

**VIRGINIA MUSEUM OF NATURAL HISTORY**  
**Board of Trustees Research and Collections Committee**

Saturday, May 15, 2021

9:00-9:45 a.m. via Zoom meeting

## **A G E N D A**

- Call to order: **Dr. Art Evans**
- Roll Call: Dr. Art Evans, Dr. Tom Benzing, Dr. Carole Nash, Lisa Moerner, Melany Stowe
- February 2021 Research and Collections Committee meeting minutes (action item)
- January-March 2021 acquisitions (action item)
- Update on repatriation of Guatemalan artifacts: **Dr. Hayden Bassett**
- Update on recent research and discoveries in VMNH myriapodology: **Dr. Jackson Means**
- Other business: **Dr. Art Evans**
- Adjourn: **Dr. Art Evans**

***The mission of the Virginia Museum of Natural History:***

*To interpret Virginia's natural heritage within a global context in ways that are relevant to all citizens of the Commonwealth.*

**VIRGINIA MUSEUM OF NATURAL HISTORY BOARD OF TRUSTEES  
MINUTES OF THE RESEARCH AND COLLECTIONS COMMITTEE MEETING  
Feb. 13, 2021**

Present at the online meeting were Dr. Art Evans, Dr. Tom Benzing, Dr. Carole Nash, Lisa Moerner, Melany Stowe, Dr. Nancy Moncrief, Dr. Kal Ivanov, Dr. Adam Pritchard, Dr. Hayden Bassett, Dr. Jackson Means, Zach Ryder, and Ben Williams.

- Committee Chairman Dr. Art Evans called the meeting to order.
- The minutes were unanimously approved by the committee.
- Due to the meeting taking place online, the new acquisitions sign-off sheet was distributed to committee members electronically. Ben Williams will submit the sheet to VMNH Registrar Jill Harris once all signatures have been collected.
- The committee moved to recommend to the Board of Trustees that Dr. Katherine Harrell be made a Research Associate. According to Dr. Hayden Bassett, Dr. Harrell specializes in conflict studies and satellite imagery analysis and intends to attend the University of Virginia's law school to specialize in cultural heritage law. As such, Dr. Bassett said, her skills will be an asset to the VMNH archaeology department's Cultural Heritage Monitoring Lab.
- The committee moved to recommend to the Board of Trustees that Dr. Michael F. Johnson's appointment as a Research Associate be renewed for an additional five-year period. Dr. Hayden Bassett said that Dr. Johnson is well-known for his work at Cactus Hill, one of the oldest archaeological sites on the east coast, and is since retired and devoting his time to his research. Dr. Carole Nash added that she has been a colleague of Dr. Johnson's for about 35 years and he's a strong advocate of citizen science.
- The committee moved to recommend to the Board of Trustees that Paul E. Olsen's appointment as a Research Associate be renewed for an additional five-year period. Dr. Adam Pritchard said that Olsen is a prolific collector of fossils along the eastern seaboard who contributed many specimens to VMNH in the early days of the institution, and he's also a former winner of The Thomas Jefferson Award.
- Dr. Hayden Bassett provided an update on the repatriation of Guatemalan artifacts that the museum acquired in 2017, several of which date to the classical Mayan period. Bassett said that VMNH has four options for the future repatriation, two of which are actively being pursued concurrently. The first plan is for Dr. Bassett and Dr. Joe Keiper to meet with a contact at the Guatemalan embassy in Herndon, Va. to discuss the possibility of a direct transfer of the collections to the embassy. That meeting is scheduled for the week of Feb. 15. The second option which is actively being pursued is to work with one of Dr. Carole Nash's contacts at the Smithsonian to see if the Smithsonian can serve as a liaison between VMNH and Guatemala's museum of archaeology. The third option — which is not actively being pursued at this time — is to travel to Guatemala and hand off the artifacts directly. Finally, the fourth option — which also is not currently being pursued — is to donate the artifacts to a Virginia museum, such as Norfolk's Chrysler Museum, which already has a number of

Guatemalan artifacts. Dr. Bassett said an update on these plans will be available the week of Feb. 15.

- Dr. Art Evans asked the curators to detail some of the highlights of their work over the last quarter, which follow below.
- Dr. Nancy Moncrief said that she has submitted a paper to the Journal of Mammalogy. The paper, which is a collaboration between Dr. Moncrief, Dr. Kal Ivanov, and Liberty Hightower, concerns healed bone fractures in tree squirrels. Additionally, Dr. Moncrief said that she gave a presentation at Waynesboro's Wayne Theatre and a presentation to Dr. DB Poli's class at Roanoke College. Recorded versions of these presentations will be used by the VMNH Education Department to assist in teacher redevelopment.
- Dr. Adam Pritchard said that he and Dr. Nancy Moncrief have been working with Dr. Ray Bernor on an initiative to establish a functional trait database on the evolution of various animals. VMNH will contribute to this database data from research projects that involve collections of functional data from underrepresented groups of animals. Dr. Pritchard added that his monograph description of an extinct gliding reptile from the family Weigeltisauridae should be published in PeerJ within the next month.
- Dr. Kal Ivanov said that museum staff are nearing completion of the VMNH genetics lab. Ivanov added that he has been teaching online courses at Hampton University during the pandemic. The virtual classes, Ivanov said, are a unique benefit of the pandemic since museum staff are generally unable to teach courses directly.
- Dr. Jackson Means, who was formerly a collections assistant and was recently hired as the museum's myriapodologist, discussed his work in invertebrate collections. Dr. Means said that getting to work in the late Dr. Richard Hoffman's millipede collections has been a dream come true. Dr. Means said that he has managed to add data on more than 22,000 specimens to a spreadsheet that will eventually be made available to researchers and the public. He added that the museum's collections contain nearly 400 millipede type specimens, more than 600 undescribed species, and roughly 200 undescribed genera. Dr. Means also discussed a paper that was recently published in Banisteria. The paper, which was a collaboration between Dr. Means, Dr. Kal Ivanov, and Ben Williams, concerns a second population of the rare millipede *Apheloria whiteheadi* that was discovered on Williams' property.
- Dr. Hayden Bassett said that he has offered several presentations over the last few months, including a presentation to the Martinsville/Henry County Historical Society and a Zoom presentation in Jamaica. Additionally, Dr. Bassett said that the museum has finalized an MOU with the Smithsonian for the establishment of the VMNH Cultural Heritage Monitoring Lab, which will report directly to UNESCO with its findings. Dr. Bassett said that the archaeology department has also officially begun the Smith River Survey, the first steps of which will involve using ground penetrating radar to target specific areas for impact analysis and opportunistic research. In addition, Dr. Bassett said that his department has received a new grant for a project involving Waller's Ford, an important local American Revolution site.
- Dr. Kal Ivanov mentioned that the former invertebrate paleontology lab is being converted into a shared lab that can be used by museum staff, visiting researchers, and students.
- Dr. Hayden Bassett said that a second shared lab is being created in the former Distance Learning Lab. This lab will become the VMNH Stem Lab and feature a GIS

setup, a 3D printer, imaging stations, digital microscopes, and other items that will aid the museum in the long-term goal of digitizing collections. Dr. Adam Pritchard added that an additional goal is to have a large monitor in the lab facing the visitors in the Hall of Ancient Life. The monitor will be regularly updated with information about VMNH research activities.

- Dr. Tom Benzing said that given the museum's recent efforts to reach out to the public through social media and online presentations, it would be useful to find a way to capture this outreach data and incorporate it into future committee reports. Ben Williams agreed and said he would try to incorporate that data in the future.
- Dr. Tom Benzing moved to adjourn the meeting and the vote was seconded by Dr. Carole Nash. The motion passed unanimously.

