SOUTHERN CALIFORNIA ASSOCIATION OF MARINE INVERTEBRATE TAXONOMISTS

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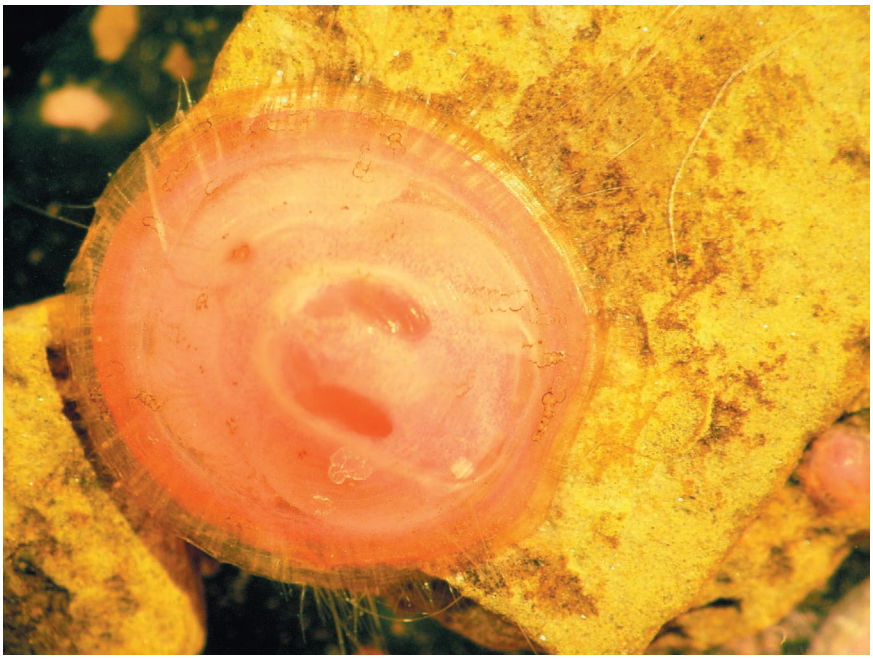

The brachiopod *Pelagodiscus atlanticus* on a shale fragment from 3000m on the Cascadia Abyssal Plain off Oregon. The animal is about 10mm across. A smaller individual is visible at right. Color comes from Rose Bengal stain, not nature. (photo Lisa Haney, CSDLAC)

This Issue

APLACOPHORE LITERATURE

All hard copy members will find included with this newsletter a CD containing the SCAMIT Supplement Volume 23 entitled: "Aplacophore Mollusks of the 2003 Regional Monitoring Surveys of the Southern California Bight." The decision to publish it on CD rather than hardcopy was due to the extensive use of color images. Color hardcopies would have been prohibitively expensive. For electronic members it will be available on the web for downloading. A limited number of extra copies of the CD are available for sale. For members: $5.00 US. For non-members: $30.00. For more information on how to order a copy please contact the SCAMIT secretary.

Upcoming Meetings

March 13 - Sponges at CSD

April 10 - Opisthobranchs with Angel Valdes at LACM

May 8 - Scaleworms with Kristian Fauchald at LACM

June 12 - Terebellids with Leslie Harris at LACM

July 10 - Phyllodocidae with Leslie Harris at LACM

August 14 - ?Gnathis & Pinnixa with Lisa Haney at CSDLAC

September 11 - ?Oedicerotids with Dean Pasko and Ron Velarde at CSD

Ocotober 9 - ?Ecology Topics at SCCWRP

November 13 - ?Heteronemertea Part 2 with Dean Pasko and Megan Lilly at CSD

WORMS UNITED!

Uniform practices between taxonomists are fundamental to high quality data that can be compared from taxonomist to taxonomist, sample to sample, and survey to survey. Several methods of utilizing detached posterior ends of polychaetes may be in use by regional taxonomists. These include:

Never utilize detached posterior ends in identifying specimens to species taxa. Specimens that cannot be identified to species by their anterior detached ends are left at the "sp" level.

