



The Smilodon

The Newsletter of the Southern California Academy of Sciences

Director's Corner

I am very pleased to introduce two newly elected members of the Board, Ann Dalkey and Gordon Hendler, who are replacing Phillippa Drennan and Kathy Keene. On behalf of the Board, I want to thank Pippa and Kathy for their dedicated service and hope they remain active in SCAS. I also want to thank Brad Blood, who served as Board President from 2006 until 2008, for his commitment and hard work in furthering the goals of SCAS. Brad has generously agreed to serve as Vice President for the next term.

In September we will begin planning for the 2009 Annual Meeting, to be held at Marymount College in Palos Verdes on May 29-30. All members of the Southern California scientific community are invited to attend, submit papers, or organize symposia.

I have identified several immediate or long-term goals for my term as President:

- Increased membership and funding. These are ongoing challenges for any non-profit organization.
- Closer ties with other local scientific organizations. Several, including the Desert Studies Consortium, the Native Plant Society, SCAMIT and SAFIT have attended our Annual Meeting, and in some cases, organized symposia. We should try to formalize our contacts with these organizations, and encourage more active participation in SCAS.
- Higher visibility for SCAS among the local scientific community, and the general public. One suggestion to accomplish this would be for SCAS to sponsor or co-sponsor public lectures on topics of general interest. Two areas that immediately come to mind are water resource management and native plant propagation. Another suggestion is to sponsor short field trips guided by SCAS members.

As the election season and the beginning of Fall semester coincide, I am preparing the syllabus for my Seminar in Bioethics. The syllabus starts with a quote from T. H. Huxley, who wrote in 1870, "Learn what is true in order to do what is right." As

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A CENTURY OF SCAS

The Academy's 100th anniversary of incorporation was in 2007. A brief history of the Academy was published in the Bulletin by Hildegard Howard in 1957. The following is a summary of that article.

SCAS was officially incorporated on May 17, 1907. However, by the time of incorporation, the academy was already 16 years old. Originally SCAS was founded as the Southern California Science Association on November 6, 1891 at the Hotel Lindley in Los Angeles. The goals of the founding of the Association was to establish a scientific society in Southern California to in-part "to secure a more frequent interchange of thought and opinion among those who devote themselves to Scientific and Natural History studies", as quoted from the original constitution of the Association. A second reason was that none of the established eastern societies has yet reached the west coast. Unfortunately a list of the original founders is not known. Among the early active members were: M. H. Alter, Bernhard R. Baumgart, D.W. Coquillet, Anstruther Davidson, Melville Dozier, Mary E. Hart, John Daggett Hooker, Major E.W. Jones, Samuel J. Keese, Abbott Kinney, William H. Knight, William Lundberg, J.C. Nevin, C.R. Orcutt, George W. Parsons, Thomas Shooter, William A. Spalding, William Lord Watts, and

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TALES OF A NINTH GRADE SOMETHING, OR How SCAS RTP Gave Me a Purpose in the World of Science

by Bonnie Lei

Bonnie Lei is a 10th-grader at Walnut High School--she presents this insider's account of the experience of participating in SCAS's Research Training Program.

I glanced around the room, my eyes lighting upon the encouraging smiles of fellow students and scientists. The silence ringing cacophonously in my ear waited for a spoken word from my lips to break it. Taking a last gulp of air, I let myself plunge into the uncharted waters and heard myself proclaim, "Good morning fellow scientists! Today, I will share with all of you my seven months research to answer this question: To speciate or not to speciate?..."

During the next fifteen minutes, my heart pulsed erratically, dancing to its own spontaneous song. All the attention in the room was riveted on me and my explanation of the research I had been steadfastly pursuing throughout the school year. This was the culmination of the SCAS Research Training Program 2007-2008. This was my chance to testify why I chose to spend 8 hours a week in a lab rather than to watch TV or hit the mall with my friends. I hoped fervently that my enthusiasm and passion can overcome my raw fear. As it always has done throughout my life, science won the battle, and by the time I reached the last slide in my presentation, I was smiling with delight. Here I was, a high school freshman, sharing noteworthy information with top scientists at the SCAS annual meeting.

The day I googled "CA science research for high schoolers" last spring, my door to research opportunity finally opened. The sixth link down, as inconspicuous as any other blue and underlined phrase, my connection to SCAS RTP was forged. After several fruitless attempts to individually seek out professors at Cal Poly Pomona ("You're too young" ... "We can't have you in the lab because of liability issues"), finding a program that was willing to give a 14-year-old a chance and provides insurance was the answer to my conundrum. I eagerly applied, and after being accepted, my search for a mentor began. SCAS encouraged me to contact professors in my area of interest, marine biology. Unfazed by initial tepid responses, I was eventually

able to find my mentor, Dr. Ángel Valdés at Cal Poly, one of the few sea slug experts in the world. After quickly learning the basics of malacology, my own project was soon underway.

