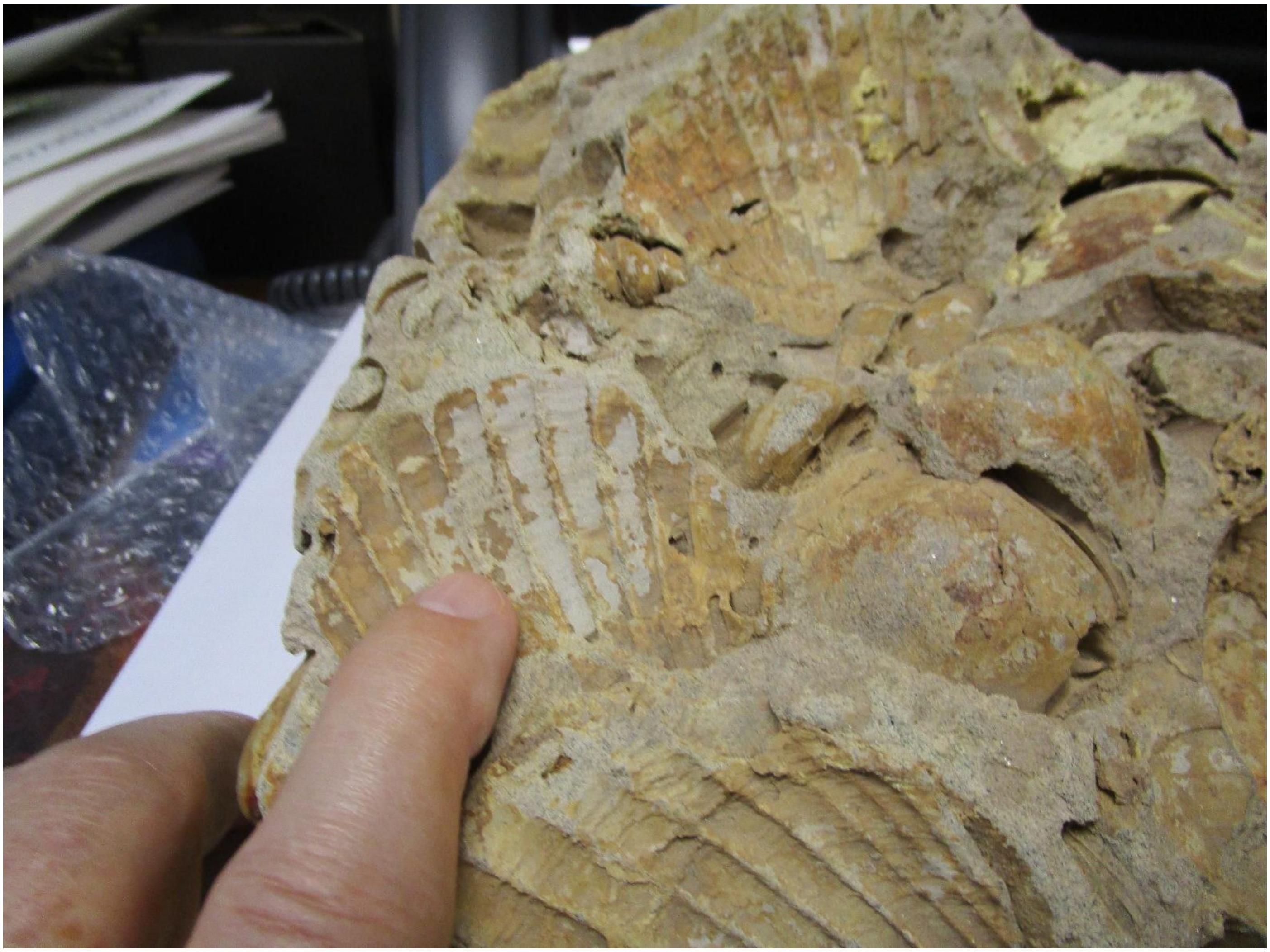
PIC 5. A picture of a large chunk of the silica cemented shell cast zone, horizon Bqmj taken from the profile of the Annapolis soil from which UM monolith no. 18 was made in 1965. This object is stored in Fanning's office (currently, 2022, in Room 0111) in H. J. Patterson Hall of the UM College Park, MD campus. This picture appears as Fig. 3 in the Fanning et al. (2010) paper. The object pictured, in reality, is about 35 cm wide and 22 cm thick. The cementing mineral is Opal-CT, where the CT stands for the SiO_2 mineral cristobalite, a polymorph of quartz, but usually, as here, with much poorer crystallinity than quartz, which as fine sand-size particles is the main mineral in the object, accompanied by fine sand-size glauconite pellets.

