

Dori Contreras with a fossil palm frond in New Mexico.

Understanding Science for the iPad!

It's here! A way for new audiences to experience *Understanding Science* on a different digital platform, the iPad! Taking advantage of this popular technology, the UCMP partnered with the California Academy of Sciences to produce an iTunes U course based on content from the *Understanding Science* website. Entitled How Science Works, the course provides a dynamic and interactive approach to increase understanding of the nature and process of science.

Inspired by the science flowchart that represents a more authentic portrayal of the process of scientific inquiry, and guided by feedback from science educators, teachers, and frequent users of the *Understanding Science* website, the iTunes U course takes the user on a multi-media journey to learn how science really works—what it is and what it is not—who scientists are, and what they do.

Available to all at no cost on the Apple iTunes site, the course is designed primarily for middle and high school science educators to broaden their own knowledge and understanding of science, and to provide resources for their students. The course weaves together activities, videos, and

see iTunes U on page 3

UCMP's summer adventures

For members of the UCMP community, summer is not a time for vacationing at the beach. It's the ideal time to further one's research: attend meetings, do field work, visit museum collections, collaborate with colleagues, and/or write.

Jean Alupay spent a week at the Marine Biological Laboratory in Woods Hole, MA, establishing collaborations with neuroscientists and physiologists to study the effects of autotomy on octopus behavior and electrophysiology. In July, she joined **Lindsey Dougherty**, **Carole Hickman**, **Jenna Judge** and **David Lindberg** in the Azores for the World Congress of Malacology. Jean gave a talk entitled "Arm autotomy in octopus *Abdopus aculeatus* on Mactan Island, Philippines." Lindsey gave a presentation on her optical, microscopy and particle-modeling work with the disco clams.

Tony Barnosky finished writing his new book on how solutions to the sixth mass extinction lie in feasible adjustments to how

we generate power, grow food, and make money. The book will be published by UC Press in 2014. Tony also continues to work with the California Office of the Governor to promote science-based solutions to global change problems. With 15 other global change scientists he developed the scientific consensus statement "Maintaining Humanity's Life Support Systems in the 21st Century," which has now found its way into a number of state, national, and international discussions about environmental solutions. Tony also traveled to Belfast, Northern Ireland, to present a paper on causes of South American megafauna extinctions (coauthored by **Emily Lindsey**, **Natalia Vilavicencio**, and **Charles Marshall**) at the 11th International Mammalogical Congress. The NSF-funded research is a collaboration involving some 20 other investigators from ten countries.

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Left: Rob Jordan; Right: Jemma Judge

Left: **Tony Barnosky** with Governor Jerry Brown after the latter was presented with a global environmental consensus statement in May. Right: **Lindsey Dougherty** talks about her work with disco clams at the World Congress of Malacology meeting in the Azores.

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Bill Clemens returned to northeastern Montana where he reconnected with current and former UCMP colleagues, including **Greg Wilson**, UCMP alum now on the faculty at the University of Washington, and **Nan Arens**, former UCMP Curator now at the Hobart and William Smith Colleges in New York. With Greg, Bill continued to collect fossil vertebrates and new data to document patterns of faunal change across the Cretaceous/Paleogene boundary. Greg brought a group of students from UW and then taught a field school for high school science teachers. Nan continued her studies of the paleobotanical record and collected sediment samples for analysis of their stable isotopes.

Also in northeastern Montana, **Paul Renne**, director of the Berkeley Geochronology Center, and his graduate students, Courtney Sprain and Jessica Banaszak, were very successful in finding layers of volcanic ash that could yield extremely precise radiometric age determinations. These, closely correlated with the fossil record, will add to the precision of studies of the tempo of faunal and floral change during deposition of the Hell Creek and Tullock Formations. **Don Lofgren**, another UCMP alum, directed the group to sites in his doctoral research area.

