



MicroNews

San Francisco Microscopical Society

Volume 10, #2 November 2015

FIFTY YEARS OF PROTOZOOLOGY

by Dr. Gregory Antipa

General SFMS Membership Meeting: Thursday, November 12, 2015, 7:15 PM

Location: (Randall Museum) at Mission Art Center, 745 Treat Ave., San Francisco

The Randall Museum is closed for extensive renovation so many of its activities have been moved to the Mission Art Center located on Treat Avenue between 20th and 21st streets. Treat runs parallel and between Folsom and Harrison. Call 415-695-5014 for additional information.



Dr. G. Antipa, Life Member SFMS

Dr. Antipa is author of over 50 publications. His research interests include cell biology, ciliate development and electron microscopy. His work has been funded by grants from the National Science Foundation, the National Institutes of Health, the Department of Energy and the Office of Water Resource Research.

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TOXIC - HOW DO WE KNOW?

Blue-Green Algae? What are they?

“Blue-green algae are actually bacteria that have qualities similar to algae and other plants. These bacteria are cyanobacteria – cyan means “blue-green” – and are commonly found on land and in lakes, rivers, ponds, and in estuaries and marine water.”

Why Are They Of Interest? Let me tell you about two walks I took this summer. The first,

in June in the morning of a fine day and as we walked around Lake Temescal in Oakland we saw a number of high school swimmers being trained as lifeguards for the park department. The lake is one of the great outdoor swimming places in the East Bay. Surround-

ed by hills and trees, it is an easily accessible



park with a wide sandy

(Continued on page 2)

Cyanobacteria cont.

beach. The swimming area was already divided into lanes for power swimmers and wading areas for the non-swimmers and the summer season was about to start, right after the water tests results came back from the lab at the end of June.

We have had a warm spring with little rain and less fog and cloud cover. The drought had reduced the water flow into the lake which is shallow , no



Seen on water where algae and cyanobacteria are concentrated.

more than 15 feet deep. The conditions are ideal for the growth of algae and cyanobacteria.

Floating on the water was this green sheen that I was also going to see on a walk with my brother, after celebrating his 91st birthday in Seattle. Green Lake is larger than Temescal but their climate has also produced a warm spring and drought.

As a result, tests indicated that there was a cyanobacterial bloom that could be toxic to pets and people, particularly children. Several of the toxins attack the liver while others have an effect on the nervous system. In most cases, it is the ingestion of the algae that will cause damage but a few do cause skin irritation. Consequently, no swimming was permitted all summer in either lakes.

I thought it would be interesting to see how the tests are performed so I called the Parks and Recreation Department of Water Resources to get per-



mission to accompany the ranger responsible for sample collection. Since Hal McClain was on vacation I was permitted to accompany Ranger Sunshine Thompson. She met me at Lake Temescal (illustrated above to the right with a sample bottle) and later in the afternoon , I saw her prepare the sample in a laboratory for a test of toxicity. Looking at a sample through a microscope identified the presence of cyanobacteria. The test for algal toxins is a strip test that involves lysing



the cells, adding reagent paper to a 1 ml sample, transferring seven drops to conical flip-top tube containing dried reagent and testing this solution with a dip stick that is read after 10 minutes incubation. The dip stick can reveal concentrations of 1 to 10 ppb where "b" is *billion*.

The kit is produced by Abraxis, LLC. The test result was negative but this would not be enough to open the site for swimming even if the site was

IS THERE A DECLINE OF PHYTOPLANKTON?

Modern research light microscopes are a wonder of light sources, filters and optics with a variety of light paths and mechanical stages to serve every need. In addition, since the image is processed by a computer program, algorithms are available that remove out-of-focus pixels, provide a way to sharpen and enhance what can be observed and record observations at discreet levels on the Z or vertical axis. Most of us have not the wealth to own such an instrument or the skill to use them but if we are willing to take classes, we can access such instruments at Merritt College in Oakland. Housed in the new Science building that opened this fall, the microscopy program prepares students to work as technicians. What light and electron microscopes do is manipulate electromagnetic energy so that we can reveal information from minute objects and processes. Interestingly, this is what NASA does but often on an entirely different scale.