At the Valdés Research Laboratory, I dissected more sea slugs than an average person would in their lifetime. Not that any "average" people have a fetish for exploring the innards of marine gastropods! I was on a mission to crack an intense mystery. *Haminocia vesicula*, a sea slug species along the western North American coast, seemed to have two separate populations, one in British Columbia and the other in Southern California, with different characteristics. I wanted to know if the extent of their anatomical and genetic variances warranted categorization into two different species. I focused on two aspects of the sea slug: its morphology and 16S genetic sequence.

The morphology portion required extensive dissection of all the specimens. Most of the specimens are on loan from the Natural History Museum of Los Angeles (NHM), and a few are personally collected from Long Beach. I soon realized that the secret to being a professional sea slug collector is strong knees and sharp eyes. Kneeling

on the dock for hours and meticulously searching through the algae masses was a wee bit painful, but the exhilaration felt in finding the tiny animals far outweighed any physical discomfort. Once my samples were preserved and ready in the lab, I used camera lucida, an apparatus that allows me to trace what I see in the microscope, to document the male copulatory organs. In order to see the minute details of the radula and gizzard plates, I needed a scanning electron microscope (SEM). I was able to access the SEM lab in the NHM, and spent a day in the museum's backstage research center taking eerily beautiful black and white SEM photos.

While the process of anatomically studying my sea slugs was relatively smooth, my attempts to extract DNA and obtain sequences were a true test of patience. Although I experimented with a variety of different extraction methods, including Chelex 100, Proteinase K, and phenol: chloroform, and

I will ride out the bumps and find my way. How can science be science without a couple of challenges?

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made countless little adjustments to the protocols, the sea slugs obstinately refused to reveal their DNA. Part of the reason was due to the age of the samples; the museum specimens were collected as early as the 1980's. Because most of my research was conducted during the cold, wintry season when sea slugs are not active in the water, I was unable to continuously collect sea slugs fresh. There were three rare instances of success with the Chelex extraction, the faintest glimmers of hope. All three extractions are from the southern population, and two were freshly collected in Long Beach. These precious miracles were sent to the Beckman Research Institute for sequencing, and the A's, T's, C's, and G's that came back were analyzed with the nifty computer program Geneious.

The conclusion in my paper is provisional, since my research is still ongoing. From the data that I have gathered thus far, it is clear that these two populations are undergoing a speciation event. There are several characteristics in the radula and gizzard plates that are consistently unique to each region, and the low genetic variability within the southern area is a promising start for sequence data. However, there is not enough evidence yet to establish a new species name for the northern population. Up to a few days before the manuscript was due, I was still desperately trying to obtain at least one 16S sequence for the northern population to use for comparison. Unsuccessful, I had to admit that DNA won that battle, but definitely not the war. Now the warmer waters are bringing the sea slugs back, and the collecting opportunities are multiplying. My goal is to acquire fresh specimens from the north, which will cooperate with the extraction process, and finally obtain those coveted northern sequences. I also plan to increase the sample size and study as many more specimens as realistically possible in order to create a more comprehensive analysis. There are many things left to do, and I am sure that the path there will not be smooth. But like I have done this past year, I will ride out the bumps and find my way. How can science be science without a couple of challenges?

Throughout my project, I looked forward to attending the Saturday meetings for RTP at Loyola

Marymount, Cabrillo Aquarium, and UCI Pollution Lab. I was able to meet and befriend the other students of RTP who are as equally avid about science research as I am. We shared our progress, comforted each other through unexpected challenges, and found common ground despite our wide spectrum of research topics. Together, we learned how to compose the final research papers, the secret to captivating presentations, and the core ethics that guide research. We even had the opportunity to explore the revolutionary research of the host scientists. The lessons that were learned at these meetings throughout the year have been invaluable both to my project and scientific curiosity.

After my presentation concluded, I sat back down in my seat and a tide of anxiety ebbed away. It was over. The enlightening SCAS RTP experience

drew elegantly to a close. Now, my attention was free to appreciate the work of my peers and marvel at their triumphs. All of us in this intimate group of amateur scientists have achieved so much in one year. For our achievement, we owe our deepest thanks to our guiding mentors, supportive parents, and SCAS. I, for one, know that my mentor, Dr. Valdés, and graduate student Carla Stout were vital teachers throughout my project. They openheartedly welcomed an inquisitive novice in the lab and selflessly spent their time

teaching me the fundamentals. I never would have been able to get to the lab in the first place without my dependable mom driving me there. And thank you SCAS, for introducing a ninth grade nothing to a new purpose, turning her into something indeed.