**JANUARY-MARCH 2021 VMNH ACQUISITIONS FOR APPROVAL BY BOARD OF TRUSTEES RESEARCH AND COLLECTIONS COMMITTEE**

<b>RIM* No.</b>	<b>Collector/Donor</b>	<b>Date at VMNH</b>	<b>VMNH Dept.</b>	<b>Quantity</b>	<b>Description</b>	<b>Method</b>	<b>To Be Accessioned (Y/N)</b>
RIM 01-2021	Zachary Ryder	01/07/2021	DEPP	1	juvenile snake (copperhead?)	SALVAGE	No. Will be used for educational programming.
RIM 02-2021	Radford University (Karen Powers)	02/09/2021	RECENT INVERTEBRATES	28 vials	isopropyl preserved invertebrates (millipedes, centipedes, immature insects)	GIFT	Yes
RIM 03-2021	Hampton University (Shawn Dash)	11/19/2020	RECENT INVERTEBRATES	493	ants (189 ethanol preserved & 304 pinned)	GIFT	Yes
RIM 04-2021	Joe B. Keiper	01/15/2021	MAMMALOGY	1	Woodland Vole ( <i>Microtus pinetorum</i> )	SALVAGE	Yes
RIM 05-2021	Chesapeake Marshlands NWR (Matt Whirtbeck)	02/03/2021	MAMMALOGY	1	mink ( <i>Neovison vison</i> )	TRANSFER	Yes
RIM 06-2021	Liberty Hightower	02/28/2021	ORNITHOLOGY	4	Cedar Waxwing (2), Eastern Screech Owl, American Robin	SALVAGE	Yes
RIM 07-2021	John, Ann, and Jozie Favero	02/10/2021	PALEONTOLOGY	6	chert nodules containing invertebrate fossils	GIFT	Yes
RIM 08-2021	J. Quincy Davenport	01/20/2021	ORNITHOLOGY	10	Am. Wood Duck, Mallard (4), Canada Goose (5)	GIFT	Yes
RIM 09-2021	USDA-APHIS (Jennifer Cromwell)	03/11/2021	ORNITHOLOGY	20	Black Vulture (4), Ring-billed Gull, Laughing Gull (15)	GIFT	Yes

\*RIM is an acronym for the Record of Incoming Material form

**JANUARY-MARCH 2021 VMNH ACQUISITIONS FOR APPROVAL BY BOARD OF TRUSTEES RESEARCH AND COLLECTIONS COMMITTEE**

<b>RIM* No.</b>	<b>Collector/Donor</b>	<b>Date at VMNH</b>	<b>VMNH Dept.</b>	<b>Quantity</b>	<b>Description</b>	<b>Method</b>	<b>To Be Accessioned (Y/N)</b>
RIM 10-2021	Trevor Clarke	03/09/2021	PALEONTOLOGY	19	Deinosuchus and Hadrosauridae: teeth, vertebrae and phalanx; Trionychidae shell piece	GIFT	Yes
RIM 11-2021	Trevor Clarke	03/09/2021	PALEONTOLOGY	6	partial fish skeleton, partial turtle skeleton, 5 trays of microvertebrate samples	GIFT	Yes
RIM 12-2021	Linwood Clarke	03/09/2021	PALEONTOLOGY	13	bone, dentary, and/or teeth whale, pinniped, peccary, fish, dolphin	GIFT	Yes
RIM 13-2021	Trevor Clarke	03/09/2021	PALEONTOLOGY	23	fish premaxilla and dentary; whale periotic bone; 20 coprolites	GIFT	Yes
RIM 14-2021	Trevor Clarke	03/09/2021	PALEONTOLOGY	42	fish skeleton in shale; 10 siltstone slabs w/bivalve shells/plants; 12 sandstone slabs w/bones; 20 sandstone pcs w/bones/teeth	FIELD	Yes

\*RIM is an acronym for the Record of Incoming Material form

**JANUARY-MARCH 2021 VMNH ACQUISITIONS FOR APPROVAL BY BOARD OF TRUSTEES RESEARCH AND COLLECTIONS COMMITTEE**

VMNH Collections Committee and Executive Director have Approved Recent Acquisitions: RIM 01-2021 through RIM 14-2021

VMNH Board of Trustees Research & Collections Committee Review of Acquisitions: RIM 01-2021 through RIM 14-2021

Arthur V. Evans, Chair

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(signature) Arthur V. Evans, Chair

\_\_\_\_\_  
Date

Thomas R. Benzing

\_\_\_\_\_  
(signature) Thomas R. Benzing

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Date

Lisa C. Moerner

\_\_\_\_\_  
(signature) Lisa C. Moerner

\_\_\_\_\_  
Date

Carole L. Nash

\_\_\_\_\_  
(signature) Carole L. Nash

\_\_\_\_\_  
Date

Melany Stowe

\_\_\_\_\_  
(signature) Melany Stowe

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Date

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(signature)

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Date

**VIRGINIA MUSEUM OF NATURAL HISTORY  
RESEARCH AND COLLECTIONS EXECUTIVE SUMMARY**

**January-March 2020**

VMNH Research and Collections staff spent the first three months of 2021 revising new publications, performing field work, and preparing for future museum offerings.

Dr. Kal Ivanov and Dr. Jackson Means had a new paper published in *Banisteria* titled “The discovery of a second population of the microendemic *Apheloria whiteheadi* (Shelley, 1986), a state-listed threatened species for Virginia.” In addition, Dr. Nancy Moncrief is nearing the completion of three separate papers, while Dr. Adam Pritchard publication concerning the ancient gliding reptile *Weigeltisaurus* should see publication in the next quarter.

Dr. Hayden Bassett and staff archaeologist Madeleine Bassett, meanwhile, have been conducting a large amount of field work in Stanleytown as part of their two-year Smith River Survey and have already uncovered two archaeological sites.

VMNH staff member have also been busy creating new experiences for guests. The new exhibit “Butterflies and moths around the world” opened to the public in early March. Also in March, staff began planning the Treasures from the Vault Drive-Thru Show, which took place in Waynesboro on May 1.

**Dr. Nancy Moncrief**

- Dr. Moncrief continued working with several colleagues on three manuscripts. The topics are as follows: 1) armadillos in Virginia, 2) skeletal injuries in tree squirrels, and 3) mammals that occur on the Virginia barrier islands.
- Dr. Moncrief worked with other VMNH staff to prepare a grant proposal for submission to the National Science Foundation
- Dr. Moncrief presented results of her research at the (virtual) annual conference of the Virginia Chapter of The Wildlife Society

**Dr. Kal Ivanov**

- Dr. Ivanov and colleagues’ manuscript “The discovery of a second population of the microendemic *Apheloria whiteheadi* (Shelley, 1986), a state-listed threatened species for Virginia” was recently published at *Banisteria*.
- Dr. Ivanov, Clemson University graduate student and VMNH Research Associate Curt Harden, and VMNH Biology Technician Liberty Hightower presented research findings at the [virtual] annual meeting of the Entomological Society of America – Eastern Branch.
- Dr. Ivanov and Virginia Tech graduate student Morgan Malone presented research findings at the monthly meeting of the Virginia Department of Conservation and Recreation – Division of Natural Heritage.

### **Dr. Adam Pritchard**

- Dr. Pritchard resubmitted his monographic description of the gliding *Weigeltisaurus* from the journal *PeerJ* in Q1 2021. It is near acceptance and should be published in Q2 2021.
- Dr. Pritchard co-authored a publication submitted to the journal *Papers in Palaeontology* with an international team of researchers. Led by Virginia Tech paleontologist Sterling Nesbitt, the paper details the discovery of monitor lizard-like reptiles from Triassic fossil sites in the southwestern United States and India.
- Dr. Pritchard continued his collaboration with Research Associate Ray Bernor and VMNH curator Nancy Moncrief on the FuTRES 2 NSF proposal, refining the role of the VMNH in the proposal. The VMNH component of the proposal would fund paid student internships in paleontology at the museum for three years. Submission is anticipated in Q2 2021.

### **Dr. Hayden Bassett**

- In early March, Dr. Bassett served as a keynote speaker at the annual conference of the Virginia Association of Museums. His presentation, titled “Museums as Global Cultural Protectors: The Modern-Day Monuments Men and the Cultural Heritage Monitoring Lab at VMNH,” detailed VMNH’s new Cultural Heritage Monitoring Lab (CHML).
- Beginning in March, Dr. Bassett completed archaeological fieldwork at the first site in the Smith River Survey (a 2-year VMNH archaeological survey of the Smith River in Henry County, VA). Dr. Bassett and VMNH staff archaeologist Madeleine Gunter Bassett excavated 36 test pits, uncovering two archaeological sites: one dating to the terminal Late Woodland (AD 1200-1450), the other dating to the Early to Middle Archaic (7,500-6,100 BC).
- In April, Dr. Bassett and VMNH staff archaeologist Madeleine Gunter Bassett presented new archaeological predictive models they developed in their study of SW Virginia at the Society for American Archaeology (SAA) conference. Their presentation, titled “Late Woodland Settlement and Subsistence in the Southern Piedmont of Virginia: A Geospatial Analysis and Archaeological Synthesis of the Smith River Valley” was presented virtually over the course of 3-days, to an international audience of between 6000-7000 participants.