Use detached posterior ends when they appear similar in size and/or number to the detached anterior ends. This allows an equal number of anterior ends preliminarily identified to "sp" to be listed by a species name. This requires the taxonomists to know the valid taxonomic description for a species' posterior fragment. It leaves unresolved how to account for the correct species and the correct count if a sample contains more posterior fragments of a genus than anterior ends, but it does allow some specimens in a sample that may otherwise be listed as "sp" to receive a species taxa name.

Use detached posterior ends only when their break point can be clearly matched to the break point of an anterior end and thus confirm that a particular posterior end actually was part of the original specimen. This would typically allow some specimens, but far fewer than in the above example, to receive a species taxa name.

There may be other varieties to these practices, but these three alone will result in variation in the number of named species in a sample and somewhat different taxa diversities depending only on the practices above. SCAMIT should consider surveying its members for known practices and subsequently erecting a standardized protocol for use of detached posterior ends. This will help

to unite local practices and prevent one taxonomist's results from becoming disconnected from another taxonomist's results.

Families likely to be subject to such reunion practices may include members of the Lumbrineridae, Maldanidae, Poeciliochaetidae, Sabellidae, Paraonidae, and Capitellidae.
T. Parker, CSDLAC

EVAPORATION RATES

The following was forwarded by member Larry Lovell from the NHCOLL-listserver.

Wanting to know more about potential alcohol evaporation rates from a new jar closure for our fluid-preserved specimens I ran what I thought was going to be a little, short-term experiment. On December 1, 1995 I sealed a 4 ounce, tall-form, flint glass jar with a polypropylene lid with a foamed polyethylene (F-217) liner. The jar had been filled with
60% ethyl alcohol (un-denatured alcohol diluted with distilled water) to within 20 mm of the jar's collar. I then put a piece of clear tape on the outside of the jar, set it on a shelf in my office, and marked the bottom of the fluid's meniscus with an ink line. Then I waited. In ten years the level of fluid within the jar has dropped 3 mm. I had only intended for the experiment to run a year or two but things kept getting busier and busier and I never got back to it. I hope this helps someone decide what type of closure to use in their museum's fluid-preserved collections.

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SPONGE TAXONOMIST NEEDED

I am a researcher working on an Introduced Species Study at Moss Landing Marine Labs. We have recently completed surveys on the Outer Coast of California as well as in San Diego Bay and San Francisco Bay. We have a plethora of taxonomists working with us to ID all of our specimens. Dr. Welton Lee, out of Oakland, has been doing the IDs for our outer coast samples, however, we have greatly overloaded him as there have been a number of them! He is working on finishing those up, however, we are in great need of a sponge taxonomist to do the IDs for our samples from San Diego Bay and San Francisco Bay.

I have about 120 containers (each containing anywhere from one to several sponges) to be ID'ed from San Diego Bay and approximately that amount or more to be ID'ed from San Francisco Bay. There are two portions to our study: qualitative and quantitative. At each site (there were 20 dive sites we sampled in SD Bay) we took samples from 4 quadrants at 0.05m² per quadrant. These were samples scraped from the undersides and sides of docks as well as sides of wood and cement pilings at various depths. We also sampled any types of floats and anything else of interest at each site. This constitutes as the quantitative portion of our study. Those samples were then fixed in 10% formalin and later transferred into 70% ethanol and sorted into phyla by our Benthic Lab.

For the qualitative portion of our study, one person spends the entire time at a site searching for non-natives and collecting them as well as anything that we may not recognize. For the sponges,

especially, we take photographs of each sponge as well as make notes on color, texture, etc and put one sample of each species into its own baggie. Each sponge is fixed in 90% ethanol and sent out to a taxonomist.

I'm wondering if anyone might be interested in working on this project with us! I will add here, that we have some pretty strict deadlines to adhere to. We are held to them, of course, by a final legislative deadline. We're looking to have all the sponge data back to us as soon as possible!