Dori Contreras spent part of her summer in Truth or Consequences, NM,

conducting her first season of field work for her dissertation. With her assistants, **Meriel Melendrez** and undergraduate **Nicolas Locatelli**, they collected an impressive load (~1 ton!) of fossil plants from a volcanic ash bed more than a kilometer long. By studying the diversity and distribution of plants from this assemblage, Dori will be able to shed some light on the community structure of Cretaceous floras in warm, wet climates. After concluding her field work, Dori headed to San José, Costa Rica, to give a presentation at the joint meeting of the Association of Tropical Biology and Conservation (ATBC) and the Organization for Tropical Studies (OTS). Then it was on to New Orleans and the BOTANY 2013 conference where she was joined by **Jeff Benca**, **Ivo Duijnste**, **Winnie Hsiung**, **Cindy Looy**, **Meriel Melendrez**, **Stephanie Ranks** and **Robert Stevenson**. Dori, Jeff, Meriel, Stephanie and Robert all walked away with awards (see Tidbits on page 3)!

Lindsey Dougherty spent her summer doing underwater field work on Lizard Island in Australia, Bali, the Indonesian islands of Raja Ampat, and in the Lembah Strait. The Australian Museum in Sydney allowed Lindsey to examine their *Ctenoides ales* (the so-called disco clam) collection, which included the holotype.

Liz Ferrer traveled to the Florida Museum of Natural History, the Smithsonian, the Australian Museum, and the Western Australian Museum in order to photograph specimens. In between trips, she co-hosted the annual Geometric Morphometrics Workshop, July 29–August 2, in the Integrative Biology Department.

Mark Goodwin spent three weeks in Montana this summer, starting on the farm of Dan and Lila Redding, longtime supporters of UCMP field research and Montana paleontology, where a Museum of the Rockies (MOR) field crew was already hard at work. Mark confirmed UCMP localities in the area and how they, and more recent localities found by the MOR group, tie in to the local stratigraphy. Mark's son Graham, a member of the MOR field crew, found a well-preserved hadrosaur jaw while prospecting with his Dad. Later in July, Mark presented results from his current research on fossil baleen at the Second International Symposium on Paleohistology, held at the MOR. Mark then headed east to Carter County, Montana, to check out Burpee Museum dinosaur sites and local exposures of the Hell Creek Formation. Mark, and other paleontologists working in the Ekalaka area,

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Congratulations!

To **Maya DeVries** who was awarded both an NSF Ocean Sciences Postdoctoral Research Fellowship and a Scripps Institution of Oceanography (SIO) Postdoctoral Fellowship in Marine Biology to work in SIO Professor Jennifer Taylor's lab (crustacean physiology and ecology). Jennifer was a postdoc with Sheila Patek when Sheila was still in IB and a curator at the UCMP, so a UCMP connection.

To UCMP Curatorial Associate **Lynn Ingram** (Associate Professor, Earth and Planetary Sciences) on the publication of her new book (August 2013) with co-author Frances Malamud-Roam: *The West Without Water: What Past Floods, Droughts, and Other Climatic Clues Tell Us About Tomorrow*.

To the Looy Lab, whose members presented six talks and two posters, and for winning *five* awards at the 2013 Botanical Society of America meeting in New Orleans. **Robert Stevenson** won the Mosely Award, given to the best student paper presented in either the Paleobotanical or Developmental and Structural sessions, that advances our understanding of plant structure in an evolutionary context. **Dori Contreras** received the Cookson Paleobotanical Award for delivering the best student paper in paleobotany or palynology at the annual meeting. **Stephanie Ranks** won the Cheadle Student Travel Award for explaining what Vernon Cheadle's most important contributions were to botany and for describing the significance of her own research. **Meriel Melendrez** and **Jeff Benca** both received Triarch Botanical Images Student Travel Awards; second and third place, respectively.

To **Rosemary Romero** for three recent awards: an Initiative for Maximizing Student Development (IMSD) Fellowship for the 2013–2014 academic year, a Hannah T. Croasdale Fellowship from

the Phycological Society of America to pay room and board at while attending summer courses, and the 2013 CenCal California Diving & Aquatic Studies Scholarship.

To **Susumu Tomiya**, who completed his Ph.D. on "Ecological Aspects of the Diversity Dynamics of North American Fossil Mammals," and has moved on to a postdoctoral position at the Chicago Field Museum of Natural History.

Announcing our student awards!

