MicroNews

San Francisco Microscopical Society Volume 12, #1 January 2017

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INSIDE

SEND IN YOUR DUES, PLEASE

This is a great time to join the San Francisco Microscopical Society.

It offers you a variety of experiences designed to broaden your knowledge of the microscopic world.

JOIN NOW.

TIME TO JOIN SFMS FOR 2017

ABOUT THIS ISSUE

Putting together material that might interest other readers is never an easy task. As editor, I keep looking for those items related to microscopy or to our society that should be reported in order to make the newsletter relevant. It would be nice to have easy access to sources of information but those are few and require reviewing a lot of material in a limited time frame. We all have other tasks that call for our attention.

The main article is the basic information on handling a simple microscope that I prepared for a great-grandson who received it as a Christmas present. The microscope is available in a number of configurations and perhaps can be upgraded over time. We will see. The price-point was an important consideration. The same model is available under several brands. It resembles the microscope I first used sixty five years ago. Your suggestions for improving the directions are solicited. Respond to hschott@aol.com.

Sincerely,
The Editor.

How to Use and Adjust Your Compound Microscope

In order to move your microscope safely, one hand should be under its base for support and the other at its arm. Set the dimmer to the lowest intensity and always turn off the lamp before moving the microscope.

You have a monocular compound microscope because it has lenses at the top, the ***eye piece***, and lenses at the bottom, **the objectives**. There is nothing very important in the tube between the eye piece and the objective lenses that will magnify the image. The compound microscope is NOT the instrument to use for looking at your finger or some dirt. For that you use a hand lens. It is a scientific instrument and can help you know the micro world.

The first thing to learn is that the lenses must not be touched. The glass lenses must only be wiped with lens paper and you do this gently and infrequently because dirt of any kind should never be permitted to land on the eye piece lens or on the objective lenses. The objective lenses are at the lower end of the microscope, just above the stage. You have three of them and they are marked with numbers: 4x, 10X, and 40X. YOU ALWAYS START WITH THE 4X IN PLACE which means it is pointing straight down. (You always leave the microscope with the 4X in place when you put on the plastic dust cover to protect the microscope from dust and dirt. NEVER TURN A MICROSCOPE UPSIDE-DOWN! The eye piece will fall out on most microscopes.

I. WHAT HAVE YOU LEARNED? (Cover the upper paragraph with a sheet of paper.)

What part of the microscope should you never touch with your wet or dry greasy fingers?

Where is the 4X objective located?

When you want to look at a specimen under the microscope, what is the first objective that you use?

Where is the eye piece?

Why would you never turn a microscope upside-down?

You have been working with your microscope when your parents call you for dinner. What are two things you should do in addition to turning off the illuminator (or light on the microscope) ?

You need light to see with a microscope. Turn on the **illuminator**. There may be a dimmer to control how much light goes through the sample you are inspecting. Set the dimmer at about half way to start. *When using the dimmer, it is best slowly increase the light intensity as the lamp heats up quite quickly.*

Place a glass slide or specimen on the **stage** with the sample directly above the aperture and, if possible, fasten it to the stage with the stage clips. *Reminder: A cover slip is always needed to allow for the best quality image and to protect the objective.*

Prepared slides that came with the microscope have a specimen mounted on a glass slide and covered with a very thin glass cover slip. Use a labeled slide (not a blank slide) with the label side up.

Below the stage is a wheel or disc with holes of different size in it. When properly used these holes help to eliminate stray light. The wheel is called the **diaphragm. Adjust it so the largest hole** allowing the maximum amount of light to reach the slide is under the hole in the stage and the 4x objective lenses. *Caution: Do not use the iris diaphragm to control the amount of light, it*

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is to control resolution and contrast - use the dimmer instead.

***Resolution** means how well you can see something, how sharp is the image. (Think of the windshield of a car during the rain-storm. You can see through the raindrops but the resolution is very poor. The wipers improve the resolution a lot.)*

***Good Contrast** means that your specimen does not look fuzzy. It means that there is the right amount of light.*

By having the 4X objective in place above the slide and the hole in the stage as well as having the diaphragm rotated to the largest hole you are now ready to look at the specimen. Hold the slide in place with the stage clips. If necessary, move the specimen so that it lines up with the objective lens. To move the slide place your thumbs at the end of the slide and finger tips at the edge of the stage.