**VIRGINIA MUSEUM OF NATURAL HISTORY  
RESEARCH AND COLLECTIONS ACTIVITIES**

**Report to the Board of Trustees  
January-March 2021**

**Kaloyan Ivanov, Ph.D.  
Associate Curator of Invertebrate Zoology**

- Dr. Ivanov and colleagues' manuscript "The discovery of a second population of the microendemic *Apheloria whiteheadi* (Shelley, 1986), a state-listed threatened species for Virginia" was recently published at *Banisteria*.
- Dr. Ivanov and colleagues' have a manuscript in review at the American Society of Mammalogists periodical *Journal of Mammalogy*.
- Dr. Ivanov, Clemson University graduate student and VMNH Research Associate Curt Harden, and VMNH Biology Technician Liberty Hightower presented research findings at the [virtual] annual meeting of the Entomological Society of America – Eastern Branch.
- Dr. Ivanov and Virginia Tech graduate student Morgan Malone presented research findings at the monthly meeting of the Virginia Department of Conservation and Recreation – Division of Natural Heritage.
- Dr. Ivanov and colleagues submitted abstracts for the upcoming [virtual] meetings of the American Society of Mammalogists and the Southwestern Association of Naturalists.
- Drs. Ivanov and Keiper oversaw the acquisition and transport of James Madison University's invertebrate collection to VMNH.
- Dr. Ivanov presented a public talk at Wayne Theatre's Signature Speaker Series.
- Dr. Ivanov joined the Editorial Board of MDPI's periodical *Insects*.
- Dr. Ivanov began work as the new Copy Editor for the Virginia Natural History Society's periodical *Banisteria*.

**Research & Collections**

VMNH Myriapodologist Dr. J. Means, VMNH Administrator of Science B. Williams, and Dr. Ivanov's manuscript on the recent discovery of a second population of the rare Laurel Creek millipede, *Apheloria whiteheadi*, was published at the Virginia Natural History Society's periodical *Banisteria*.

[Means, J. C., K. Ivanov, and B. R. Williams. 2021. The discovery of a second population of the microendemic *Apheloria whiteheadi* (Shelley, 1986), a state-listed threatened species for Virginia. *Banisteria* 55: 9–17]

VMNH Curator of Mammals Dr. N. Moncrief, VMNH Biology Technician L. Hightower, Georgia College & State University faculty Dr. A. Mead, and Dr. Ivanov are currently revising their manuscript "Skeletal injuries in two North American tree squirrels (*Sciurus niger* and *S. carolinensis*)" which is in review at *Journal of Mammalogy*. This research will also be presented at the upcoming [virtual] annual meeting of the American Society of Mammalogists.

VMNH Research Associate and Clemson University graduate student C. Harden, L. Hightower, and Dr. Ivanov presented research findings at the [virtual] annual meeting of the Entomological Society of America – Eastern Branch regarding their ongoing project on the efficiency of two subterranean trap designs for targeting hypogaeic invertebrate taxa in the eastern US. Preliminary findings indicate that these techniques are effective at sampling hypogaeic ants and beetles, including rare species not captured by traditional methods. This research currently is being extended into a manuscript for publication. (March 22-24)

Dr. Ivanov and Virginia Tech graduate student Morgan Malone presented research findings at the monthly meeting of the Virginia Department of Conservation and Recreation – Division of Natural Heritage regarding their work on the Ants of Virginia Project and the distribution of the invasive red imported fire ant, *Solenopsis invicta*, in Virginia. The presentations were followed by a Q&A and a short brainstorming session aimed at developing strategies for early detection, and improved monitoring of *Solenopsis invicta* in Virginia. (February 1)

Drs. Dash, Zhuang, and Ivanov continued work on a project focused on the ant diversity of the Chihuahuan Desert. The project, based on data generated by Hampton University and University of Texas at El Paso students involved in Hampton University's BIO 408, is the first comprehensive account of the ant fauna of North America's largest warm desert. Although numerous myrmecological studies have focused on the deserts of the American Southwest, to date, limited coverage has been offered to the ant fauna of the Chihuahuan Desert. Preliminary data will be presented at the 68<sup>th</sup> [virtual] annual meeting of the Southwestern Association of Naturalists in late April. This work currently is being extended into a manuscript for publication

Myriapodologist (millipede expert) Dr. Jackson Means began work in the Department of Recent Invertebrates on January 4, 2021. The purpose of this newly established position is to complement the Associate Curator of Recent Invertebrates in conducting research, inventorying and databasing specimens, writing reports and scholarly articles, and performing field and laboratory work with a strong focus on millipedes continuing the museum's strong reputation in millipede research.

Drs. Means and Ivanov initiated research projects in collaboration with researchers from Hampden-Sydney College, Virginia Tech, U of Alabama, and Virginia DCR – Natural Heritage. The "Troglitic Millipedes Project" will focus on the endemic, cave-adapted *Pseudotremia* and *Zygonopus* millipedes of the eastern US, while the "*Nannaria incertae sedis*" project will target a number of known, but currently undescribed, members of the xystodesmid genus *Nannaria*. Field work for these projects began in early March and is ongoing.

Dr. Ivanov and L. Hightower completed the identification and curation of 4,063 ant specimens from various Delaware, Maryland, and Virginia localities as part of an ongoing project with Dr. S. Dash and colleagues on the ant diversity of the Delmarva Peninsula. Eight of the 45 ant taxa identified in this study were not previously known from the Delmarva Peninsula. Three hundred and four mounted specimens were retained and incorporated into VMNH's invertebrate holdings.

As part of their ongoing project on the efficiency of two subterranean trap designs for collecting hypogaeic invertebrate taxa in the eastern US, Dr. Ivanov and L. Hightower completed the processing of the latest set of samples from Rabun Co., GA, Monroe Co., KY, Macon Co., NC, and Patrick Co., VA. The processed materials included 3,378 specimens representing 15 ant taxa which were incorporated into VMNH's collection.

As a result of these ongoing projects and recently donated materials (Dr. S. Dash, RIM 2021-03), which also contribute data towards VMNH's long-term "The Ants of Virginia Project", the museum's Formicidae holdings have increased from 907 specimens and 72 species to 42,372 curated and digitized specimens representing 229 species.

VMNH Collections Manager H. Cartmell and L. Hightower, with help from Dr. Ivanov, completed the organization, curation, inventory, and rehousing of 2,259 Lepidoptera Riker mounts which are now stored in the museum's dry invertebrate collection.

In preparation for expected future work on terrestrial isopods, L. Hightower and Dr. Ivanov updated the taxonomy, curated, and inventoried VMNH's isopod (Crustacea: Isopoda) holdings. The collection includes 99 lots of identified (to at least a genus) specimens representing 25 species of aquatic and terrestrial isopods in addition to 229 lots of unidentified materials.

Dr. Ivanov responded to information requests regarding VMNH holdings: freshwater mussels (Unionidae, Margaritiferidae) (J. Pfeiper, USNM); *Fallicambarus* spp. (Decapoda: Cambaridae) (S. Henkanathgedara; Longwood U).

Dr. Ivanov oversaw the acquisition of 19 lots of ethanol-preserved millipedes, 6 lots of ethanol-preserved centipedes and 3 lots of ethanol-preserved insects from Loudon and Montgomery Cos and the City of Radford, VA donated by Dr. K. Powers (Radford U; RIM 2021-2); 189 ethanol-preserved and 304 mounted ants from various Belize and US location donated by Dr. S. Dash (Hampton U; RIM 2021-3).

Drs. Ivanov and Keiper traveled to Harrisonburg and oversaw the acquisition of James Madison University's invertebrate collection. The collection which comprises 35 Cornell drawers of pinned insects and >1,500 lots of ethanol-preserved invertebrates is currently temporarily stored at the museum's facility in Martinsville pending disinfestation processing before being incorporated into the museum's holdings.

Drs. Means, Moncrief, and Ivanov completed work on establishing a functional genetics lab at VMNH to be shared by all R&C personnel and also used by visiting students and researchers. This brand new facility will open great many new possibilities for in-house research and offer numerous opportunities for future research collaborations and outreach.

VMNH R&C staff (Drs. Bassett, Ivanov, Moncrief, and Pritchard) spearheaded efforts of establishing a multidisciplinary STEM lab at VMNH in response to the museum's growing need for integration of digital methodologies, digitization of collections, and exhibition of digital content. The new STEM Lab will serve the combined museum research and outreach needs by consolidating its current and forthcoming advanced technologies into a single, cohesive lab space. In this regard, Drs. Ivanov and Means are in the process of setting up an imaging station which will allow the capture of high-

resolution images of minute specimens and artifacts for research and outreach and greatly facilitate R&C's ongoing and future research projects.