UCMP is fortunate to have received donations in the form of an endowment from individuals dedicated to the support of graduate training and research, especially field work. Each year we use the earnings from these endowments to make research awards to our graduate students, and we are proud to announce this year's recipients of the Welles and Palmer awards and offer them congratulations.

From the Doris O. and Samuel P. Welles Fund

Elizabeth Ferrer for travel to museums in Australia to photograph fossil and extant varanid specimens for geometric morphometrics analysis.

From the Dorothy K. Palmer Fund

Lucy Chang for travel to institutions in the Denver, Colorado, area and collect data for use in characterizing ammonite morphology in the Western Interior Seaway. Project goals include tracking morphological changes exhibited by ammonite fauna in epeiric sea environments. Lucy also received support from the William B.N. Berry Memorial Research Fund.

Jenna Judge for instrument deployment and sampling of specialized fauna and substrate materials associated with deep-sea woodfall substrates. Molecular phylogenetic analysis of the materials sampled is expected to provide insight on symbiotic relationships.

Welcome new students!

Brett Archuleta joins the Finnegan Lab and comes to us from Westminster College in Utah; he plans to focus on

research in benthic foraminifera.

Emily Orzechowski will also be joining the Finnegan Lab. She completed her undergraduate degree at the College of William & Mary and plans to work on Plio-Pleistocene molluscan fauna of the west coast of North America.

Jun Lim completed his Master degree at Imperial College London will join the Marshall Lab.

Other news

Sarah Werning from the Padian lab has joined the Turner Lab at Stony Brook University as an NSF Postdoctoral Fellow. She plans to study the evolution of crocodylian growth, histology, and physiology using bone tissue analysis. 🐊

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classroom-ready materials into a primer on the process of science that mirrors the components of the science flowchart. From exploration and discovery to testing ideas and obtaining community feedback, six chapters highlight an authentic and engaging science experience for educators and students:

- Ch. 1: How Science Works
- Ch. 2: Everyone Explores and Discovers
- Ch. 3: Testing Ideas
- Ch. 4: Community Analysis & Feedback
- Ch. 5: Benefits and Outcomes
- Ch. 6: How Science Works Matters

Download the course to your iPad from the Apple iTunes site now!

<https://itunes.apple.com/us/course/how-science-works/id689052881> 📱

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gave public presentations on their work at the Carter County Museum’s “Dino Shindig.” Mark’s presentation was on pachycephalosaurs.

Carole Hickman led an expedition to the remote Tjörnes seacliff shell beds in northern Iceland, carrying the flag of the Society of Woman Geographers. Expedition participants included UCMP Curatorial Associate Dr. **Doris Sloan**, Professor Sally Walker (University of Georgia, UCMP Ph.D. 1975), and volunteers Ellen Barth, Cheryl Longinotti, and Laura Stockton. The expedition obtained detailed photographic documentation of field settings and stratigraphic horizons matching UCMP collections.

This summer, **Jenny Hofmeister** spent another three months at the USC Wrigley Institute for Environmental Sciences on Catalina Island. She counted and collected octopuses, their predators, and their prey in her further efforts to understand what ecological factors dictate octopus distribution and abundance in the wild. She also helped with the outreach and education programs on the island.

David Lindberg traveled to Northern Ireland and visited the Queen’s University Marine Laboratory in Portaferry where he studied the local limpet fauna.



Mira Parentik

Jere Lipps swimming among the jellyfish of Jellyfish Lake, Palau.



Mark Goodwin

Clockwise from top: **Mark Goodwin’s son Graham** trims down a jacket containing a hadrosaur jaw that he found while prospecting in the Judith River Formation, Kennedy Coulee, Montana. Tjörnes expedition participants **Carole Hickman**, Sally Walker, Cheryl Longinotti, and Doris Sloan at Tjörnes, Iceland. **Emily Lindsey** with husband Martin and son Christopher at Punta del Este, Uruguay.



Laura Stockton

Emily Lindsey had a baby (Christopher Darwin Lindsey Tomasz) and moved to Uruguay to start a Fulbright grant researching late-Quaternary extinctions in South America.

After 19 years, **Jere Lipps** returned to Palau to study forams and the taphonomy of soft-bodied organisms in the marine lakes formed in Miocene raised reefs of the Rock Islands. With Michael Dawson of UC Merced, Jere returned to the famous Jellyfish Lake to recollect sites published by Jere and former post-doc Martin Langer in 1999.