You are now ready to focus but….WAIT… read to the end of this paragraph. You will look through the eye piece with your stronger eye instinctively and will try to close the other eye but you do not need to do that. Your brain will quickly learn to ignore that other eye's information and concentrate on the eye that you use for looking into the eye piece. Do not touch your eyes or eyelids. Leave both eyes open. If necessary, make a cup with the hand and rest your finger tips on your forehead to cover the open eye that you do not use to look into the microscope. Keep your face muscles relaxed and concentrate on finding the specimen. Slowly and gently rotate the focusing knob until the image is sharp and clear. *Using lower magnifications first helps to select the part of the specimen of interest and then adjust further.*

You must know and recognize what your specimen represents at this magnification. Look at the eye piece for a number. It probably is 10X. If the objective lenses magnify four times producing an image four times larger than what is on the slide, and you look at that image with a lens (the eye piece) that makes it ten times larger, then your specimen will have been magnified 4 x 10 or ==== (fill in)

As you focus the microscope, the stage will move up or down. The knob acts as both a coarse adjustment and a fine adjustment. Never force the knob since this can result in an expensive repair. If the knob will not move in one direction, go in the opposite direction. If you cannot find the specimen, look at the stage and be sure that the slide and its specimen is directly under the 4x objective. You **must** get a clear sharp recognizable image at 4x before you rotate the next objective into position.

II. WHAT HAVE YOU LEARNED? (Cover the upper paragraphs with a sheet of paper.)

Where is the diaphragm and what does it do?

How do you control the amount of light going through your specimen?

What do the stage clips do?

What eye do you use to aim with? _____ It is your stronger eye.

What should your weaker eye do while you use your stronger eye at the microscope?

When you turn the focus knob, can you feel a difference between coarse and fine adjustment?

If you move another objective into the viewing position by rotating the nosepiece and the number on the objective was 20, what would be the magnification?

If you image is sharply focused and recognizable, you can now rotate the nosepiece to the next shortest objective marked 10X. NOTE that it is longer and closer to the slide than the 4X objective. Every time you rotate the nosepiece, be sure you look at the objective and the slide to see that they do not touch each other. Rotate the nose piece so that you go directly from 4x to 10x. That is the correct and safe way to do it. When you next look at your specimen you will see less of the total specimen but at a higher magnification. You now can also move the diaphragm to a smaller hole. You may want to slightly increase the illumination. You may need to slightly move the fine focus to get a sharp image. Your microscope has lenses that are PARFOCAL. This means that if the microscope is in focus at a lower magnification it will

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also be in focus when you move up to the next objective with higher magnification.

If for any reason, you do not see the specimen, go back to the next lower magnification and adjust the slide so that the specimen is in the center of the circle. Be sure that the nosepiece clicks into place so that the lenses line up properly.

To move a slide without removing the stage clips, place both thumbs on the stage so they touch the edge of the end of the slide and gently push the slide. You will note that if you push to the right the image in the microscope will move to the left. If you push up or away from you the image will move toward you. The lenses turn the image left to right and up to down.

What is the highest magnification of your microscope? ======= This is called HI-DRY magnification. To view an image at a higher magnification requires a much more expensive microscope that has OIL IMMERSION objectives. Research microscope have oil-immersion lenses that require a special drop of oil between the objective lens and the slide. This oil forms a path for light so that more light reaches the objective lens instead of being scattered. Using immersion oil is a skill that you can learn when you have the use of a more powerful microscope but it will still only be two to four times more powerful than your microscope because that is the limit of a light microscope. Only electron microscopes can magnify to a much higher magnification.

You can take a picture of a specimen at any magnification and have it enlarged to a poster size but you will not see more details. Oil immersion objectives let you see more details but they also have limits of about 1,600x. Beyond that you need an electron microscope.

III. WHAT HAVE YOU LEARNED? (Cover the upper paragraphs with a sheet of paper.)

What should you do next if you are looking through the eye piece and have tried to focus

Making the Metric System More Accurate?

You may have noticed when you were in the grocery store that some packages now have rather odd weights. It may be that the brand no longer wants to raise their price to maintain their profit so they reduce the weight. In some cases they want to convert the weight from “grams” to “ounces” as in the case of Swiss chocolate. Why have we not adopted the metric system? In science we have and in most other countries including Canada and Mexico metric measurements are standard.