## **Education & Outreach**

Dr. Ivanov presented a public talk at the Wayne Theatre's Signature Speaker Series in Waynesboro, VA. The presentation titled "Virginia's biodiversity: an entomologist's perspective" focused on the diversity and importance of Virginia's invertebrate biota and attracted 16 on-site and 677 online (via FB Live) viewers. (January 12)

Dr. Ivanov and museum staff participated in an online meeting regarding planning for the upcoming VMNH "Treasures from the Vault" Drive-Thru Experience in Waynesboro, VA. Drs. Ivanov and Means, and L. Hightower are currently working on drafting text and specimen selection. (March 3)

Dr. Ivanov and museum staff participated in an online meeting regarding early planning stages for the museum's newly proposed "Birding Project" which will introduce museum patrons to local birds, birding, and the tools needed to become a successful birder via a series of outings and field trips. (March 30)

This quarter, Dr. Ivanov responded to fungi, bird, and insect identification and information requests to individuals from Stuart and Henry Co., VA. Some of the requests were submitted to VMNH's FB page by museum patrons with the remainder representing taxa featured in VMNH's online series BenInNature.

## **Exhibits**

Dr. Ivanov and museum staff completed work on VMNH's newest permanent exhibit "Butterflies and moths around the World" which opened to the public in early March. The exhibit, which offers a close look at the world's moth and butterfly diversity, includes 727 Riker mount specimens from the museum's invertebrate collection representing over 500 moth and butterfly species from North America, South America, Europe, Africa, Asia, and Australia. In addition, the exhibit features an interactive pictorial key allowing guests to identify various Lepidoptera species and learn more about one of the world's largest and most charismatic insect groups.

## **Media**

Dr. Ivanov's post on "Mermaid's Necklace" (unusual egg cases of the Knobbed Whelk, *Busycon carica*) recently discovered at Grandview Nature Preserve in Hampton, VA was featured on the museum's FB page and generated 94 views.

## **Professional Service**

Dr. Ivanov was invited and recently joined MDPI's (Multidisciplinary Digital Publishing Institute) Editorial Board for the periodical *Insects* as a Topic Editor.

As the acting Copy Editor of the Virginia Natural History Society's periodical *Banisteria*, Dr. Ivanov copy edited and compiled the end-of-year *Banisteria* 54 (2020) volume which includes 10 research articles, 3 shorter contributions, and one citizen's science article

and is available for free download on the Society's website. By late March, Dr. Ivanov completed the copy editing of another six articles for *Banisteria* 55 (2021).

Dr. Ivanov served as a peer reviewer for manuscripts submitted to *Acta Oecologica* (completed March 12), *Acta Zoologica Bulgarica* (March 16), and *Diversity* (March 21).

**Nancy D. Moncrief, Ph.D.**  
**Curator of Mammalogy**

- Dr. Moncrief continued working with several colleagues on three manuscripts. The topics are as follows: 1) armadillos in Virginia, 2) skeletal injuries in tree squirrels, and 3) mammals that occur on the Virginia barrier islands.
- Dr. Moncrief worked with other VMNH staff to prepare a grant proposal for submission to the National Science Foundation
- Dr. Moncrief presented results of her research at the (virtual) annual conference of the Virginia Chapter of The Wildlife Society

### **Research and Collections**

Dr. Moncrief continued work on three manuscripts as follows:

- 1) She submitted, received reviews, revised, and re-submitted a manuscript to *Southeastern Naturalist*. It describes details of the first specimens of nine-banded armadillos from Virginia, which are housed at VMNH. Her co-authors are Mr. Seth Thompson and Mr. Michael Fies, who are Biologists in the Virginia Department of Wildlife Resources.
- 2) She submitted, received reviews, and started revisions of a manuscript to be re-submitted to *Journal of Mammalogy*. It provide details about healed skeletal fractures in eastern fox squirrels and eastern gray squirrels; many of the specimens for this study are housed at VMNH. Her co-authors are VMNH Associate Curator of Recent Invertebrates Dr. Kal Ivanov, VMNH Biology Research Technician Ms. Liberty Hightower and Dr. Alfred Mead, who is on the faculty of Georgia College.
- 3) She drafted text, tables, and figures for a manuscript that will be submitted to *Northeastern Naturalist*. It is an annotated checklist of mammals that live on Virginia's barrier islands and the adjacent Eastern Shore mainland. Her co-authors are VMNH Research Associates Dr. Raymond Dueser and Dr. John Porter, both whom are at the University of Virginia.

In January through March, Dr. Moncrief worked with VMNH Research Associate Dr. Raymond Bernor, Assistant Curator of Paleontology Dr. Adam Pritchard, Education Manager Christy Deatherage, and Deputy Director Ryan Barber to prepare a grant proposal that will be submitted to the National Science Foundation for collections-related research and education programs. VMNH is participating in this project as a collaborating institution with the University of Oregon the University of Florida, and several other universities. The VMNH portion of funding totals about \$360,000.

In early February, Dr Moncrief attended a virtual conference of the Virginia Chapter of The Wildlife Society. She presented results of some of her research on raccoons that live on the Virginia barrier islands. Her co-authors were VMNH Research Associates Dr. Raymond Dueser and Dr. John Porter.

Dr. Moncrief continued working with Biology Research Technician Ms. Liberty Hightower, VMNH Collections Manager Ms. Haley Cartmell and VMNH Registrar Ms. Jill Harris to conduct and coordinate VMNH review activities prior to installation of a new collections management software system (Proficio) and migration of the VMNH collections databases to that software.

Dr. Moncrief continued working with Biology Research Technician Ms. Liberty Hightower, to prepare, install, and document (electronically and in archival hardcopies) traditional specimens and frozen tissues of mammals and birds.

Dr. Moncrief responded to several inquiries for information about the vertebrate zoology collections, and she hosted a visit by Dr. Bryan McLean, who is on the faculty of the University of North Carolina at Greensboro

### **Professional Service and Other Duties**

Dr. Moncrief began serving on the Council of the Virginia Natural History Society (VNHS) on 1 January 2021. She continued serving (with Dr. Ivanov) a four-year term (ends December 2022) as Co-Treasurer. As part of her duties as Co-Treasurer, she recorded dues payments for new and renewing members in January through March of 2021.

Dr. Moncrief serves on the Awards Committee of the Virginia Chapter of The Wildlife Society. Along with other committee members, in February she reviewed nominations for several service awards and student scholarships bestowed by that organization.

### **Scientific Programs, Exhibits, and Other Activities**

In early February Dr. Moncrief recorded a digital lecture about the importance and uses of natural history collections for two classes at Roanoke College (taught by VMNH Foundation Board Member Dr. DorothyBelle Poli). This presentation will also be used by the VMNH Education Department's as part of the on-line K-12 Teacher Professional Development series.

Dr. Moncrief continued work on a special exhibit about flight. She prepared several bat wings and worked with VMNH Research Technician Ms. Liberty Hightower to select and prepare bird wings that demonstrate different types of powered flight. She met several times with VMNH Exhibits Manager Jessica Davenport and VMNH Education Manager Christy Deatherage to discuss specimens and options for displaying them.

Dr. Moncrief selected specimens and photos, and then drafted text and notes for the Drive-Through Festival in Waynesboro, which is scheduled to take place on 1 May. She will have two tables that display a diversity of horns and antlers.

**Adam Pritchard, Ph.D.**  
**Assistant Curator of Paleontology**

- Dr. Pritchard resubmitted his monographic description of the gliding *Weigeltisaurus* from the journal *PeerJ* in Q1 2021. It is near acceptance and should be published in Q2 2021.
- Dr. Pritchard co-authored a publication submitted to the journal *Papers in Palaeontology* with an international team of researchers. Led by Virginia Tech paleontologist Sterling Nesbitt, the paper details the discovery of monitor lizard-like reptiles from Triassic fossil sites in the southwestern United States and India.
- Dr. Pritchard continued his collaboration with Research Associate Ray Bernor and VMNH curator Nancy Moncrief on the FuTRES 2 NSF proposal, refining the role of the VMNH in the proposal. The VMNH component of the proposal would fund paid student internships in paleontology at the museum for three years. Submission is anticipated in Q2 2021.
- In March 2021, Dr. Pritchard carried out a VMNH field trip to a Triassic (~228-million-year-old) fossil site in Ashland, Virginia. The team was supported by a small number of amateur paleontologists. The trip recovered several hundred pounds of sandstone boulders containing bones, teeth, and fish skeletons.
- Dr. Pritchard oversaw the intake of dozens of paleontology donations from Richmond-based amateur paleontologists. These included a number of whale specimens, marine invertebrates, and a partial skeleton of a leatherback sea turtle, all discovered from the Cenozoic (66 million years ago to today) of the Atlantic Coastal Plain.
- Dr. Pritchard continued his biweekly educational video series 'Tales of Ancient Life' for the VMNH social media platforms. He produced seven videos in Q1 2021, which received over 2,500 views (as of April 15, 2021).
- For distance learning, Dr. Pritchard presented three dinosaur-centered programs from the VMNH collections for elementary school groups. These included two Virginia K-12 classes from Kent Gardens Elementary school in Arlington, VA and a K-12 class from Novi Elementary school in Novi, MI.