Several members of the Looy Lab drove to Albuquerque, NM, for a conference on the Carboniferous-Permian transition that was organized by the New Mexico Museum of Natural History and Science. While there, **Jeff Benca**, **Ivo Duijnste**, **Renske Kirchholtes**, **Cindy Looy** and **Robert Stevenson** did some fossil collecting at late Carboniferous and early Permian plant fossil localities in the Albuquerque vicinity.

In June, Cindy and Ivo returned to Washington, DC, where Cindy attended



Courtesy of Emily Lindsey

a biannual workshop on assembly and disassembly of ecosystems organized by the Evolution of Terrestrial Ecosystem program of the Smithsonian’s National Museum of Natural History. Cindy compiled existing data sets on Paleozoic plant fossils for the workshop while Ivo photographed Permian conifers as a precursor of future data sets.

Tesla Monson worked with Hlusko Lab undergraduates in the ongoing Pleistocene South Africa Summer Curatorial Project. The group spent the summer curating and cataloging UCMP’s South African fossils. The undergraduates involved in the project are **Bogart**



Dakota B. Dietz



Courtesy of Whitney Reiner



Tesla Monson



Courtesy of Lisa White

Marquez, Sandy Gutierrez, Marianne Brasil, Kevin Roth and Risa Takenaka. Their analysis of these and other fossils is contributing to individual research projects. Bogart and Sandy both presented their research at Berkeley's Biology Scholars Program symposium in July and will present posters at the SACNAS (Society for the Advancement of Chicanos and Native Americans in Science) conference in October. Marianne and Kevin are working on honors theses using the UCMP collections and Tesla will be presenting her research at the American Association of Physical Anthropologists conference in April 2014.

Members of the UCMP had another successful season in the Triassic at Ghost Ranch, NM. UCMP Curator **Kevin Padian**, former grad student **Randy Irmis** (a professor at the University of Utah), former undergrad student **Sterling Nesbitt** (a professor at Virginia Tech), current undergrads **Sarah Tulga** and **Ben Kligman**, and a rotating cast of participants from other institutions worked the various levels of the Hayden Quarry for the eighth consecutive year. Some excellent specimens were recovered.

Whitney Reiner joined the Olduvai Vertebrate Paleontology Project (OVPP) for a second field season. Co-directed by

Clockwise from top left: **Rosemary Romero** sampling green algae in the intertidal at the Romberg Tiburon Center. **Whitney Reiner** collecting vertebrate fossils in Olduvai Gorge, northern Tanzania, as part of the OVPP (Olduvai Vertebrate Paleontology Project). Students **Bogart Marquez** and **Sandy Gutierrez** working on the Pleistocene South Africa collection. **Lisa White** with METALS program students at Pt. Reyes National Seashore.

her advisor **Leslea Hlusko**, she kept busy collecting vertebrate fossils in Olduvai Gorge, located in northern Tanzania.

Rosemary Romero spent her summer at the Darling Marine Center in Maine and at Friday Harbor Labs on San Juan Island, WA, taking courses in algal culturing techniques and Marine Phycology. Rosemary also worked with **Cindy Looy** on a project timing the origin of kelps and began an experiment at the Romberg Tiburon Center that tests the effects of herbivores on recruitment of "green tide"-forming algae.

Allison Stegner spent April–May excavating Holocene fossils near Canyonlands, Utah. After breaking her foot in the field, she had plenty of time over the summer to pick fossils out of the sediment she recovered.

As part of the METALS (Minority Education Through Traveling and Learning in the Sciences) program, **Lisa White**, with faculty and graduate students from San Francisco State University, University of Texas El Paso, and University of New Orleans, led 30 high school students from the Bay Area, El Paso, and New Orleans on a California geology field trip. Starting at Pt. Reyes National Seashore and concluding at Yosemite National Park, the trip was supported by an NSF collaborative grant. METALS (Minority Education Through Traveling and Learning in the Sciences) seeks to increase the number and diversity of students choosing academic paths in the Earth Sciences by exposing them to the geosciences in field settings. 🐚

In Memoriam

Claire Louise Englander (1945-2013)

by David Smith

Claire Englander, a University employee of nearly 30 years, and more recently, a donor and volunteer at UCMP, passed away on July 15 after a long battle with cancer. She began working at the University in 1984 as a secretary with the College of Engineering. Later, she worked at the University and Jepson Herbaria, served as an assistant to the disabled, and then found a home in the campus library system, taking positions at the Biosciences Library, The Bancroft Library, the Conservation/Preservation Department, Map Room, and finally the Technical Services Department.