Remote sensing has become a specialty of NASA and the many companies that contract with this federal agency. Using instruments that are sensitive to specific bandwidth of the electromagnetic spectrum, satellites are able to provide data that reveal subtle changes in the reflected sunlight from ocean water and from land. The color spectrum of this reflected light depends upon what the ocean water contains and the depth to which light can penetrate and be reflected. If the absorption spectrum matches that of chlorophyll then we can assume that this substance is present. While many other factors must be considered when taking measurements over prolonged periods of time, the process can be refined to yield accurate data and it suggests that [there](#) has been a decline in chlorophyll in vast areas of the Pacific and Indian oceans over the past 15 years.

Every fisherman who cast his net in



Diatom from Don Edwards Preserve by Wm. Gurske
Member, SFMS

the ocean in the nineteenth century thought that the supply of fish would never dwindle. Whalers knew better. Their effort at securing sperm oil was increasingly more difficult and the search for the elusive leviathans was forcing them to sail into less well-traveled waters, particularly into the arctic and Antarctic seas.

We still marvel at the vastness of the oceans that comprise 70% of the earth's surface. We have learned a lot about the properties of ocean water and can now recognize that acidification is a threat to certain marine organisms. If a marine animal's shell is partly made of calcium carbonate, a slight reduction in pH becomes life-threatening since it can increase the solubility of carbonates, making it more difficult to precipitate the substances to form shells.

Every microscopist learns to appreciate the beauty and value of diatoms. Not only are they invaluable indicators of the fossil record but they also function as a great carbon sink. The single cells are contained in a case (called frustule) formed by two cups or valves, one of which overlaps the other, the larger being the epitheca and the smaller

the hypotheca. Each is made of silica compounds. Diatoms are autotrophs, capturing light energy through photosynthesis. Great deposits of these frustules form 1500 foot thick beds at Lompoc, California, and are mined for diatomaceous earth, used in a number of products and processes such as filtration, mild abrasive powder, cat-litter absorbent compound and filler in plastics and rubber.

If you have looked at samples of pond water, you have seen diatoms. They are present in very small quantities in municipal water supplies and are harmless. In the oceans they form blooms that span hundreds of miles and can be observed from space. The photosynthetic process converts carbon dioxide dissolved in the water into organic carbon compounds such as sugars (saccharides) used to grow more diatoms. When the cell dies, the frustule containing the carbon compounds sinks to the ocean floor where they act as "manna from heaven" for the benthic animals or become sequestered in the sediment and stored for thousands or millions of years.

NASA has developed many instru-

Phytoplankton Decline, continued.

(Continued from page 3)

ments capable of analyzing light as well as other electromagnetic energy. These sensors mounted on earth-orbiting satellites provide a wealth of data collected over



Thalassiosira sp. Marine diatoms
by Wm. Gurske, Member, SFMS

predetermined geographic points at specific sun angles and time stamped so that the data become recoverable from the enormous data-record beamed by satellites to earthbound antennas. Two satellites participated in collecting the data on oceanic blooms by measuring the presence of chlorophyll. The Geo Eye OrbView-2 satellite collected 1997 to 2010 data using a *Sea-viewing WideField of View Sensor*. The Aqua satellite, using a *Moderate Resolution Imaging Spectroradiometer (MODIS)* started collecting data in 2002 and continues to do so. The analysis of the data shows that chlorophyll from all the phytoplankton species observed in the northern hemisphere is declining with significant losses occurring in the North Pacific, North Indian and Equatorial Indian oceans. It is believed that

the decline in the diatom populations is responsible for this change. Measurements indicate that these populations have shrunk more than 1% per year from 1998 to 2012 globally. Such a shrinkage may reduce the amount

of carbon dioxide removed from the atmosphere and sequestered in the ocean sediment.