### **Research & Collections**

Dr. Pritchard resubmitted his monograph on the gliding reptile *Weigeltisaurus* for the journal *PeerJ*. The peer-review process has taken a substantially longer time than anticipated, but the article should be published in Q2 2021.

Dr. Pritchard collaborated with Virginia Tech paleontologist Sterling Nesbitt and an international team of researchers on the Triassic reptile *Malerisaurus*. Superficially resembling modern-day Komodo Dragons, malerisaurs are now known from the Triassic

rocks of southwestern Virginia and India. The paper is currently in review at the journal *Papers in Palaeontology*.

Dr. Pritchard carried out a field trip to his field site in the Triassic rocks of Ashland, Virginia (March 9, 2021). With a small team of amateur paleontologists and locals, he collected several hundred pounds of sandstone blocks containing the remains of fossil fishes and small reptiles. Additionally, the team recovered small slabs containing fossil ferns and wood pieces, substantially expanding the types of fossil material from the site. Identifications and plans for further work are ongoing.

Dr. Pritchard worked with amateur paleontologists in Richmond, Virginia who have amassed collections of marine animals from the Cenozoic Atlantic Coastal Plain rocks of the state. The amateur paleontologists donated numerous significant specimens to the VMNH collections including fossil urchins, whales, dolphins, and a partial sea turtle skeleton.

Dr. Pritchard evaluated four VMNH collections inquiries from outside researchers. One, from a team in the United Kingdom, would provide specimens in support of a postdoctoral researcher's project. He also supported a socially distanced collections visit by amateur paleontologist Michael Stevens to examine the Triassic fossils at the museum.

## **Funding**

Dr. Pritchard worked with Research Associate Ray Bernor and VMNH curator Nancy Moncrief on developing a VMNH role in a National Science Foundation proposal for the Advancing Biological Infrastructure directorate. The FuTRES 2 proposal is a multi-institutional collaboration with ecologists and morphologists from the University of Oregon, University of Florida, Texas A&M, and the University of Arizona. It is focused on building an online functional trait database for vertebrates. If funded, the VMNH will receive money for internship support, a research assistant for the three VMNH participants, and travel funds. Submission is anticipated in Q2 2021.

## **Education & Outreach**

Dr. Pritchard produced seven educational videos in his 'Tales of Ancient Life' series for VMNH social media outlets in Q1 2021.

Dr. Pritchard worked with the Research and Collections team to prepare specimens and text content for the upcoming 'Treasures from the Vault' drive-thru event in Waynesboro, VA (scheduled for May 1, 2021).

Using the VMNH paleontology collections, especially those of dinosaurs, Dr. Pritchard presented educational programs for 3 K-12 classes. Two were from the Kent Gardens Elementary School in northern Virginia and one was from an elementary school in Novi, Michigan.

Dr. Pritchard set up and began running the LulzBot Mini 2 3D printer. Presently based in the VMNH Stem Lab (between the Archaeology and Paleontology labs on the first floor), the printer can reproduce objects in plastic to a high degree of fidelity. Initial prints for

the museum collections and exhibits include the beak of the giant bird *Pelagornis*, limb and skull bones of the South African early human *Homo naledi*, and enlarged finger bones from the modern-day reptile *Sphenodon punctatum*.

Dr. Pritchard evaluated several fossil identifications relayed through VMNH social media.

### **Exhibits**

Dr. Pritchard developed exhibit text content for the upcoming VMNH special exhibit of flight. His contributions focused on the diversity of flying and gliding organisms in the fossil record.

### **Professional Service**

Dr. Pritchard completed a review for the *Journal of Vertebrate Palaeontology*.

**Hayden Bassett, Ph.D.**  
**Assistant Curator of Archaeology**

In his third quarter with the museum, VMNH Assistant Curator of Archaeology Dr. Hayden Bassett focused his efforts on archaeological fieldwork for VMNH's Smith River Survey (SRS), conference presentations, and setting up VMNH's new Cultural Heritage Monitoring Lab (CHML).

### **Research and Collections**

In early March, Dr. Bassett served as a keynote speaker the annual conference of the Virginia Association of Museums. His presentation, titled "Museums as Global Cultural Protectors: The Modern-Day Monuments Men and the Cultural Heritage Monitoring Lab at VMNH," detailed VMNH's new Cultural Heritage Monitoring Lab (CHML). He specifically reported on the critical role the VMNH is playing in: 1.) protecting cultural heritage caught up in armed conflict in Northern Ethiopia and the Nagorno-Karabakh region between Armenia and Azerbaijan; and 2.) the VMNH's data production support provided to the modern-day "Monuments Men" of the US Army.

From March through mid-April, Dr. Bassett completed archaeological fieldwork at the first site in the Smith River Survey (a 2-year VMNH archaeological survey of the Smith River in Henry County, VA). This fieldwork followed a comprehensive data synthesis and predictive modeling, using all known archaeological site locations in Henry, Patrick, Franklin, and Pittsylvania Counties (Smith River drainage). This first phase of fieldwork focused on a series of fields in Stanleytown, VA, which these models identified as "high probability" for archaeological sites. Dr. Bassett and VMNH staff archaeologist Madeleine Gunter Bassett excavated 36 test pits, uncovering two archaeological sites: one dating to the terminal Late Woodland (AD 1200-1450), the other dating to the Early to Middle Archaic (7,500-6,100 BC). New collections from these sites are currently being processed in the VMNH Archaeology Lab and will be formally accessioned in the next quarter.

In April, Dr. Bassett and VMNH staff archaeologist Madeleine Gunter Bassett presented new archaeological predictive models they developed in their study of SW Virginia at the Society for American Archaeology (SAA) conference. Their presentation, titled "Late Woodland Settlement and Subsistence in the Southern Piedmont of Virginia: A Geospatial Analysis and Archaeological Synthesis of the Smith River Valley" was presented virtually over the course of 3-days, to an international audience of between 6000-7000 participants. A scientific poster of this presentation is available as a PDF for those interested in this research.

In collaboration with the Smithsonian Institute, the new Cultural Heritage Monitoring Lab (CHML) housed at the VMNH under the direction of Dr. Bassett, made significant progress in initiating projects in Armenia, Ethiopia, Uzbekistan, Turkey, Mozambique, Honduras, and Cuba. These geospatial data production projects were initiated at the request of the US Army Reserve 38G/6V (Monuments Men), to support their ability to protect global cultural heritage. Through the CHML at VMNH, Dr. Bassett is leading a team of 16 cultural heritage professionals from around the country in data production and satellite imagery analysis. As the producer and curatorial repository of these new

digital collections, the VMNH Archaeology Department has expanded its digital collections holdings by nearly 4,000 “objects” in this quarter, and anticipates comparable growth in digital collections with each new quarter. Over 1,300 of these digital objects in the VMNH’s CHML collections were requested/accessed by outside researchers between February and April.

## **Education and Outreach**

As a member of the US Army’s/Smithsonian’s new wave of Monuments Men, Dr. Bassett spoke at one virtual workshops for US active duty soldiers, US reserve soldiers, and allied partners (UK Army, French Army). Dr. Bassett is currently in the direct commissioning processes to enter to the US Army Reserves as one of approximately 35 new “Monuments Men” Army reserve Captains, Majors, and Lt. Colonels.

In February, the VMNH Archaeology Lab worked with several local schools. The first was a local student doing a project on artifact repatriation. Dr. Bassett and VMNH staff archaeologist Madeleine Gunter Bassett worked with her in the lab using the VMNH Guatemala artifacts as a case study for her repatriation project. Second, Dr. Bassett filmed a promotional video for a VMNH behind-the-scenes archaeological collections tour, which was viewed by several hundred students, teachers, parents, and alumni at a local K-12 school.

Between February and March, the VMNH Archaeology department worked with several colleges and universities. Dr. Bassett added 7 undergraduate and graduate students to the VMNH’s institutional ArcGIS license. He is currently teaching these students in how to use GIS for archaeology. In February, Dr. Bassett was contacted by William & Mary, and asked to teach an undergraduate and graduate-level course in Archaeology remotely from the VMNH (committed for Fall 2021/Spring 2022). Last, the VMNH Archaeology Department was contacted by Longwood University to assist with instruction and technical expertise for their NSF-funded summer 2021 Archaeological Field School.