Claire, as her brother Phil noted, had a “burning desire for knowledge.” For the past five to ten years she was a fixture in UCMP Curator and Professor of Integrative Biology **Kevin Padian**’s paleontology classes, but Claire also audited classes in the Department of Earth & Planetary Sciences and attended seminars. Claire was fascinated with paleontology—she was engrossed in a text on vertebrate paleontology when she began volunteering at the museum—and she was a generous donor to the museum’s research and education programs, often preferring to remain anonymous.

Her volunteer work at the museum began in September of 2011, after learning of the museum’s grant-funded project to catalog our archives. She had plenty of library experience so Claire was put to work rehousing and creating indexes for the papers of vertebrate paleontologist **Ruben A. Stirton**. Claire found Stirton’s correspondence absorbing and was always bringing some interesting aspect of it to my attention.

Claire was a remarkable woman. Despite being 67 and in her twelfth year of chemotherapy, she continued to come to work at the library and volunteer as her health allowed. If she felt too ill to come in, she would apologize profusely. I would continually remind Claire that she was a volunteer—she could make her own hours—but she had been given a job to do and was determined to do it. Because of her schedule at the library, Claire asked if it would be possible for her to come in on weekends and work past 5:00 PM on weekdays. The only way to accommodate her was to “buy” a small piece of her time from the library and to put her on the museum payroll. Claire was so appreciative of this that she wrote:

Lately I have been remembering “An old man goes to Paris, as every old man must. He finds the winds blow cold, and his dreams have turned to dust.” I feel very old, and with this great kindness, I no longer feel that way—that my dreams have turned to dust. Something that I never dreamed of—an honor like working for UCMP, for any amount!

Claire refused to let her illness keep her from living life to the fullest. She continued to read, learn, travel, and challenge herself until the very end. She was truly extraordinary and will be missed.

Robert Mendez

Robert Mendez graduated from UC Berkeley with a degree in Anthropology and founded NetHawk.net (<http://www.nethawk.net>) in 1998. For the last eight years, Robert had been a Friend of UCMP in every sense of the word. He not only offered us financial support, but he also placed great value on our efforts in science education and loved to brainstorm about different strategies to counter misrepresentations of science and anti-science agendas. Though Robert was a fighter, he lost his battle with cancer in June, and UCMP lost a great friend. We will miss him. 🐉

FRIENDS OF UCMP

We would like to welcome the following new or renewing members to our Friends of UCMP:

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Judy Scotchmoor

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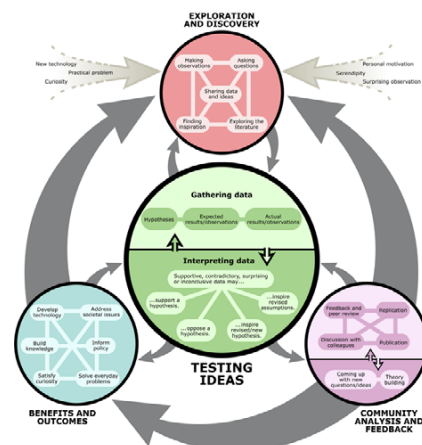
Donor

Frank Perry
Mary Small
Scott Starratt

¹Designates a donation to the Claire Englander Student Prize in Paleontology

²Designates a donation to the William B.N. Berry Memorial Research Fund

How science works



Understanding Science is now on the iPad! See the cover story.