While microscopes are indispensable for identifying and distinguishing between the large diatoms and the smaller organisms such as coccolithophores, chlorophytes and tiny cyanobacteria, such data can only be gathered from on-sited sampling. These field observations are indispensable for matching with satellite-generated data and provide part of the information used to build computer models of ocean basins.

Diatoms (more accurately referred to as Bacillariophyceae) and other phytoplankton would not be able to exist in an environment consisting of water contained only NaCl and pure water forming a good saline solution. Nutrients must also be present

even if in very small amounts. Besides the continuous addition of nutrients from the rivers of continents, the upwelling flow of water from the ocean depth also provides for recycling of some nutrients particularly at the western margins of continents. This upwelling of essential nutrients stimulates the food chain and creates the important fishing grounds of the oceans. The food chain begins with diatoms and other algae that capture the sun's energy but this

can only occur in the upper layer of the ocean where sunlight can penetrate. This layer is referred to as the mixing area because wave action and currents churn the water and help to distribute the nutrients from deeper layers of water. It is posited that the mixing layer is becoming shallower by an average of 1.8 meters over the 15 year study period. Why this is taking place, why the mixing layer is becoming shallower, is still uncertain. While the data point to a reduction in the production of phytoplankton the length of the

study and the many parameters that must be considered and that may have an effect on the availability of nutrients during this relatively short time period do not yet justify great alarm.

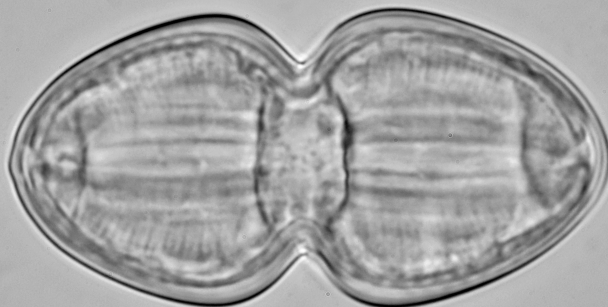


Thalassiosira sp. with attached choanoflagellates Salpingoeca sp. by Wm. Gurske, SFMS Member.

We know that carbon dioxide concentration in the atmosphere has been steadily increasing over the past one hundred years. This increase has had widespread effect on climate and on the acidification of lakes and possibly the ocean.

By H. Schott

Part of this report is based on material gleaned from a NASA article entitled: *NASA Study Shows Oceanic Phytoplankton Declines in Northern Hemisphere*, Published Sept. 23, 2015.



Diatom from Don Edwards Preserve
by Wm. Gurske, Member, SFMS

FROM FARM TO FERMENTATION

This was not the first time that this festival was graced by the presence of microscopes lent for the occasion by the microscopy program at Merritt College. Packed in their special carrying cases and nestled in the trunk of Peter's car, they traveled early in the morning to Santa Rosa where a space had been reserved for this service. Neither Merritt College nor the SF Microscopical Society were there to ferment grapes, corn or veg-



that do this task while numerous other booths were devoted to the specialized equipment needed for successful fermentation or to sell the many products that are the result of fermentation including beer, wine, cheese and yogurt.

The festival was held at the Santa Rosa Finley Center, 2060 West College Ave., a lovely modern facility, and was very well attended. We



etables. We were there to highlight the organisms that

probably should have a special issue of Micro News devoted to fermentation microscopy, what is going on in this process. A steady stream of adults came by and looked

Also in attendance were Bill Hill and for three hours, yours truly, who fought traffic most of the way to get there.

What was missing was good signage indicating who we are and identifying our web site. We also need stools so that people can position themselves in front of micro-

scopes through the microscopes at blue cheese mold, yeast and other molds recovered from nearby displays. The microscopes were arranged on two tables. Visitors asked questions,



Microscope table to high for kids. Brother lifting his little sister to get a peek.