The silica doing the cementing was very likely put into solution from silicate minerals in the soil by acid sulfate weathering processes from higher in the soil-geologic column, and caused to precipitate in this zone by a higher pH when the shells were still present. The shells, composed of $CaCO_3$ dissolved and were leached away after the cementation took place, leaving the casts as void space. The pH was likely about 8 when the shells were present, which high pH may have induced the precipitation of the opal. The pH of this zone, in which the mineral jarosite is present on the walls of some of the casts (see PICS 6 and 8) is presently about 4.0. An even lower pH during active sulfuricization induced the precipitation of the jarosite in preference to iron "oxides".

PIC 6. Picture taken with digital camera, 11/3/20 of another fragment from Bqmj horizon showing jarosite, pale yellow mineral (formula $KFe_3(SO_4)_2(OH)_6$) in shell casts. The overall fragment is about 8 inches (20 cm) wide at its base.

The presence of jarosite in this fragment of the Bqmj horizon indicates that this soil material was sulfuricized after this sea-shell-bearing material, that also contained the sulfide mineral pyrite, was raised by tectonic forces out of the sea and exposed to aerobic conditions that caused the sulfides to oxidize and also promoted the oxidation of the iron (Fe) and the hydrolysis of the oxidized form of the Fe to form the jarosite under ultra-acid, sulfuricization, soil conditions. These acid conditions also dissolved silicate minerals, such as glauconite, in the soil, some of which silica in the soil solution precipitated to cause the silica cementation of this zone of the soil. The acid also caused the solution of the shells. The evidence that the shells were ever present are the casts of them that remain. For a description of the sulfuricization process, refer to Chapter 10 of Fanning and Fanning (1989) or other references. Yellow jarosite is Fanning's favorite mineral. In combination with the pH of the soil material in which it is found, jarosite tells him whether the sulfuricization is active and pyrite is still present in the soil material, if the pH is 3.5 or below or whether the sulfuricization is in a post-active stage, as here, where the pH measured in water was 4.2. The pH when the shells, composed of calcium carbonate, were present was likely about 8.2.

PIC 7. Finger points to where brown clay skins are/were present on faces of shell cast surfaces, some now chipped away. The clay presumably eluviated from horizons higher in the profile and illuviated (was deposited) on the surface of the casts.



PIC 8. Close-up of yellow jarosite on walls of shell casts. Picture taken with object on office desk. A portion of telephone on desk shows in upper right hand corner of photo. For scale, fingernail is about 12 mm wide

REFERENCES:

Fanning, D. S. and M. C. B. Fanning. 1989. Soil: Morphology, Genesis and Classification. John Wiley & Sons, New York.

Fanning, D. S., M. C. Rabenhorst, D. M. Ballduff, D. P. Wagner, R. S. Orr and P.K. Zurheide. 2010. An acid sulfate perspective on landscape/seascape soil mineralogy in the U.S. Mid-Atlantic Region. Geoderma 154: 457-464.

Tapper, M. and D. S. Fanning. 1968. Glauconite pellets: Similar X-ray patterns from individual pellets of lobate and vermiform morphology. Clays and Clay Minerals 16: 275-283.view

ADDENDUM: To view the official soil series description for the Annapolis soil series, go to its web site: https://soilseries.sc.egov.usda.gov/OSD_Docs/A/ANAPOLIS.html

UM SOIL MONOLITH NO. 59

CENTRAL AVENUE CAT CLAY ON SCALPED LAND SURFACE IN BELTWAY CLOVERLEAF

By D. S. (Del) Fanning and D. P. (Dan) Wagner

INTRODUCTION. This monolith is one of the first of acid sulfate soils collected for the UM soil monoliths collection. It is of an active acid sulfate soil brought into existence during the construction of the Washington, DC, Beltway that opened in 1966. The term cat clay used for this soil comes from the term used by the Dutch and others for acid sulfate soils back in the 20 century before the term acid sulfate soils became preferred and more heavily used. And with this monolith we have chosen to apply the cat clay term that was originally assigned to this soil