LETTER FROM THE DIRECTOR



A vibrant summer in UCMP

Summer is usually pretty quiet in UCMP, with people doing field-work, attending conferences, and writing (for highlights see the rest of this newsletter). Not so this summer! A record number of undergraduate students joined graduate students and volunteers in collections-based projects. Supported by grants from the NSF, the Mellon Foundation, the W.M. Keck Foundation, and Caltrans (described in earlier newsletters), students helped to document our “hidden archives”, rehouse and digitally image the USGS invertebrate collection, prepare fossils from the Caldecott Tunnel fourth bore, and more. It was very rewarding, even if a bit tricky, to be nearly tripping over the students in the collections all summer! Continuing to foster undergraduate energy and enthusiasm is something we look forward to growing. And in this vein, this Fall also sees a new undergraduate course entitled “Natural History Museums and Biodiversity Sci-

ence” based in all the Berkeley museums, so our collections are being well used in undergraduate education.

This summer also saw UCMP host its fifth annual Evolution Institute attended by more than 30 science educators, and work on the Understanding Global Change project, funded by the Gordon and Betty Moore Foundation, is now kicking into full gear.

The summer also brought more than 20 researchers to the UCMP for a Cretaceous-Paleogene Food Web workshop organized by UCMP’s **Bill Clemens**, **Pat Holroyd** and **Mark Goodwin**, as well as **Ken Angielczyk** (Field Museum of Natural History), Peter Roopnarine (California Academy of Sciences), and **Greg Wilson** (University of Washington).

All this collections activity was made possible by our good fortune (and effort) in raising grant money for UCMP projects, and by the energy and abilities of everyone associated with UCMP, includ-

ing our UCMP friends and contributors, although we are sad to have had to say goodbye to two of them, **Claire Englander** and **Robert Mendez**, who are honored in this issue.

From the collections, best wishes and thanks to all of you.

Sincerely,
Charles Marshall

Want to receive UCMP News electronically?

If you would like to receive the *UCMP News* as a color pdf attachment, please let us know. Just send your email address to Chris Mejia at cmejia@berkeley.edu. We are trying to go green wherever possible and reduce costs, but we also understand if you prefer the usual hard copy.

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Who is UCMP?

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William Clemens*	Charles Marshall
Seth Finnegan	Kevin Padian
Carole Hickman*	James Valentine*
Leslea Hlusko	Tim White
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Diane Erwin	Patricia Holroyd

Prep Lab Manager:

April Carr

Education & Public Outreach:

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Trish Roque	Anna Thanukos

Edited by Lisa White; layout & graphics by David K. Smith

For the broader UCMP community, visit the UCMP website: www.ucmp.berkeley.edu; Understanding Evolution: evolution.berkeley.edu; and Understanding Science: www.understandingscience.org

*emeritus

USGS project update *by Erica Clites*

Over the summer the UCMP USGS rehouse project explored California's Franciscan assemblage and Great Valley sequence, not in the field, but through the exquisite collections made by USGS scientists. This continuing work is part of a UCMP two-year NSF grant to rehouse, catalog and digitally image 100,000 specimens from the former USGS Menlo Park invertebrate collection, now at UCMP.

UCMP grad students **Renske Kirchholtes** and **Jenna Judge** compiled locality data from multiple spreadsheets, doubling the number of Mesozoic localities ready to be added to the UCMP online database. Geologic ages were assigned to these 3,000 localities based on the geologic formation, identified fossils or the locality placement geologic maps. We discovered excellent online resources for topographic and geologic maps called TopoView and MapView. These programs allow you to search/view any USGS quadrangle map, or search geologic maps by zip code or latitude and longitude coordinates. We use TopoView to fill in missing county names or check for the proper spelling of places in the locality description. With MapView, we can assign probable ages to localities based on where the

fossils were collected.

While searching drawers of fossils for age information, we discovered a large collection of hand-drawn geologic maps of the Elk Creek-Fruto area near Chico, CA, completed by Stewart Chuber in 1961 as part of his Ph.D. dissertation at Stanford. This is a great example of the primary purpose of the Menlo Park collection—using fossils to map and assign ages to geologic units. The project has added nearly 7,000 localities to the UCMP database and linked 1,000 photos to these records so stay tuned for more updates! 🦕



Left: 1958 draft geologic map of the Elk Creek Quadrangle, Glenn Co., CA, by Stewart Chuber. Right: *Buchia* sp. collected by Chuber from USGS Mesozoic locality M880, Glenn Co.