Microscope table to low for adults. Note Micro News and SFMS literature on table.

scopes properly. Even two stools would have help. Boxes for kids to stand on could be an additional good item if they would also serve as carry-crates for ancillary equipment. Last, but not least, we need good signs that explain in a few words what people are seeing under the microscope. Large and bold, clear and illustrated placards near each microscope, these are what people will remember. Bill Hill was working on this near the end of the get-together. Producing it on site would be worthwhile. To do so, we need a portable printer and laptop computer. YOU MISSED SOMETHING INTERESTING. Next year plan on being there. Many thanks

picked up SFMS literature, both old issues of Micro News and the 3-fold. We met people from SF and Oakland though the majority were local.

Fermentation products are an important part of our diet and include cheese and bread as well as pickles and sauerkraut. Wine and beer were also exhibited and sold in the courtyard.

Special thanks go to SFMS member Arvid Ekenberg who spent the whole day helping Peter. Arvid lives in Sonoma so he was closer than most of us.

Available Microscope Slides

While some members have acquired a personal collection of microscope slides, it has been the intention of the board for several years that there be a lending library of slides available to members. The first steps in that direction have been taken with the purchase of a set of 25 slides described as General Biology Elementary Slide Set A to be followed by the purchase of 150 more slides. Produced

by the Lieder company of Germany, the slides cover a wide range of biological subjects.

The lending library will be available only to members who must take responsibility for their proper use. To see a list of available slides, go to www.lieder.com. Select the slide number (i.e.507, 509, 514) that you want to see and contact HSchott@aol.com who will mail them to you.

To recommend the purchase of slides or slide sets of

Your SFMS Board Actions

The SFMS Board Meeting of October 11, 2015 was held in Oakland and was attended by President & Chair: Peter Werner, Bill Hill, Vice President and Myron Chan, Treasurer. Guests were Henry Schott, editor of Micro News (and acting Secretary) and Terri Beauséjour, website developer. The Board decided to invest part of the reserve in a conservative fund. The treasurer was asked to develop a budget for 2016 based on our recent history. He reported that in the past three months we have spent \$848. SFMS received dues from Linda Ann Wrxall, a long-standing regular member that converted her membership to Life Member. Congratulations to Linda and thanks for her continued support.

The Randall Museum is undergoing a year-long refurbishing and reconstruction. The Board voted to make a

donation toward furnishing the interior for which funds are being solicited. A one-time donation of \$5,000.- was approved.

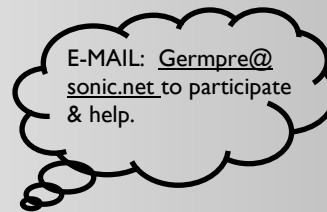
The purchase of a slide collection has been under consideration for a long time. Board members believe that German made J. Lieder GmbH & Co. KG are among the best available on the market. A set of 25 slides was ordered on October 1 from an American supplier who discounted the sale to \$105 (plus tax and shipping) but had not yet been delivered. It was agreed to buy Sets B, C and D (150 slides total) to give a reasonable spectrum of slides of animal and plant tissues. These will form the basis of a slide lending library. A maximum expenditure of \$1,500 for this purchase was approved.

At numerous public meetings we hand out a tri-fold information and member-

ship pamphlet. Fifty dollars was allocated to print additional copies.

Peter Werner introduced Terri Beauséjour (terribeausejour@gmail.com) who specializes in web design and marketing. After her presentation, the Board allocated \$5,000 for a redesign of the SFMS web site using *Drupal*, a website platform that is an open source content management system (CMS). Progress reports will be considered at each of the next two or three board meetings.

The next Board meeting will be at 1:00 PM on Saturday, November 14, 2015, in Alameda. (Please see e-mail for later confirmation.) The current meeting adjourned at 3:51 PM. HS



INFORMATION ?

Calendar Items

Please help and support SFMS participation in these activities.

24 October 2015, Saturday, **Bay Area Science Festival Discovery Day**. Cal State East Bay Hayward: Science Building

31 October 2015, Saturday, **Merritt College Bio-Fest**. 10 am to 2 PM
6 November 2015 Friday, 6-9 PM. Fermentation Microscopy. Counterculture Lab, Oakland, 4799 Shattuck Ave.