In April, Dr. Bassett served as a representative of the VMNH in the 2021 Virginia Trout Stream Sensitivity Study (VTSSS). He assisted this four-decadal study (coordinated by UVA) with water quality sampling at 6 wild/native trout streams in Franklin, Floyd, and Patrick Counties. These sample efforts will be highlighted as VMNH contributions to the state-wide study in the museum’s recently expanded *Wild Watersheds exhibit*. Dr. Bassett responded to five public requests for identification of artifacts, all of them from Virginia, and provided three site tours of VMNH’s active archaeological excavations. Artifact identifications were made in-person (in the museum lobby), and field tours were provided on-site (masked and distanced). In March, he also responded to one request for a field inspection for a local landowner’s property.

## **Professional Service**

Dr. Bassett continued his duties as Vice President of the Board of Trustees for Falmouth Heritage Renewal, an international historic preservation non-profit, based in The Plains, VA. He also continued his appointment as a Research Associate at the Smithsonian Institution to support international efforts and contributions made through VMNH’s new Cultural Heritage Monitoring Lab. Last, he continued his appointments as

Visiting Scholar and Adjunct Faculty at the College of William & Mary, where he will resume teaching (remotely) in late 2021.

From late January through mid-April, Dr. Bassett organized four meetings of the Culture Conflict Resource Network (CCRN), an NSF-funded group of collaborative researchers working on research surrounding the impacts of armed conflict on cultural heritage. The VMNH, through the Cultural Heritage Monitoring Lab (CHML), is a collaborative partner of the CCRN, along with the University of Pennsylvania, the Smithsonian, and several other institutions.

This quarter, Dr. Bassett and VMNH staff archaeologist Madeleine Gunter Bassett were appointed to the Research Committee of the Archaeological Society of Virginia. In these roles, VMNH Archaeology staff will provide direction, technical review, grant approvals, among other tasks for state-wide archaeological research for the foreseeable future. In February, Dr. Bassett joined the publications team of the Archaeological Society of Virginia as a peer reviewer for the organization's longstanding (1945-Present) research journal. He reviewed two article manuscripts this quarter for the upcoming issue. From late January through mid-April, Dr. Bassett was consulted on five separate occasions by members of the Archaeological Society of Virginia for his expertise in Geospatial Analysis. He provided his technical services to professionals seeking to map and generate geostatistics on the state-wide distributions of certain types of archaeological sites, and he advised on predictive analysis methods he developed at the VMNH.

## **Research and Collections**

### **Jill K. Harris, Registrar**

Fourteen (14) collections acquisitions were recorded for 640 specimens and 28 vials of specimens. These specimens were added to the invertebrate zoology collection, vertebrate zoology (mammal and bird), paleontology collections, and the department of education teaching collection.

One outgoing loan was recorded for this quarter, which was for mammal skeletal specimens to the Virginia Commonwealth University.

### **Haley Cartmell, Collections Manager**

Curators and staff modified/updated 411 existing records and added 183 new records to the VMNH collections databases, Rediscovery (for biological and archaeological collections) and EGEMS (for physical geological and paleontological collections).

Ms. Harris repaired over 90 Riker mounts of Lepidoptera specimens. Once repaired, Ms. Cartmell integrated these mounts with the rest of the collection and updated the electronic database. Also, an additional 50 Riker mounts were processed through the bubble, inventoried, and rehoused with the collection.

PEOPLE SERVED DATABASE printed 4/27/2021  
Summary

People Served Jan-March 2021

# of Activities	TYPE OF ACTIVITY	PROFESSIONALS AND 13+ STUDENTS	K-12 STUDENTS	K-12 TEACHERS	PUBLIC			TOTAL #	
3	Conference presentations (A)	0	0	0	800			800	
0	Meetings chaired (B)	0	0	0	0			0	
8	Review documents/manuscripts (B)	22	0	0	0			22	
9	Requests for information about collections (C)	31	0	0	0			31	
1	Visiting researcher (C)	0	0	0	1			1	
0	Collections tours (D)	0	0	0	0			0	
1	Lab Tours (D)	0	1	1	0			2	
0	Receptions	0	0	0	0			0	
10	Responses to requests for information about specimens at VMNH (D)	5	1	0	37			43	
2	Lectures and presentations at VMNH (D)	84	0	0	35			119	
4	Technical consultations (B, D, & E)	6	0	0	5			11	
0	Display table with specimens	0	0	0	0			0	
0	Off-site education programs	0	0	0	0			0	
1	Lectures Not at VMNH (E)	2	0	0	689			691	
5	Off-site presentations (E)	28	60	0	8			96	
5	Field trips/Field Work	0	0	0	13			13	
0	<b>TOTALS</b>	0	0	0	0			1829	

TOTAL # INDIVIDUALS SERVED

1829

## Research & Collections Facebook Statistics Jan-March 2021

### Total Research & Collections Post Reach

172,258

### Total Research & Collections Post Reactions (Likes, Comments, Shares, etc.)

7,270

### Total Research & Collections Post Clicks (user clicks on picture/video, link within post, "see more", etc.)

8,568

### Top 5 Performing Research & Collections Posts by Total Engagement (Reactions, Comments, Shares)

1. Ask an Expert (Do Slugs Like Beer?) - March 29 - 524 [NOTE: This post was boosted.]
2. #BenInNature (Laurel Creek millipede, *Apheloria whiteheadi*) - March 8 - 273
3. #BenInNature (Virginia opossum, *Didelphis virginiana*) - February 26 - 166
4. #BenInNature (Eastern slender glass lizard, *Ophisaurus attenuatus longicaudus*) - January 5 - 146
5. #BenInNature (Eastern black kingsnake, *Lampropeltis nigra*) - January 25 - 145

### Top 5 Performing Research & Collections Posts By Total Clicks

1. Ask an Expert (Do Slugs Like Beer?) - March 29 - 2,348 Clicks [NOTE: This post was boosted.]
2. #BenInNature (Laurel Creek millipede, *Apheloria whiteheadi*) - March 8 - 273 Clicks
3. General Post (Mermaid's Necklace) - March 17 - 173 Clicks
4. Video Post (Q&A with Dr. Pritchard) - March 3 - 144 Clicks
5. #BenInNature (Eastern slender glass lizard, *Ophisaurus attenuatus longicaudus*) - January 5 - 113 Clicks

### Total VMNH Facebook Audience Growth from January 1 to March 31, 2021

- The total number of followers increased by 169 (from 12,726 to 12,895).
- The total number of likes increased by 97 (from 12,547 to 12,644).

# Smithsonian VOICES



Smithsonian Institution

## NATIONAL MUSEUM *of* NATURAL HISTORY

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#### **How Museum Collections Advance Knowledge of Human Health**

April 7th, 2021, 6:00AM / BY [Emily Leclerc](#)



The National Museum of Natural History's 146 million objects and specimens are studied by researchers worldwide who are looking to understand all aspects of the natural world. (Chip Clark, Smithsonian)

Collecting has a long history dating back to ancient times. The Egyptians collected books in the Library of Alexandria. The Medici Family in Renaissance Florence collected art. Now, kids at school collect Pokémon cards. The neighbor down the street collects postage stamps, and the Smithsonian collects scientific specimens.

Unlike other collections, the [National Museum of Natural History](#)'s 146 million artifacts and specimens do more than collect dust in the museum's display cases. They are important sources of information for scientific research being conducted all around the world.

To celebrate World Health Day, here are six ways the museum's collections have contributed to our understanding of health and medicine.

#### **Mosquito collections help researchers prevent disease**



The mosquito species *Aedes aegypti* can carry dengue fever, Zika virus and yellow fever. They spread disease easily to humans because they breed in areas close to humans, like water-filled containers, flowerpots, fountains and barrels. (Kmaluhia, [CC-BY-SA-4.0](#))

Summer brings warm weather, barbeques and swimming. But it also brings one of the deadliest insects in the world, mosquitoes.

Mosquitoes transmit diseases like Chikungunya virus, dengue fever, West Nile virus, yellow fever and malaria. They cause the death or debilitation of more than one million people each year. In hopes of [preventing outbreaks](#) of these deadly diseases, scientists use museum collections to learn more about the taxonomy, biology, and distribution of mosquitoes that transmit diseases to humans.

The National Museum of Natural History, in partnership with the Walter Reed Biosystematics Unit (WRBU), maintains the [largest mosquito collection in the world](#) with over 1.7 million specimens. The collection helps researchers not only better understand distribution, environmental preferences and specific mosquito biology, but also [how the insects transmit disease](#). This information, along with other tools developed by WRBU, helps scientists trying to prevent future outbreaks of mosquito-borne illnesses.