If anyone is interested, or knows someone who might be, please contact us, it would be greatly appreciated. Below is the contact information.
Thank you,
Ashleigh

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VISUAL VERACITY

In their recently published article, "Visual Clutter Causes High-Magnitude Errors" in Plos Biol 4(3): e56; Baldassi, Megna, and Burr demonstrate that what we all think we see may not be what really is visible.

Experimentally testing the relationship between the ability to accurately view conditions in a field of view and the degree of complexity in this view, these researchers determined that the more cluttered the field of view is with "detractor" images the more likely the observer is to make an error. But in these conditions, the observer is also more confident that their observations are actually correct.

Signal Detection Theory assumes that the brain represents each element in view as an independent variable and also that when the observer is unsure of the preferred target item, the brain monitors all items in the view and accuracy performance suffers. Thus busy streets, messy desks, and probably poorly sorted benthic samples are likely environments for error prone observations.

Their results suggest that the probability of being sure you saw something you didn't increases in chaotic visual environments.

The article is available on-line at plos.org.
Tom Parker - CSDLAC

GEE, I MISSED THAT!

I was 10 years old in 1956, and although extremely interested in sea life, was not yet a connoisseur of literature. Two of the many papers published that year have recently come to my attention. Emery and Terry (1956) published a first description of the continental slope off Palos Verdes. They described the steepness of the slope in comparison with slopes off Catalina and in

the Santa Cruz Basin, and provided profiles of a series of transects perpendicular to the shoreline of the peninsula. They also ran transects parallel to shore which revealed extensive gullying of the slope, a somewhat unusual feature. We deal with this in our trawling program, where trawling along an isobath means cutting across these gullies. Of course such data has been superceded by bathymetric information of much finer detail. Still, it is interesting to see the original work on the submarine geomorphology of this local continental slope.

Dr. M. W. de Laubenfels, the man who almost single-handedly described the sponge fauna of California, had other interests as well. His publication on a suggested mechanism for the great Cretaceous extinction (de Laubenfels 1956) proves of interest. In this paper he advances a hypothesis that the demise of the dinosaurs might have stemmed from extraterrestrial influence. This suggestion predates the discovery of the great Chicxulub crater in the Caribbean which is currently viewed as the impact point of a very large extraterrestrial object (10km). de Laubenfels drew on descriptions of the much smaller Tunguska, Siberia, impact of 1908 in constructing his hypothesis. Impact is now seen as the most likely cause of the end-Cretaceous mass extinction that wiped the dinosaurs off the map. In the 1970's, unusual levels of iridium in sediments were reported deposited at the Cretaceous/Tertiary boundary. Shortly after, Luis Alvarez and his son Walter proposed impact of a massive extraterrestrial object (meteorite or comet) enriched in iridium to account for the large amounts of iridium found at the CT boundary. Extraterrestrial impact moved from a hypothesis to a viable theory based on this evidence.

The mechanism de Laubenfels proposed was but one of the known contributory causes to the extinctions. He suggested that the heat pulse caused by the impact of an object killed most large terrestrial organisms. While this may have been true in the general vicinity of the event, it was probably not a world-wide phenomenon. Shortly following the heat pulse, massive tsunamis, generated by the initial impact in 100m deep water, probably reached 50-100m in height and affected all land surrounding the Gulf of Mexico. Recent analyses suggest that the return of the larger masses of materials ejected by the impact in a meteorite rain ignited massive wildfires at several points on the globe. These are modeled to have spread rapidly to cover a substantial portion of the world's surface, destroying much vegetation and generating huge plumes of smoke. Other contributing factors were the ejected fine particulates, which circulated for at least 6 months to a year in the upper atmosphere, reflecting and absorbing sunlight; the vaporization of evaporite rocks at the impact site which released large amounts of sulfur into the atmosphere; and the release of large amounts of the green-house gas carbon dioxide from vaporization of carbonate rocks. Together these effects would have reduced light and temperature world-wide for a period of a year or more. The article is very interesting reading, and worth a little sleuthing to find. Theories and debate on the relative scale of the multiple consequences of the impact continue to date. See www.lpl.arizona.edu/SIC/impact_cratering/ Chicxulub/Chicx_title.html