7 November 2015, Saturday, **Discovery Day at AT&T Park** in SF. 10 am to 4 PM

12 November 2015, Thursday, 7:15 PM. Scheduled **General Membership Meeting**. Dr. Gregory Antipa will present "50 Years of Protozoology". 745 Treat Ave. SF.

14 November 2014, Saturday 12 noon for lunch, 1 PM to 3 PM **Board Meeting** in Alameda (Please see later confirmation.)

6 December 2015, Sunday, 10 am to 5 PM. **Fungus Fair**, A Celebration of Wild Mushrooms. SF Fair Building, Arbo-retum in Golden Gate Park, 1199 9th Ave., SF at Lincoln)

CORRESPONDENCE

This e-mail to the Board Members was severely edited to fit the available space.

Ladies and Gentlemen [of the Board]:
As Secretary of this non-profit Corporation, it is my duty to announce and publish notifications for board meetings. It is my duty to publish the agenda for these board meetings. It is also my duty to enter the minutes of the board meetings into the bound book of the corporation. It turns out that it takes more than a Quorum in order to declare a Board Meeting duly

convened.
Gentlemen of the Board of the SFMS, What were you thinking agreeing to spend \$5,000.00 US Dollars on a web site? I am all for nepotism, but it must be at least competitive with other sources. \$5,000.00 is 5X to 10X times too much to pay for a web site.
.... I can get the job done for \$1,000.00.
Peter, I have to comment on the way you have done the scheduling, you called me the hour of the board meeting (Oct.11th) asking for me to attend....
People, this is not the way to run a professional organization.

...
I have repeatedly asked for time and dates of meetings. I have asked for agenda items to be submitted. ...
Given last minute cancelation of a properly scheduled Board Meeting (Oct. 4th) and the lack of proper notification given to board members of the time, date and location of the inappropriately scheduled, subsequent board meeting (Oct. 11th), Therefore, in my position as secretary of the corporation, I refuse to ratify the minutes of the meeting as valid.... None of the measures voted on at this last meeting shall stand until a properly convened Board Meet-

ing can be scheduled and the issues submitted for the agenda and must be raised again for a new vote.
...., you all have a positive fiduciary obligation to use all due frugality in your deliberations. ...
I am asking you all to step up...and take this society and our membership much more seriously. ...
I have been calling for a more professional model of administration in all of my more recent correspondences.
Before you start calling me about my authority to declare the proceeding of Oct.

WHAT I SAW THROUGH MY MICROSCOPE

by: Judd Smith 8/24/2015, SFMS Life Member

Being a farm boy and hunter... I am a Feces Man from wayback. Henry Schott the Editor of Micro News knows this. I have supplied Henry with pig-dung with maggots to Henry's unending satisfaction. One thing you can always say about a deposit of feces: There's always something there to inspect.

I use a compound 4-objective (4,40,500,1000-x) American Optical microscope that I acquired for \$300 from UC Davis Instrument Reclamation in 2004. An important recent addition is a \$300 AmScope MU1400 USB-connected and powered via the USB connection digital camera that comes bundled with utterly magnificent software. The MU1400 captures images at resolution of 14 Mega-Pixels and flawlessly adapts to any 21mm "ocular lens" barrel. Further adaptors are included. Upon invoking the software, it automatically "gets" the MU1400 and displays microscope images to the computer screen. If this sounds like an advertisement...well...I am a pleased user.

The subject, "The Tentacle Guy" at 400x, is both interesting, and unknown. I put my images up on the I-Net website: www.microbehunter.com. In response, several opinions were offered but none of "us" know what it is. "Us"...because I have joined that website...it is magnificently useful to any microscopist with digital capability. Digital capability allows one to communicate "findings" with others. Digital is as effortless.... as film-cameras were NOT!!! Digital capability is dirt-cheap. Go price it yourself.

A WORD OF WARNING

Just FOR YOUR INFORMATION:...When one is

looking about where pathogens are to be found!.