#### **Leech collections improve anticoagulants**



The leech *Hirudo medicinalis* was the most commonly used species for bloodletting. They were harvested almost to the point of extinction and remain a threatened species today. (Robyn Jay, [CC-BY-SA-2.0](#))

In the 1700 and 1800s, prescriptions often included leeches. These bloodsucking animals were used for a treatment called bloodletting, where blood would be removed from a patient to cure an assortment of illnesses. While purposefully attaching leeches to a person may seem barbaric, leeches are still used in medicine today.

**Medicinal leeches** are FDA approved medical devices that are most often used after digit reattachments, skin grafts and other reconstructive surgeries. Leeches secrete an anticoagulant from their salivary glands near their mouths which stops blood from clotting while they feed. The anticoagulant — along with the leech siphoning off blood that may become trapped in a reattached finger, nose, ear or toe — keeps oxygenated blood flowing into the tissues which promotes healing.

Leeches are also used in a modern version of bloodletting to treat rare blood conditions like polycythemia, an abnormally high red blood cell count, and hemochromatosis, when blood has too much iron.

The National Museum of Natural History has more than 200 specimens of 28 species of **medicinal leeches**. Scientists study these specimens to better understand the animal's evolutionary relationships and how the variety of anticoagulants they make can be used in human and veterinary medicine.

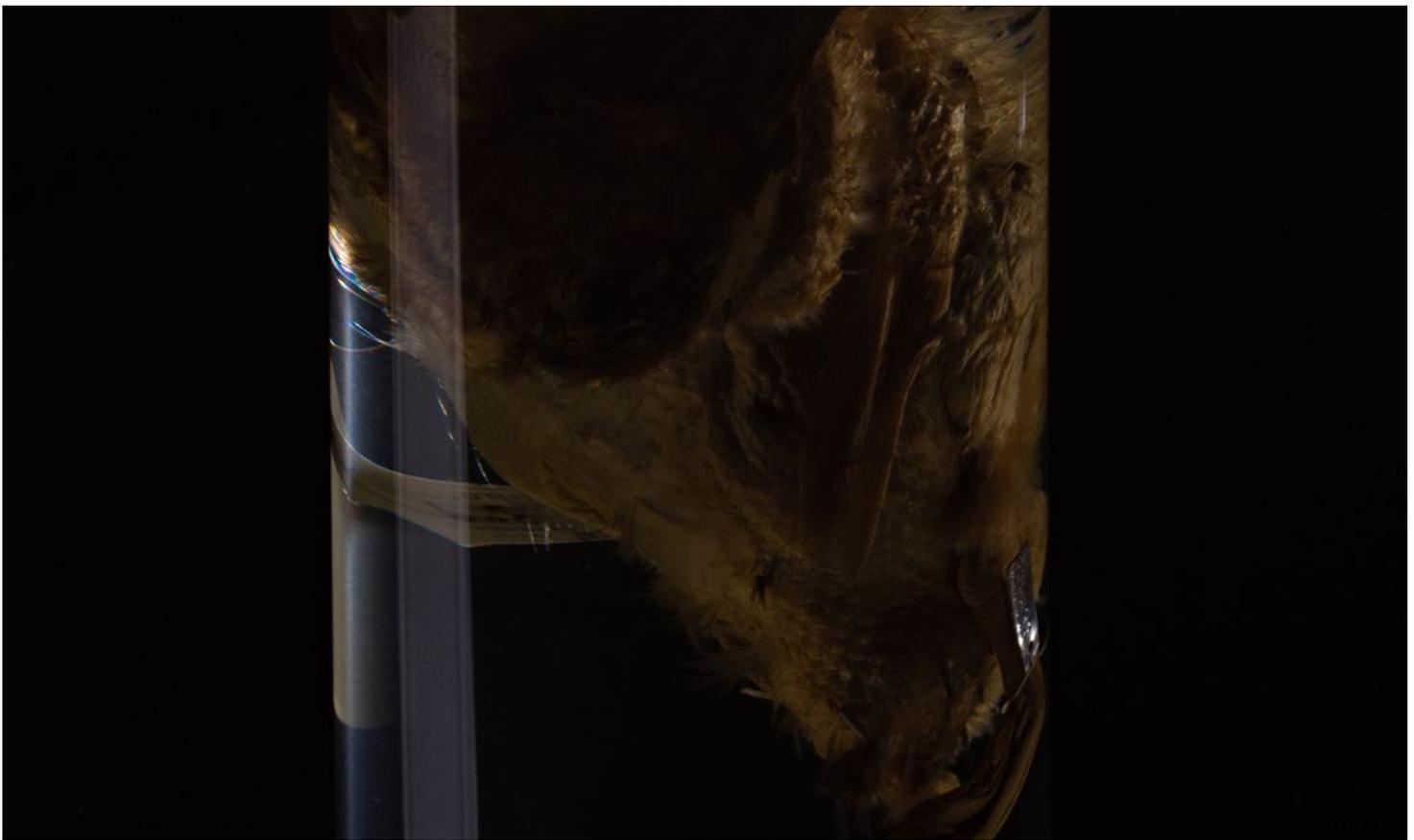
#### **Bird collections help scientists study past pandemics**





829  
Aves - Mammals  
Sept 24, 1919  
T. A. Mearns

829

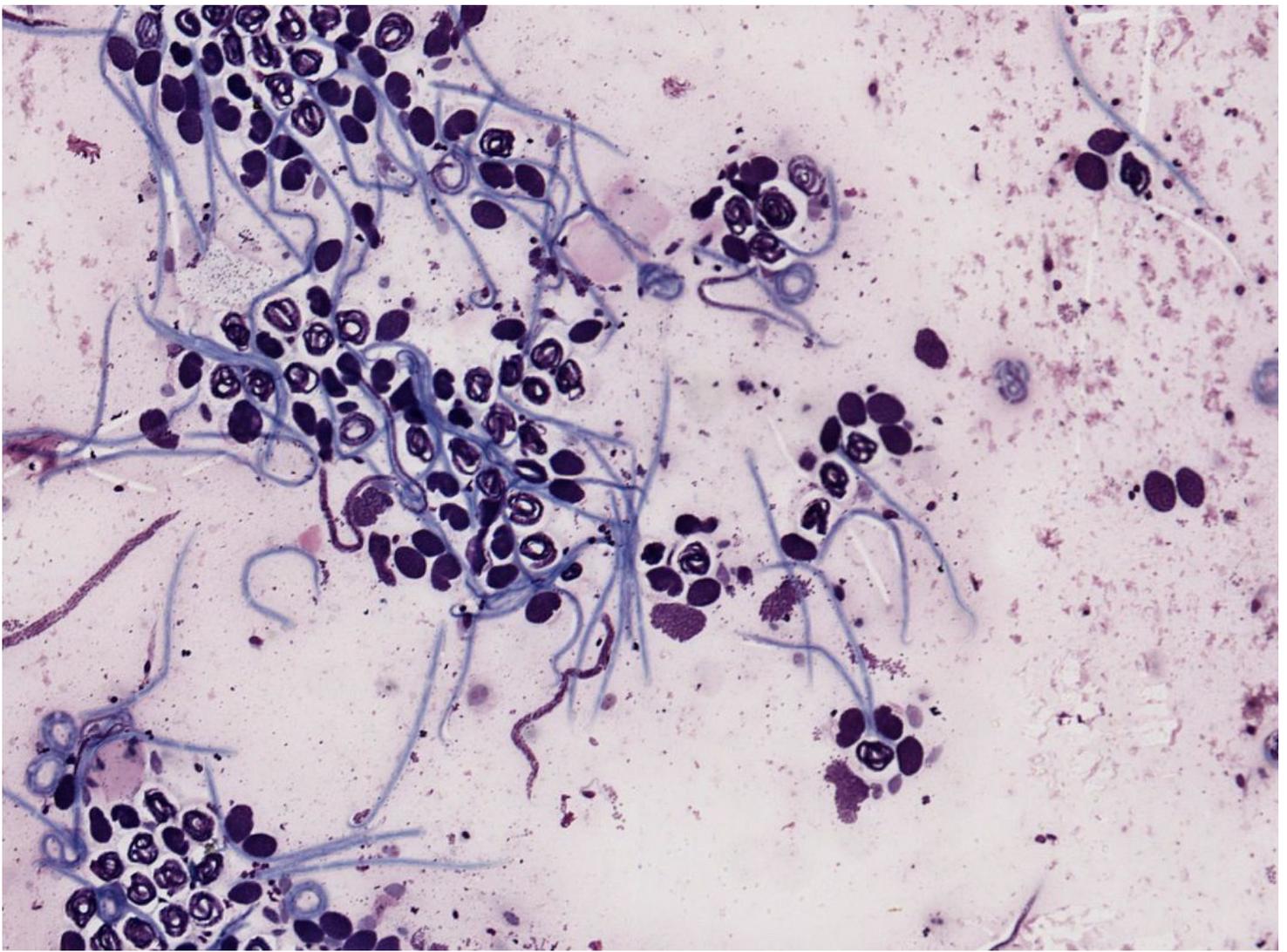


Alcohol preserved specimens, like this Green-winged Teal, can be used to study the pathogens that may have been circulating before the Great Influenza. (Smithsonian)

In 1918, a deadly strain of the influenza virus swept the world. Scientists estimate that one-third of the world's population became infected and at least 50 million people worldwide died. But despite being the deadliest pandemic in the last century, not much is known about the evolutionary history of the flu strain and why it was so dangerous.