An even bigger picture was pursued by Bottjer and Jablonski (1988) who attempted to determine the factors behind major distribution pattern of marine communities since the Paleozoic. The fossil record is not sufficiently complete to preserve all members of marine communities, so their analysis was based on a subset of three clades. They considered isocrinid crinoids, cheilostome bryozoans, and tellinacean bivalves. They followed these groups over time using their relative occurrences in five sections of the ocean. They used divisions which are familiar and still appropriate today: nearshore, inner shelf, middle shelf, outer shelf, and slope/deep basin. The time line was divided into 5 million year segments.

Their analysis confirmed the previously observed pattern of introduction of taxa at shallower

depths followed by their diversification there accompanied by movement into deeper parts of the world ocean. Their data did not support the previous conclusion that this was a community level epiphenomenon. They found that the histories of the three tested clades were sufficiently different to demonstrate that trends were not community wide, but based on biotic interactions within individual parts of communities. These results pre-date the broad availability of information on vent taxa, and an analysis conducted on vent/seep forms alone might find a different pattern over evolutionary time than that provided by the authors.

Don Cadien - CSDLAC

DR. ROBERT SMITH, A BRIEF PERSONAL NOTE

Somehow the loss of someone in robust health, with a healthy life style, is infinitely more shocking than that of a victim of chronic disease, or with a life-style not based on good nutrition or behavior. Bob Smith was such a robust person, and his death on December 29th 2005 shocked me profoundly. He was sixty-two, and very active.

Bob got around. I first met him in 1975, when I began doing data analysis for Marine Biological Consultants. Bob was already in contact with many local agencies and consulting firms, and I was sent to him to learn the ropes of cluster analysis using his EAP (Ecological Analysis Package). I sat in his kitchen in Redondo Beach discussing methods and reasons with him for most of a day. His wife, Posey, kept us supplied with fuel, and kids were not too much in evidence. Our professional relationship continued over many projects, and persisted with my move to the County Sanitation Districts, where Bob had long been providing assistance with data analysis. I consider myself fortunate to have always had Bob as the go-to guy when I had questions about analyses, but perhaps it was inevitable. Virtually everyone I came in contact with in my daily peer interactions knew Bob and used either his program or his services. Meetings were brief, but we spoke often on the phone. Bob was always mentoring other biologists (including me); presenting them with understandable digests of statistical and computational complexity. To me he was always a biologist first and a statistician/analyst second. He relocated his family to Ojai years ago, and started a consulting firm, Ecoanalysis, which eventually was lost on the rocks of several very large contracts.

Starting in 1994, with the Southern California Bight Pilot Program, our meetings became much more frequent. Both of us were involved with data collection and analysis for this and subsequent Regional Monitoring efforts. We sat in seemingly endless meetings, discussing what needed to be done, and how to do it. These efforts eventually let to his development of the Benthic Response Index (BRI) since no available community metric seemed to fit the bill. Such contacts continued through recent Bight'03 preliminary data analysis meetings. In the last year another joint project again increased the frequency of our interaction; work on sediment quality objectives through SCCWRP. All of these contacts were enjoyable, but all were work related rather than personal. The only real personal time I spent with Bob was at one of Mary Bergen's get-togethers at her Ojai ranch several years ago. Even there Bob and I largely talked shop. Well, pleasurable as that was, it was my loss not to know more of the private Bob.

I attended his memorial service in Ojai on 21 January of this year, as did quite a few other folks. It was there that I got glimpses of Bob's non-professional side. I found he was an avid bike-rider, who rode daily under most circumstances, and had a habit of taking a little 170-mile bike circuit on weekends. He rode competitively as well as recreationally, and apparently was a very accomplished rider. He also swam and ran. I was familiar with his habit of pushing himself

intellectually, but found out this habit carried over into his physical activities as well. The warm thoughts and reminiscences of his local friends and acquaintances permeated the proceedings during the memorial.