The soils from the site from which the monolith was taken were mapped for the Prince George's County, MD, soil survey report (Kirby et al., 1967) before the Beltway was constructed. The survey report shows the soils as mapped in the survey pre-Beltway with the position of the highway of the Beltway printed on top of the survey map showing the soils mapped in the survey. The soil delineation shown on the survey in the northwest cloverleaf at Central Ave. (Rt. 214) and the Beltway contains the symbol CmB2 to represent the Collington fine sandy loam surface texture phase on a B (2-5%) slope, moderately eroded. In making the monolith it was estimated that 2-3 meters -was scalped (cut) away at the site exposing the sulfides-bearing unoxidized zone of the soil geologic column at the site that underwent oxidation following exposure with the formation of sulfuric acid and ferrous sulfate and a *sulfuric horizon* as defined by current *Soil Taxonomy* to a depth of 30 cm, 12 inches, by the time the monolith was made in 1977. This resulted in the soil being totally unvegetated when the monolith was made, and from earlier observations of the site this lack of vegetation happened almost, if not, immediately after the scalping took place.

CONSTRUCTED BY; This monolith was constructed by undergraduate student Kenneth M. Bounds for his term paper for AGRO 414 in the UM 1977 Fall Semester Soil Morphology, Genesis and Classification course. Permission to dig the soil pit for describing the soil and making the monolith was obtained from the Maryland State Highway Administration by D. S. Fanning and graduate student at that time, Daniel P. Wagner, who described the soil. Samples were collected from the horizons of the soil that were analyzed by Wagner with results published in his dissertation (Wagner, 1982) and in a paper in the SSSA Acid Sulfate Weathering Publication (Wagner et al., 1982) and figures showing some of these results were republished in the Fanning and Fanning (1989) book, Chapter 10. who also published a picture of the profile of the soil for which the

monolith was made, Plate 4B of that book. We hope to add that or a similar picture of the profile and a landscape picture showing the lack of vegetation on this site at the time the monolith was made. The site has subsequently become naturally vegetated of which we would like to add a picture of that.

DESCRIPTION OF MONOLITH SOIL PROFILE, FROM DAN WAGNER'S PH.D. DISSERTATION (Wagner, 1982)

Central Avenue Acid Sulfate Soil

Pedon S77MD16-1
Unnamed 30 c
Typic Sulfaquept, fine-loamy, mixed, mesic

Horizon	Depth (cm)	Properties
Bw	0-6	Dark yellowish brown (10YR 4/4) sandy clay loam; weak, medium platy structure; friable to very friable; pH 3.0; abrupt smooth boundary
BCj	6-20	Dark olive gray (5Y 3/2) sandy clay loam; many medium distinct pale yellow (5Y 7/3 to 5Y 7/4) jarosite mottles, and many medium distinct strong brown (7.5YR 5/6) and dark reddish brown (5YR 3/4) mottles; moderate medium platy structure; mottles mainly on plate faces; very fine clusters of gypsum crystals on plate faces; friable; pH 2.8; clear smooth boundary
BC	20-30	Dark olive gray (5Y 3/2) gravelly sandy clay loam; many medium distinct reddish brown (5YR 4/4) and many medium faint olive gray (5Y 4/2) mottles; massive with tendency to platy structure; friable; pH 2.6; abrupt smooth boundary
Cg	30-60+	Black (5Y 2.5/1 to 5Y 2.5/2) sandy clay loam; common to many partially decomposed shell fragments having pinkish gray (5YR 7/2), light gray (5YR 7/1, and variably iridescent colors apparently from opal that lines shells; massive with tendency to platy structure; firm but friable in upper 5 cm; pH 6.3 in upper part to 6.6 in lower level

Location: Prince Georges County, Maryland; intersection of Capital Beltway (I 495) and Central Avenue (MD 214) within northwest loop of cloverleaf
Vegetation: None
Parent Material: Glauconitic, sulfidic sediments of the Monmouth Formation of Upper Cretaceous age
Physiography: Upland; graded excavation with original natural surface removed (2-3 m)
Elevation: 33 m
Slope: 5%, southern aspect
Drainage: Moderately well to well
Permeability: Moderate in B horizon, slow in C
Moisture: Moist
Groundwater: Below 2 m

Described by: D.P. Wagner and D.S. Fanning, 11/1/77

DESCRIPTION OF MONOLITH 59 SOIL PROFILE, UPDATED BY DSF, 11/24/2021, FROM DAN WAGNER'S PH.D. DISSERTATION (Wagner, 1982)