It was in France in 1799 that measurements were first standardized based on a platinum rod represented a standard meter and a platinum weight the standard kilogram. It was thought that from these two standards all the others could be derived. Ninety years later the need for more standards became apparent and the first General Conference on Weights and Measures added the Standard Second soon to be followed by the kelvin as a measure of temperature in 1954. By 1983 the meter was redefined as the distance light travels in a given time period. I wonder what a carpenter would say if his building plans were drawn in “light-travel/sec” units. How would you define a second? Take an average solar day and calculate the 1/86,400 fraction of that day as equal to one second. That may be good enough for your wrist watch but not for scientific experiments. In 1967 it became tied to the number of periods of radiation produced by an atom of cesium 133.

The next change will come in 2018 when the kilogram will be defined by Planck’s constant to be equal to $6.62606983 \times 10^{-34}$ kgm^2/s measured using a NIST-4 watt balance. (National Institute of Standards and Technology). It is nice to know that someone is concerned about accuracy and reproducibility. (For more information go to NIST or the September 2016 issue of the Scientific American. HS

MicroBioblitz: Lake Merritt

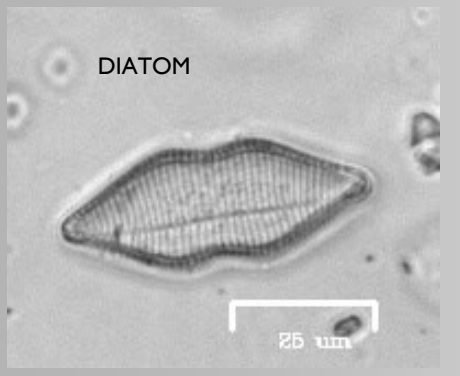
When: Wed, Jan 18 @ 6 - 8 pm
Where: Rotary Nature Center, Lake Merritt, Oakland
Cost: FREE!
$20 suggested donation.

Come explore the microworld of the microcosm that is Lake Merritt! The majority of the biological world lives at scales that we cannot perceive, but with the aid of magnification we can peer into this amazing world.

The event will kick off with a short background on some of the organisms we can expect to see, a brief amount of time will be spent on how to use the equipment, and then we'll dive right into some samples collected from Lake Merritt and its surrounding shores.

Space is limited to 20 people, so sign up to reserve your spot.

www.calnature.org



YOUR REMINDER

January is the start of our fiscal year and time to ask you for your $12 dues. While membership dues do not cover the cost of running the organization and meeting our financial obligations, it does give us a clue of your interest in the survival of SFMS.

Please see page 8 for instructions.

ELECTIONS MATTER

Anyone who has lived through the November, 2016 national presidential election knows that voting is the most important step a person can take in deciding the future of a government or institution. In all pre-election predictions the outcome was for the Democrats to win but as very late results accumulated, the pendulum swung to the other side. We may belabor the point that the majority of the popular vote went to the Democrats but we are not one United State but rather 50 States that "send" delegates to the Electoral College where the President is "selected". This concept is difficult to sell to the rest of the world, especially when we otherwise support the rule of majority votes.

> "Nothing is so firmly believed as that which a man knoweth least"
> Michele de Montaigne (1533-1592)

SFMS is also governed by a ***constitution*** and it could use some revising. We find ourselves in January 2017 with the requirement to hold election of officers even though we are unable to set up a venue for a meeting.

We also do not have a full slate of five officers to place before the membership. Recruitment of new members is down and interest in the activity of the Society seems to be waning. The Randall Museum reconstruction is progressing very slowly with no announcement of a definite time for an opening date. While we have enjoyed the use of the Merritt College Laboratories, they have not proven convenient for those living in the San Francisco area.

Perhaps, we will need to consider meeting in private homes. Considering the number attending, this is certainly feasible. We could even start with a Pot-Luck dinner at six. We have enough microscopes and now, with a good collection of slides, we can explore a subject or each take charge of an interesting slide and talk about it briefly.