Not that his professional associates were unrepresented. A number of folks from SCCWRP, CLAEMD, CSDLAC, and CSDMWWD were present, as were representatives of several consulting firms. Bob's own co-workers and employees at Ecoanalysis were much in evidence, one having flown back from the East Coast to participate. Brock Bernstein, who was a close associate of Bob for many years, officiated and delivered a fine eulogy. One of Bob's long-time Ojai friends put together a CD of pictures of Bob that was distributed to attendees. Unlike many such memorial gatherings, the sense of loss among the survivors was more than offset by the warmth and celebration of Bob's life and achievements. His family, friends, acquaintances, employees, coworkers, and professional contacts all merged together seamlessly into a group. Quite a number of people got up to share reminiscences of Bob with all. Even after the official proceedings had to end (the Ojai Center for the Arts needed the room for another event) parts of the group spun off to other locales to continue. I was part of a group which met at Brock Bernstein's home and continued our reminiscences for several more hours.

SCAMIT lost a good friend when Bob died. He was very aware of the damage done to analysis by confused or contradictory taxonomy in the base data. He generally felt that, despite published information to the contrary, the more detailed taxonomy was, the better the result.

The manner of his death seemed fitting to those at the memorial who knew his personality the best. He died while mountain biking with a friend. They had just raced up a very hard climb and crested a hill, starting down the other side. As they did Bob's blood pressure dropped, his heart gave out, and he lost consciousness. His riding buddy was a cardiac nurse. She was right on the scene but could do nothing for him. He died peacefully and apparently without pain.

I hope those of you who knew Bob will put down your own thoughts about him to share with us. Those of you who didn't know him lost a chance to share the life of a wonderful person on December 29th.

Don Cadien - CSDLAC

OFF THE DEEP END, SEEMINGLY FOREVER

It has been five years since I began working on northeastern pacific bathyal and abyssal materials. Although other sources have been sporadically available from local institutions, the majority of the material has come from the epibenthic sled samples I received from Dr. A. G. Carey at Oregon State University. Rather than see them discarded by a squeeze on storage space, he ceded them to me for processing. When received, the material consisted of 55 5-gallon buckets of ethanol preserved, unsorted sediments from Oregon, and four 1 ½ gallon jars from the Tanner Basin. None of the containers were full of sediments, but this was still a substantial volume to process. To date, 36 of the 55 buckets have been sorted, representing 19 of the 28 sites.

I began with the Tanner Basin samples (smaller and more local) which had originally been collected by Dr. Robert Hessler at SIO, and provided to Dr. Carey for comparison with his Oregon samples. All of the materials dated from between 1972 and 1975. Some had been stained with Rose Bengal. Hessler's students had removed arthropods from all but one of the Tanner Basin samples but other taxa remained. Mollusks were quite prominent in these four samples, with large suites of some bathyal bivalves, particularly taxodonts. All four of these samples have

been fully sorted, and many of the non-polychaete taxa have been identified. The polychaetes from all samples will go to Leslie Harris at the Natural History Museum of Los Angeles County, but she doesn't currently have the time to look at them.

Once the Tanner samples were sorted I proceeded to attack the bathyal samples from Oregon (5 sites). Several of these were very large (one was split into 10 five-gallon buckets), and took over a year of late-night and weekend work to sort. No partial sorting of these had been done, so representatives of many groups were found in abundance. Because of the huge volume of material in some sled samples, the sorting process was modified to remove only complete or substantially complete organisms. Even so, the more abundant taxa were represented by more than a thousand specimens. In one Oregon sample from 732m ophiuroids were exceedingly numerous, and good growth series of several species could be constructed from just post-settlement to adult. This sample was also the source for a new species of *Caecognathia*, represented by 358 specimens (*Caecognathia* sp CS1 in Lisa Haney's gnathiid presentation).