Scientists know that the 1918 flu came from birds. They are now studying how closely related the 1918 strain was to flu strains found in wild birds. Using fluid preserved bird specimens that were collected in the late 19th and early 20th centuries, [Smithsonian researchers](#) are extracting viral samples from the birds to compare it to the 1918 flu. These wet specimens retain soft tissues and other physical materials that make this genetic testing possible. Researchers hope to unlock the genetic secrets of the flu strains found in wild birds to better understand how the 1918 flu evolved into the deadly pandemic that it was.

#### **Parasite collections can inform organ transplant procedures**



*Onchocerca volvulus*, pictured here, can take over a year to fully mature. It is only after the adult worms become capable of producing large numbers of offspring that the infected person will start to feel symptoms. (Yale Peabody Museum of Natural History, [CC-Zero](#))

[Parasites](#) are often portrayed as the villains in a story, and while having a parasite is not usually a good thing, they can reveal a lot about human health.

The nematode *Onchocerca volvulus* is a human parasite responsible for a disease called Onchocerciasis or river blindness. To prevent transmission of the disease, organizations worldwide tried to eradicate the worm in the mid-1990s. In 2016, Guatemala fully eradicated the worm, but before that happened, the museum collected worms from the country. Those specimens represent something that no longer exists, but they are also [an important resource for researchers](#) studying how the parasite can live in their host for decades by evading detection from the host's immune system.

Learning how these parasites hide inside a host, could be a breakthrough in medicine and inform procedures, like organ transplants, where doctors are purposely suppressing the immune system.

**Botanical collections ensure clarity in drug discovery**



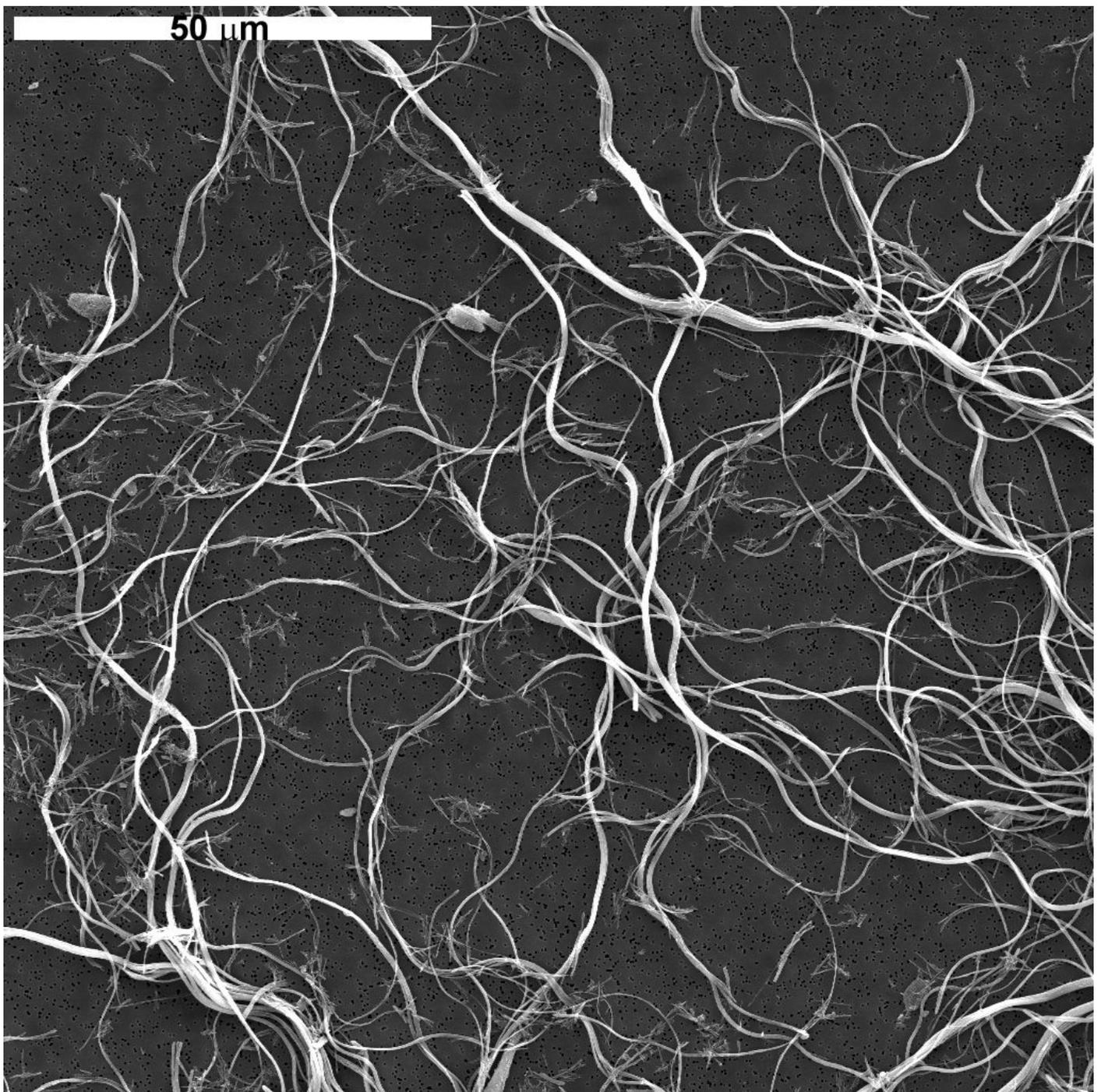
Taxol is an anti-cancer drug that comes from a compound found in the bark of a western yew tree, pictured above. Doctors use Taxol to treat breast cancer, ovarian cancer, non-small cell lung cancer, pancreatic cancer and AIDS-related Kaposi sarcoma. (Nancy Lankford, [CC0](#))

Cancer is a tough beast to fight. Because of the disease's diversity, researchers are always on the hunt for [new anti-cancer agents](#) to expand treatment options. Scientists from the National Cancer Institute (NCI) often turn to nature in search of new drugs.

NCI scientists collect plant samples in the field to screen them for [cancer-fighting compounds](#). After the samples are identified and screened, the NCI sends voucher samples to the United States National Herbarium at the National Museum of Natural History. Voucher samples, which represent an organism stored somewhere for further examination and study, are critical to drug discovery.

Botanical voucher samples document the source material of a drug discovery. When researchers look for a specific plant in the future, they can compare their specimen to the voucher sample to guarantee they have collected the correct plant. The U.S. National Herbarium's voucher samples ensure that new anti-cancer agents can be found and properly identified over and over again.

**Mineral collections reveal risks of asbestos exposure**



“Asbestos” is an over-arching term that refers to six unique minerals – chrysotile, amosite, crocidolite, anthophyllite, tremolite and actinolite. Chrysotile, pictured here, is the most common mineral referred to as “asbestos.” (U.S. Geological Survey)

Asbestos exposure is linked to several lung diseases. But it took a long time for scientists to understand the dangers that asbestos exposure poses.

The risks of asbestos exposure were first studied in the early 1900s. Dr. E.R.A. Merewether published the first clinical examination of workers in the asbestos industry that showed a link between exposure and disease in 1930. Since then, countless studies have been conducted on asbestos using mineral samples from the National Museum of Natural History’s collection. The museum’s asbestos-like minerals helped scientists research the effects of asbestos on the human body and confirm the relationship between asbestos exposure and different lung diseases

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[This Smithsonian Scientist is on a Mission to Make Leeches Less Scary](#)



Emily Leclerc is an intern in the Smithsonian National Museum of Natural History's Office of Communications and Public Affairs. Her writing has appeared in Boston University News Service, Wahpeton Daily News and Dana-Farber's Insight Blog, among others. Emily recently graduated from Boston University with an MS in journalism. She also holds a BA in biology from Roanoke College in Virginia. You can find her at .

**Tags:**

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