A month later, the news arrived in a large russet envelope. Typed up primly in a letter was the announcement that four other RTP students and I have been chosen to attend the AAAS annual meeting next February in Chicago. I literally squealed with elation and disbelief. This is the Holy Grail of RTP. Now, the soaring spires and slushy snow of Chicago await me. A Valentine's celebration combined with the prospect of presenting my research to an even larger audience in "The Windy City"? Nothing can be more exciting. That is, for a science devotee like me!



Haminoea vesicula, photographed in Morro Bay, California in 1971. Photo: Gary McDonald

PROFILES: SCAS' BOARD OF DIRECTORS

The results are in, and the Class of 2008 - 2010 Board of Directors are:

Dr. Jon Baskin
Ms. Anne Dalkey
Dr. Gordon Hendler
Ms. Andrea Murray
Dr. John Roberts
Ms. Gloria Takahashi

Following are brief biographical sketches of the individuals who will be serving on SCAS' board for the coming term.

JONATHAN N. BASKIN, Ph.D., (Incumbent) is Professor of Biological Sciences at California State Polytechnic University, Pomona, where he has been since 1971. He also holds the position of Research Associate at the LA County Museum of Natural History. Jonathan received his Ph.D. at the American Museum of Natural History through the City University of New York and his B.A. degree from Harvard University. His research interests are in the systematics and ecology of fishes, especially catfishes and neotropical and southern California freshwater fishes. He has served on the Board of Governors of the American Society of Ichthyologists and Herpetologists and Southern California Marine Institute, was a founder of the Neotropical Ichthyological Association, and been appointed to the Los Angeles County Significant Ecological Areas Technical Advisory Committee. He has consulted and been active in numerous environmental issues related to endangered species of freshwater fishes in southern California. Jonathan has been an active member of the SCAS since the early 1970's. During his first two terms on the Board of Directors, he was chair of the local committee for the 1998 annual meeting and has been very active in organizing the two most recent Annual Meetings.

ANN DALKEY. As a long-time member who has participated in many annual meetings, I have found that the strength of SCAS comes from its multi-disciplinary approach. Having a varied background myself, I will work toward continuing this tradition while serving on the Board of Directors. In particular, we are facing challenging environmental issues that present a wide range of topics suitable for discussion at SCAS. Currently I am Director

of Science Programs for the Palos Verdes Peninsula Land Conservancy where I oversee scientific activities of the organization that includes applied, educational, and academic studies to promote better understanding of the natural processes within preserves on the Palos Verdes Peninsula. Before coming to the Conservancy, I worked as a marine biologist for the City of Los Angeles' Environmental Monitoring Division (1984 - 2006) and the Orange County Sanitation Districts (1974 - 1984). During this time, I was an officer of the Southern California Association of Marine Invertebrate Taxonomists (1982 - 2002). Since 2001, I have been Co-chair of the Beach Bluffs Restoration Project, an ad hoc steering committee with the common vision to restore native habitat to the beach bluffs of Santa Monica Bay from Malaga Cove to Ballona Creek. I have a B. S. in Marine Biology and M. S. in Biology from California State University, Long Beach.

GORDON HENDLER, Ph.D. is head of the Department of Invertebrate Zoology and Curator of Echinoderms at the Natural History Museum of Los Angeles County. He received his B.A. from Rutgers in 1968 and his Ph.D. from the University of Connecticut in 1973. He has conducted field work in most countries with reefs, including the Phillipines, Indonesia, Panama, Columbia and Belize as well as off both coasts of the United States. He has published extensively on the taxonomy and ecology of brittle stars and published through the Smithsonian Institution Press a popular book on Sea Stars, Sea Urchins and allies of Florida and the Caribbean.

ANDREA P. MURRAY (Incumbent) received her undergraduate degree at San Diego State University in Anthropology, with an emphasis in Archaeology. Andrea worked for three years during the formative stages of the San Diego Archaeological Center, a curation facility dedicated to the preservation and research of archaeological collections. She also has worked as an educational and research technician at the Crow Canyon Archaeological Center in Colorado where she instructed participants in archaeological procedures and methods, and conducted analyses of Mesa Verde region ceramics. She currently serves as the Coordinator of Archaeology for the Orange County Curation Project at CSU Fullerton and is a member of the Public Education Committee for the Society for American Archaeology. Andrea has organized several workshops and symposia, including sessions on archaeological topics for SCAS. She is completing graduate work at California State University Fullerton where she is investigating the micro-morphological development of *Chenopodium*

quinoa, an early Andean cultivar. Andrea has conducted research in California, Baja, Central America, England, and the American South West. Her research interests include archaeobotany, the origins of plant domestication, subsistence studies, the development of social complexity, and lithic and ceramic analysis.