(A) Drape a plastic-backed alcohol/formalin-damp rag on the right knee or nearby.

(B) Wipe" your nitrile examination glove fingers on that rag often.

(C) Wear laboratory protection glasses...because a spatter-in-the-eye equates to a hypodermic injection.

(D) Wear a surgical mask whose moist back-pressure reminds you that the job is serious-stuff.

(E) DO NOT "load" or wash slides or coverslips in a sink used by ...a n y o n e....

(F) Know how to sterilize (in a pressure cooker) and dispose of contaminated material properly.

And that's just for starters....."aseptic procedure"....is an entire subject-discipline. So...watch yourself!



"Tentacle Guy" is tentatively identified as Chaetoceros sp. 400x

PREPARATION:

I placed the feces in a zip-lock bag with 2/3rds cup of warm water and let it sit. I then kneaded it through the plastic *while wearing protective gear*. This is from a Berkeley deer, therefore is perhaps more "refined" than most ---but certainly as anal as any. More refined? Well, deer are "goats" they eat brush tips. I expected coarseness. Virtually every part of the bag-gied slurry would "fit" under a coverslip.

Microscopy is full of hard-to-identify-stuff. I am referring to my unknown microscopic "find" as "The Tentacle Guy". But working from what you've got...and where it came from....and what you conjecture it MIGHT be..??. If you submit a GOOGLE search-line of "Deer Parasites" you will harvest a zillion really-neat images. Microscopists have been posting images to the I-Net for two decades now. A deer's gut contains what the deer ate. Therefore, the possibility must be entertained that this image is

(Continued on page 8)

SFMS

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Stamp

FROM: Micro News

San Francisco Microscopical Society
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COME TO THE NOVEMBER 11 MEETING

See page 1 for details. Dr. Greg Antipa, Life member of SFMS will give an overview of what was achieved in Protozoology, the study of single celled animals, in the past half century.

MEMBERSHIP INFORMATION

To join the Society or pay your dues:

fill in the form available at www.sfmicrosoc.org

Mail it to : SFMS Treasurer
435 Melrose Ave
San Francisco, CA 94127

Make check out to SFMS.

Dues are \$12. per calendar year. Pay now for 2016

Life membership is \$144.00

TO:**WWW.SFMICROSOC.ORG**

merely...."throughput"... I am inclined to think that this guy.....is.....throughput.....

I was EXPECTING to find zillions of hook-worms....deer have them in quantity. I found one almost immediately ..but .. didn't photograph it expecting to find better. Then found none!

ON THE SUBJECT OF DIGITAL MICROGRAPHY
File-size is not very important. Large file-size can be a downright inconvenience. SELDOM does a microscopist wish to make wall-size hard-copy enlargements of his images that would benefit from a large file-size. In most cases, one just wants to "post" an image. In ALL WEB POSTINGS..a file-size of 250 K-bytes per image is perfect. Because of download times and storage considerations, websites frequently REQUIRE file-size reduction. Absolutely none of your friends will appreciate getting e-mailed, a 14 MegaPixel file.

The convenience of digital microscopy opens an otherwise entirely-closed venue to ordinary people

Dr. Antipa's Laboratory

Dr. Antipa concentrated on basic problems which were best approached with the use of protozoa as either model systems or pragmatic solutions to fundamental problems in biology. They centered around issues of general ecology, cellular development, and structure/function relationships. With respect to the latter, inasmuch as the protozoa are both cells and organisms, the emphasis has been on just what cellular adaptations have been made to accomplish life as a unicellular eukaryote.

In the case of development, my laboratory paid special attention to the role of basal bodies and centrioles in their regulation & semiautonomy during growth and cellular division.

Insofar as ecology is concerned, the program of division is applied to the estimate of the growth of these organisms, the behavior of ciliated protozoa as they respond to chemical environmental cues, and finally an evaluation of the role protozoa play in the decomposition of organic wastes, particularly during the activated sludge process. The activities of my laboratory have been funded by grants from the National Science Foundation (NSF), the