This is a reminder that you can request microscope slides if you are a member. The basic list should be on our web site but can also be accessed at Johannes Lieder (http://www.lieder.de/). (See ***Multi-Media Program for Biology A, B, C and D*** for a list.***)***

SFMS needs an additional officer in the position of Recording Secretary. This is not as much work as it may seem but does require attendance at board meetings that are held three or four times a year, sometimes on Sunday. We need to fill this important position that helps us maintain our legal status as a non-profit. To stand appointment or election for this position on the board you need to be (or become) a member, and let Peter Werner know of your interest to serve on the board. (Contact Peter through germpore@sonic.net)

You may be reluctant to volunteer

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THE SFMS BOARD NEEDS YOU

Keeping an organization alive and functioning is job #1 for the SFMS board. Without officers, we would be a ship without a rudder, a tree without roots, a book without content.

We are fortunate to have President Werner who has continued for several years in that position even though he would be delighted if another SFMS member would offer to take charge for a year or two.

Out treasurer, Myron Chan, is equally dedicated and has kept the books and looked after membership for a number of years. He has carried out his responsibilities with steadfast attention to detail and has helped us to maintain our status as a non-profit.

Our vice president, Bill Hill, has been a great contributor during board meetings where he has helped the board solve problems by contacting the right party on the spot to get quick answers. Since he is currently president of the Lichen Society, he has not been as available to also carry the duties of the program chair.

Africa Williams has served as the communications secretary and we hope that she will be able to be our temporary recording secretary, a position that is essential to running an effective board.

Being a board member is a good opportunity to develop new skills and to bring fresh ideas to the organization. The time you donate, always kept to a minimum, is both a chance to work cooperatively with other members and to contribute to keeping our meetings interesting and informative.

Joining the board does require that you be a member and that you be willing to stand for election at the first meeting of the general membership during the year, usually in January. Letting the president know will make it easier to arrange to have your name on the ballot and to introduce you at the meeting.

SAN FRANCISCO FUNGUS FAIR

Merritt College and SFMS shared space at the Hall of Flowers where participants had a unique opportunity to view fungal specimens up close and under UV light.

The show was well attended and provided a wide variety of displays. Students from Merritt College Microscopy Club helped adjust the microscopes.

Bill Hill (right) at the Lichen Display table during the Fungal Fair

The Microscopy table.

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Stamp

FROM: **Micro News**
San Francisco Microscopical Society
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OAKLAND CA 94611-2613

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 2017**
Life membership is $144.00

WWW.SFMICROSOC.ORG

WE HAVE BEEN UNABLE TO SCHEDULE A GENERAL MEMBERSHIP MEETING IN JANUARY. LOOK FOR INFORMATION IN YOUR E-MAIL REGARDING WHERE AND WHEN THE FIRST MEETING OF THE YEAR WILL TAKE PLACE.

TO:

The S. F. Microscopical Society

SFMS dates back to 1870-72 when it was founded but as a result of the 1906 earthquake it was disbanded and not revived until the 1950s. It has been active over the past sixty years and has served the wider community of the nine counties during that time. For the past fifteen or more years, our base has been at the Randall Museum in SF but this year the Randall is being rebuilt and thus we have often met at Merritt College in Oakland. Merritt has a new building for the sciences in which the first floor is devoted to light microscopy and cell culture.

We have four elected officers that comprise the board of directors: Peter Werner, President, Bill Hill, Vice President, Myron Chan, Treasurer, Africa Williams, Corresponding Secretary, and (Vacant), Recording Secretary. Henry Schott is the editor of the Micro News and is not an elected officer. Elections are usually held at the January *General Membership* meeting. Board meetings are announced and open to all members. *General Membership* meetings are held five times a year, usually meeting on the second TUESDAY, 7:00 to 9:30 PM. of September, November, January, March & May. The location is announced by e-mail.

The Society's newsletter is the **Micro News**, published four times each year and mailed to members. In the eight-page newsletter is information about the upcoming meetings and activities of the board as well as any items that the officers or the editor want to share with the members. Members are encouraged to share what they find interesting in microscopy by providing pictures and text. **Sometimes it is difficult** to get out the newsletter so please help by sharing any material of interest.

JOIN THE SOCIETY NOW FOR 2017,
PLEASE PROVIDE THE FOLLOWING INFORMATION:

Full Name
Mailing address and zip code
Phone number
e-mail address
Year of birth

Membership is for the calendar year. Enclose a check for $12.- (or multiple thereof for each subsequent year, i.e. $24.– for two years) . Life membership is $144.-.

Make the check payable to:

S. F. Microscopical Society

Mail to:

SFMS Treasurer
435 Melrose Ave