As a breather between such massive samples (and to satisfy my curiosity) I processed a few of the abyssal samples here and there. I had received samples from 23 stations at depths between 2762 and 3000m. The first few processed had little in them compared to the bathyal samples, and most specimens were quite small. I left most of these abyssal sled samples for later, and began working on separating more finely the sorted materials from bathyal samples.

Where to start! My interests are fairly broad, but during the current period I am concentrating on aplacophore mollusks and peracarid crustaceans (particularly cumaceans and isopods). Serendipity however, presented me with a wonderful tool with which to tackle another group. "Bivalve Seashells of Western North America" which arrived in 2000, thoroughly covered the depth range of samples I was examining, bringing together information from many scattered sources. I tried to identify the bivalves from the samples I had already sorted. Along the way a new species of *Nuculana* turned up at several of the lower bathyal sites. While discussing deep-water mollusks with Linda Kuhnz of MBARI, she recognized the animal I was describing. She had run across it in materials collected during various investigations at MBARI, and was describing it with Paul Scott (SBMNH). I promised to hand over my material to assist that process.

No other group had such a resource to facilitate identification of unfamiliar taxa. In the aplacophores, for instance, the few resources available were scattered. Despite Scheltema's work in the Taxonomic Atlas (Scheltema 1998), most of the taxa in the group remain poorly known. In the neomeniomorphs there are 9 species described from the NEP between California and Alaska at bathyal or abyssal depths. In the materials from Oregon, two of those occur, along with 19 other morphotypes based on external appearance alone. Several of these will probably prove to be described once internal structures are known, but that still leaves a large number of undescribed forms. There are also a few undescribed chaetodermomorphs in the samples. Separating these specimens into presumptive species lots took awhile: I currently have over 1450 specimens of aplacophores in the Oregon samples, probably 1200 of which belong to undescribed species. As more of the abyssal samples are sorted, more aplacophores show up.

Because of the sheer volume of material I have begun to seek collaboration from other SCAMIT members. So far I have transferred the shelled mollusks to Kelvin Barwick (CSDMWWD), and am preparing to send the echinoderms to Megan Lilly also at San Diego. I have had interested

enquiries from a few others, but so far have chosen to keep on sorting by myself. I hope to complete the sorting by the end of 2006.

All of the non-stained samples have been processed at this point. My distaste for the Rose Bengal stain, and its results in the preserved animals, has finally been overcome by the necessity of completing the sorting and determining the boundaries of the available materials. Until this is complete, little additional fine separation of the sorted materials will be accomplished. They are currently sorted only to family level or higher for most groups. Separations to date have isolated 238 species level taxa, of which 106 are provisionals.

I have begun work on the Ischnomesidae of the North East Pacific. There is only one record, from hadal depths, of a member of this family in the region. There are grey literature reports, however, and I have specimens from Oregon. The members of this family are usually uncommon to rare in samples, and are fragile and easily fragmented. So far the Oregon samples have provided 38 specimens of family members. Among these I have separated seven morphotypes. I would say species except that ischnomesids can exhibit considerable sexual dimorphism. The impetus to complete the sample sorting comes primarily from the need to find additional ischnomesid specimens. Through the kind offices of Jim Barry and Linda Kuhnz at MBARI I have five additional specimens from Monterey Bay under examination. Two of these represent an 8th morphotype, and one a ninth.

Recently I was contacted by Karen Osborn (MBARI and UCB) a graduate student working on phylogeny of munnopsid isopods. Attempts to assist her by providing material may push me into working on one or more new munnopsid species from the material at hand. I told Karen I was interested in describing a new *Syneurycope* and perhaps also a *Vanhoeffenura*. Manuscripts describing a new cumacean (*Procampylaspis*) and a new isopod (*Pleurocope*) are currently in progress with Dr. Jody Martin (NHMLAC). Another on the *Caecognathia* sp CS1 with Lisa Haney (CSDLAC) is in the planning stages. Description of a new *Cylichna* is planned with Kelvin Barwick (CSDMWWD).