Central Avenue Acid Sulfate Soil

Pedon S77MD16-1
Unnamed
Typic Sulfudept, fine-loamy, mixed, mesic

Horizon	Depth (cm)	Properties
Bw	0-6	Dark yellowish brown (10YR 4/4) sandy clay loam; weak, medium platy structure; friable to very friable; pH 3.0; abrupt smooth boundary
BCjy	6-20	Dark olive gray (5Y 3/2) sandy clay loam; many medium distinct pale yellow (5Y 7/3 to 5Y 7/4) jarosite, and many medium distinct strong brown (7.5YR 5/6) and dark reddish brown (5YR 3/4) redox concentrations; moderate medium platy structure; redox concentrations mainly on plate faces; very fine clusters of gypsum crystals on plate faces; friable; pH 2.8; clear smooth boundary
BC	20-30	Dark olive gray (5Y 3/2) gravelly sandy clay loam; many medium distinct reddish brown (5YR 4/4) redox concentrations and many medium faint olive gray (5Y 4/2) redox depletions; massive with tendency to platy structure; friable; pH 2.6; abrupt smooth boundary
Cg	30-60+	Black (5Y 2.5/1 to 5Y 2.5/2) sandy clay loam; common to many partially decomposed shell fragments having pinkish gray (5YR 7/2), light gray (5YR 7/1, and variably iridescent colors apparently from opal that lines shells; massive with tendency to platy structure; firm but friable in upper 5 cm; pH 6.3 in upper part to 6.6 in lower level

Location: Prince Georges County, Maryland; intersection of Capital Beltway (I-495) and Central Avenue (MD 214) within northwest loop of highway cloverleaf. Should try to get GPS coordinates of approximate location
Vegetation: None at time of soil description in 1977. However, the site has now been vegetated for several years at time this description was updated in 2021.
Parent Material: Glauconitic, sulfidic sediments of the Monmouth Formation of Upper Cretaceous age. *Sulfidic material* by *Soil Taxonomy*.
Physiography: Upland; graded excavation with original natural surface removed (2-3 m)
Elevation: 33 m
Drainage: Moderately well to well
Permeability: Moderate in B horizon, slow in C
Moisture: Moist
Groundwater: Below 2 m
Described by: D.P. Wagner and D.S. Fanning, 11/1/77

Added comments, 2021. The pH was presumably measured with a glass electrode in an approximately 1:1 soil/distilled water ratio. The zone from 0-30 cm constitutes a *sulfuric horizon* as that term is defined in current *Soil Taxonomy*.
A photo of the soil profile of the soil for which the monolith was made appears as Plate 3B in the Fanning and Fanning textbook (Fanning and Fanning, 1989) and data on the pH and total S and sulfate S with depth in the profile are presented in Figures 10.3 and 10.4 of that book

REFERENCES:

Fanning, D. S. and M. C. B. Fanning. 1989. Soil: Morphology, Genesis and Classification. John Wiley and Sons, New York. 395 pages.

Kirby, Robert M., Earle D. Matthews, and Moulton A Bailey. 1967. Soil Survey of Prince George's County, Maryland. USDA Soil Conservation Service in cooperation with Maryland Agricultural Experiment Station. U.S. Government Printing Office, Washington, DC.

Wagner, D. P. 1982. Acid sulfate weathering in upland soils of the Maryland Coastal Plain. Ph.D. Dissertation, University of Maryland, College Park, MD. Dissertation Abstracts Int. 44 (6, Dec., 1983: 1681B).

UM SOIL MONOLITH NO. 115

ACID SULFATE SOIL WITH SILICA CEMENTATION ON MUDDY CREEK ROAD, RT. 426, ROADCUT IN ANNE ARRUNDEL COUNTY MD

By Del Fanning and Barret Wessel

INTRODUCTION:

Information on this soil monolith has been recorded in detail by Wessel et al. (2017), who made the monolith and studied the soil for which it was constructed. An electronic reprint of that paper is available from its senior author. Much of the information in this document is based on and supported by this article.

Figure above is adapted from Figure 1 of the Geoderma article. It shows an image of the monolith 115 on the left and a picture of the soil profile from which it was taken on the right.

This soil is unusual not only because of the silica cementation that occurs in it, those horizons with qm subscripts in the horizon nomenclature symbols, but that this cementation occurs within the part of the profile that contains sulfides, those horizons with se subscripts. This likely means that this cementation occurred before these horizons acidified such that the yellow mineral jarosite formed within them. The dissolved silica in the soil solution that precipitated to form the opal-CT silica cementation likely was released into solution by acidification from silicate minerals that occurred in soil higher in the geologic column that no longer exists because it was eroded or scalped away to create the present soil surface.