JOHN ROBERTS, Ph.D., (Incumbent) has been a Professor of Biology at California State University, Dominguez Hills since 1985. John attended the University of California at Santa Barbara, earning a B.A. in Cellular Biology in 1968 and a Ph.D. in Biology in 1974. He has post-doctoral experience in the Biology Department at UCLA for three years and worked as a Senior Research Fellow at the Kerckhoff Marine Laboratory/Division of Biology at Caltech for six years. His research interests are in evolutionary and ecological genetics, molecular evolution, and developmental biology. He has been Chair of the Department of Biology at CSUDH since 1997, Chair of the Institutional Animal Care and Use Committee at CSUDH, and Member of the Governing Board and Executive Committee of the CSU Program for Education and Research in Biotechnology. John was also the Chair of the Local Committee for the SCAS 1999 Annual Meeting held at CSUDH.

GLORIA TAKAHASHI, M.A., (Incumbent) is a science teacher and former science department chair at La Habra High School and Director of the American Junior Academy of Science. She is also an adjunct faculty member at Cerritos College and California State University, Fullerton. Gloria developed the SCAS Research Training Program for high school students in 1980. Gloria has received numerous honors for her work in science education, including the Sigma Xi Outstanding Science Teacher Award, Southern California Edison Outstanding Science Teacher Award, Presidential Award for Excellence in Science Teaching Nominee, and the National Association of Academies of Science Distinguished Service Award. Gloria currently serves on the Board of the National Association of Academies of Science, and the Special Advisory Board of the AAAS National Council on Science and Technology Education. During her many terms on the SCAS Board, Gloria has been instrumental in developing and administering our educational programs for high school students.

SCJAS UPDATE

The Southern California Junior Academy of Sciences has been very active in the autumn of 2008. SCJAS members met September 27 at Loyola Marymount University and November 22 at Cabrillo Marine Aquarium in San Pedro. Following are a few photos taken at the events.



Director's Corner, continued

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scientists, we have the responsibility to advocate for science. Many political decisions involve science, and a scientifically literate public is necessary for the functioning of the nation; thus, we should promote increased funding for science education and research in public schools. Similarly, we, as professional scientists, must insist that political decisions affecting public policy be based on the best available science.

A CENTURY OF SCAS

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M.F. Woodward. Mr. Alter was an Optometrist, Mr. Baumgardt was a printer, Mr. Keese was an Electrical Engineer, Mr. Davidson a botanist, and Mr. Watts a Geologist.

SCAS was originally divided into various sections including Geological, Biological, Zoological, Meteorology and Aeronautics, Camera, and Archeology. Originally, sections had their own meetings, or hosted one of the regular monthly meetings and presented a scientific talk. SCAS no longer functions in sections, but does attempt to form the Board of Directors to represent various scientific disciplines.

SCAS' first publication appeared in July 1896, and has been continuously published since that date. Although originally planned as a monthly periodical, it has been published three times per year for most of SCAS' history. An example of some of the early publication included; "A Catalogue of the Plants of Los Angeles County (July 1896) by Anstruther Davidson, and an interesting work entitled "Eucalyptus" by Abbott Kinney published in September of 1896.



SCAS

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SCAS played an important role in the excavation of the fossil of the La Brea Tar pits and in the establishment of the natural History Museum of Los Angeles County. In 1909 SCAS approached and obtained permission from the owner of the tar pits to excavate a small area. SCAS subsequently obtained a donation from one of its early members, Mr. John D. Hooker, and the excavations were started. This led to SCAS' interest in the establishment of a museum. So, with the Southern Section of the Cooper Ornithological Club, the Historical Society of Southern California, and the Fine Arts League, SCAS and representatives of the other organizations entered into an agreement with the County of Los Angeles. The associated societies formed the governing body of the museum and the County contributed funds for construction, maintenance, and staffing. On December 17, 1910 the cornerstone was laid for the new museum. Among the documents placed within the cornerstone were SCAS' Articles of Incorporation, a history of the Academy, and a list of members.

SCAS has enjoyed and still enjoys a close association with the Los Angeles County Museum of Natural History. The Board of Directors meets there monthly to plan annual meetings and tend to other business. More snippets of SCAS history will be included in future newsletters.