Parties seeking involvement in this long-term project should contact Don Cadien at dcadien@lacsd.org (or 310-830-2400x5602) and discuss their interests and availability. All materials will eventually be deposited in the collections of the Natural History Museum of Los Angeles County, where they will join Oregon materials from other collecting efforts (trawls, box-cores, anchor dredges). This will form the core of a significant regional collection of invertebrates from the bathyal and abyssal North East Pacific. Other materials from other efforts (including AHF canyon and basin samples, and BLM deep water samples) also feed into this collection, strengthening it and broadening its coverage.

While few bathyal areas fall within the routine monitoring coverage of cooperating agencies, interest in the down-slope fauna seems to be increasing. The City of San Diego is currently examining materials collected from the bathyal zone (to 500m depth) in their study area. The County Sanitation Districts of Los Angeles County performed a reconnaissance effort in 2003 at unexamined sites in their study area (many at depths to 960m) and may repeat this effort in future. The Bight '03 Regional Monitoring Project ventured into deeper water, examining samples from depths to 1000m within the Southern California Bight. We should continue to refine our skills and increase our familiarity with the animals that occur there, many of which differ from shelf species.

Don Cadien - CSDLAC

ANOTHER BRACHIOPOD

Dr. Eric Hochberg, in his brachiopod section of the Santa Maria Basin Taxonomic Atlas series (Hochberg 1996), provided a most useful compilation of information on the brachiopods found off California. While his treatment is extensive, it was limited to materials available for study, and was not comprehensive.

Recently, in one of the abyssal samples taken off Oregon by Oregon State University in the 1970's (see Off The Deep End, seemingly forever in this issue), a number of shale fragments joined the usual foraminiferal and radiolarian debris retained on a ½ mm screen. I was both surprised and delighted to find on these, numerous specimens of a small, unfamiliar brachiopod. This was a form with one valve attached to the substrate, and the other free. The sample had been Rose Bengal stained, so these had the appearance of hairy pink blobs on the shale fragments. Most were intact, although some had lost the upper valve. I expected to find the animal in the Atlas, but didn't. Digging further into the literature I found what I needed in Hertlein and Grant (1944); a description and figure of *Pelagodiscus atlanticus* King 1868. The species is in the family Discinidae. The test of a related species in the genus *Discinisca* is figured by Hochberg (1996, Figure 1.1 j,k,l). In *Pelagodiscus* the apex is more central, but the similarities in overall structure are strong.

While, as the name suggests, the organism was originally taken in the Atlantic, it is known from many parts of the world in abyssal depths. Austin (1985) listed it from the NEP abyssal, and McCauley (1972) from 2600-2850m off Oregon. Only this latter record was mentioned by Boudrias and Taghon (1986) in their compendium of records from the Gorda Ridge and vicinity. Bernard (1972) which did not cover the abyssal fauna, did not mention *Pelagodiscus*. In coastal abyssal collections off San Francisco at depths between 2300-3000m they were not reported from either infaunal (Blake et al 1992) or trawl (Nybakken et al 1992) samples.

While examining the specimens something finally clicked and I placed structures I had often seen in other Oregon abyssal samples, at bathyal depths in the Tanner Basin, and at basin depths within the southern California Bight. The structures are ovate-conic and corneous, slightly thickened at the apex, or conversely, thinned at the edges. I had been at a loss as to their affinity, but had picked them from samples as reminders of the presence of some animal. They were the top valves of *Pelagodiscus*. As many were quite worn, these valves must persist long after the rest of the organism has disintegrated. These artifacts indicate the species is much more widespread than a single collection of living animals off Oregon might indicate. We can speculate that the species also occurs off California at bathyal and abyssal depths, since the upper valves are not uncommon there. Without actual animals, however, we may be seeing evidence of a locally extinct population. As more eyes are turned towards these deeper waters locally, perhaps we will learn the status of the species off California.

Don Cadien - CSDLAC

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Please visit the SCAMIT Website at: www.scamit.org

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