MONOLITH CONSTRUCTED BY: Barret M. Wessel, Jaclyn C. Fiola and M. C. Rabenhorst. Sampling and construction started in Fall semester, 2015, as part of a term paper project for UM soil morphology, genesis and classification course, ENST 414, but continued as part of a research project by the authors of the Wessel et al. (2017) paper.

SOIL DESCRIPTION: The description provided below is an updated one from Table 1 of the Wessel et al. (2017) paper.

Soil morphological description at field site where the soil monolith was collected. Final pH values were taken after four months of moist aerobic incubation. (G) refers to ground and (UG) to unground samples that were incubated. Horizon nomenclature is provided for both a lithic contact interpretation and a pedogenic interpretation of the silica-cemented (qm subscripts) layer.

Horizon (lithic)	Horizon (pedogenic)	Depth (cm)	Description	Initial pH	Final pH	Δ pH
A	A	1-6	5Y 4/2 dark grayish brown fine sandy loam; moderate granular structure, 45% of sands are glauconite pellets, abrupt smooth boundary.	4.2	3.6	0.6
Rjse1	Bjseqm1	6-15	Lithic contact/silica-cementation with many prominent jarosite concentrations, fragmental, clear smooth boundary.	4.2 (UG) 4.8 (G)	3.3 (UG) 2.8 (G)	0.9 (UG) 2.0 (G)
Rjse2	Bjseqm2	15-47	Lithic contact/silica-cementation with many prominent jarosite concentrations; higher color value than above horizon, fragmental, clear smooth boundary.	3.6 (UG) 4.3 (G)	3.1 (UG) 3.7 (G)	0.5 (UG) 0.6 (G)
Bjse1	Bjse1	47-65	2.5Y 4/1 dark gray sandy loam; weak subangular blocky structure; common prominent jarosite intercalations	3.0	1.7	1.3
Bjse2	Bjse2	65-80	2.5Y 3/1 very dark gray sandy loam; weak subangular blocky structure; common prominent jarosite and iron oxide intercalations	2.9	2.2	0.7
Cse	Cse	80-108	2.5Y 2.5/1 black sandy loam; massive structure	5.5	1.9	3.6

LOCATION: The site from which the monolith was collected occurred at the top of a deep roadcut made when the highway. MD Rt. 426, was reconstructed in about 1960. The geographic coordinates for the site are (38°53′08.51″N, 76°34′08.06″W). The site is on the east side of Muddy Creek Road, about 50 meters north of where Mill Swamp Road from the west has its east end at Mill Swamp Road.

REFERENCES:

Wessel, B. M., J. C. Fiola, and M. C. Rabenhorst. 2017. Soil morphology, genesis, and monolith construction of an acid sulfate soil with silica cementation in the US Mid-Atlantic Region. Geoderma 208: 260-269.

Final Editors' Comment for this issue. The document on the three acid sulfate soil monoliths ends above. A section on labeling of the monolith is only included with Monolith 18. It demonstrates our Word program for labeling the monoliths. Labels for individual horizons are cut out of a printed version and glued on the monoliths in appropriate locations. Monolith 18 has many photo images, made in part by scanning old Kodachrome slides, digital cameras were not available when that monolith was made in 1965. Monolith 57 has no photo images as Kodachrome slides of it by Fanning and Wagner exist we think and we may go back and add these to the write up, after digital scanning, for storing with the files of that monolith at a future date. Places where images of that profile are mentioned in the text about it.

Regarding the plans for MAPSS field day and Association meeting in August, 2022, inserted below is a message from Ben Marshall, MAPSS 2022 President.

Yes, we are planning on a hemp and soil health field day, in person, probably the 3rd week of August. We haven't set a day yet. The plan is to have a field day, and then a business meeting afterwards, with food (possibly catered food).

Barry G. is assisting me in getting permission to the property and we plan to go out for a day to see the farm in the next couple of weeks. Its called Fingerboard Farm near Urbana. - Local & Online CBD Shop, https://fingerboardfarm.market/pages/meet-farmher-dawn-gordan

We hope to have a couple of speakers, maybe something on hemp production, and then carbon sequestration from the roots of the plant.

There will be a limit of 35 cars at the farm. (So we might need to limit the number of people attending the field day), Ben