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# Focal Point

## The Newsletter from Southwest Precision Instruments

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January, 2010

Page 1

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### ***In This Issue:***

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|   |               |
|---|---------------|
| <b>Eight Maintenance Secrets for Your Microscope</b>                                    | <b>Page 1</b> |
| <b>Humidifiers May Help in Reducing Flu Virus (Harvard School of Public Health)</b>     | <b>Page 5</b> |
| <b>America's Daily Information Consumption: 34 Gigs per Person (UC-San Diego)</b>       | <b>Page 5</b> |
| <b>The Case of the Toxic Gingerbread Man (Utah State University)</b>                    | <b>Page 6</b> |
| <b>Champagne is Good for Your Heart, but Only in Moderation (University of Reading)</b> | <b>Page 7</b> |

## **Microscopy and Imaging: Eight Maintenance Secrets for Your Microscope**

It's always a good idea to have your microscopes thoroughly cleaned, serviced and aligned on a regular basis. A microscope is a precision-engineered optical instrument that requires periodic service to keep it performing optimally.

Nonetheless, there are several things you can do between regular service visits that will make your professional life (and ours!) much easier.

Here are eight cleaning secrets, based on what we've seen after servicing several hundred instruments in teaching, research, industrial and clinical laboratories.

### **1. Keep your microscope covered when it's not in use.**



Dust is the number one enemy of microscopy. *If your microscope has a dust cover, be sure to use it!* If you don't have a dust cover, use a large plastic trash bag to cover the instrument. Do whatever is necessary to protect the instrument from airborne contamination.

### **2. Allow the lamp house to cool down before covering it.**

This is especially important for high-intensity halogen and mercury lamphouses. They get very hot, and they will melt a plastic dust cover in a matter of seconds. Allow the lamp house to cool down for about 15 minutes before covering it.

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# Focal Point

## The Newsletter from Southwest Precision Instruments

132 North Elster Drive • Tucson, AZ • Tel./Fax 520.546.4986 • swpinet.com

January, 2010

Page 2

---

---



Don't  
cover  
when hot!

Start at the top of the instrument and work your way to the bottom. Horizontal surfaces are favorite places for dust to accumulate, and from there it can migrate to optical surfaces. Use a soft natural bristle artist's brush, a makeup brush, a compressed gas duster or a small vacuum cleaner designed for computers.

### 4. Clean the optical elements that are easily accessible.

This includes eyepieces, the top condenser lens element, the light port in the base of compound microscopes and the objective lenses of inverted microscopes. Don't forget to clean colored filters and polarizing filters if they are accessible.

### 3. Regularly remove dust from the microscope's external surfaces.



### 5. How to clean optical elements.



Blow the dust off first. The safest way is to use compressed air or an ear syringe to deliver puffs of air to the surface. This removes small particles and

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# Focal Point

## The Newsletter from Southwest Precision Instruments

132 North Elster Drive • Tucson, AZ • Tel./Fax 520.546.4986 • swpinet.com

January, 2010

Page 3

---

---

prevents them from scratching the surface coatings in the next step.

### **6. After dusting, use distilled water and/or a mild solvent.**



Most contaminants such as fingerprints, urine, blood and crystallized buffer salts will be soluble in either alcohol or water, and you may need to use both.

Many microscope manufacturers provide guidelines for solvents and cleaning of the optical elements. If you don't have guidelines from the manufacturer, follow the procedures listed below.

Use cotton-tipped applicators lightly moistened (but not saturated) with the cleaning solution. Follow with dry applicators to remove the solvent and to dry the surface.

- For a mild organic solvent, use 70% ethanol or 70% isopropanol.
- As an alternative, we recommend Sparkle<sup>®</sup> glass cleaner. It contains a glycol ether (2-butoxyethanol) that helps lift stubborn contaminants.
- For distilled water, you can distill your own. Just exhale with your mouth open, and the moisture in your breath will condense on the optical surface.

If you're using a solvent, lightly moisten a cotton-tipped applicator with the solvent; **start in the center of the optical element, and with a circular motion work your way to the outside edge.** *Don't press down!* Let the applicator do the work.

Before the solvent evaporates, use a dry applicator to gently remove the solvent. Remember: start in the center, use a circular motion and work your way to the edge.

Don't go back to the center of the surface with an old applicator; always use a new applicator for every cleaning cycle.

Repeat as needed with wet and dry applicators until the surface is clean.

### **7. Removing oil from objective lenses.**

It normally isn't necessary to remove all of the oil from an oil immersion lens. Simply drag a piece of lens tissue across the front of the objective to remove the excess oil.

If any of the "dry" objectives have oil on them, they will have to be cleaned. This is best done by

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# Focal Point

## The Newsletter from Southwest Precision Instruments

132 North Elster Drive • Tucson, AZ • Tel./Fax 520.546.4986 • swpinet.com

January, 2010

Page 4

---

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unscrewing the objectives and removing them from the microscope.



***Note: if you don't feel comfortable doing this, don't do it! There is a danger of dropping the objective as you remove or replace it. High-end objectives can cost \$3,000 or more. Call your service provider if you have any doubts about removing the objectives or which solvent to use.***

If you [Google](#) "removing oil from objectives," you'll discover many opinions on how to do it and the best solvents to use. We'll only comment that the following procedures work well for us.

- Be prepared to use lots of cotton-tipped applicators. You may have to repeat the cleaning procedure several times to remove all of the oil.
- Remove an eyepiece from the microscope, invert it and use it as a magnifying loupe to examine the surface of the objective lens. Tilting the lens to reflect light from the surface will allow you to determine whether the objective has been properly cleaned.

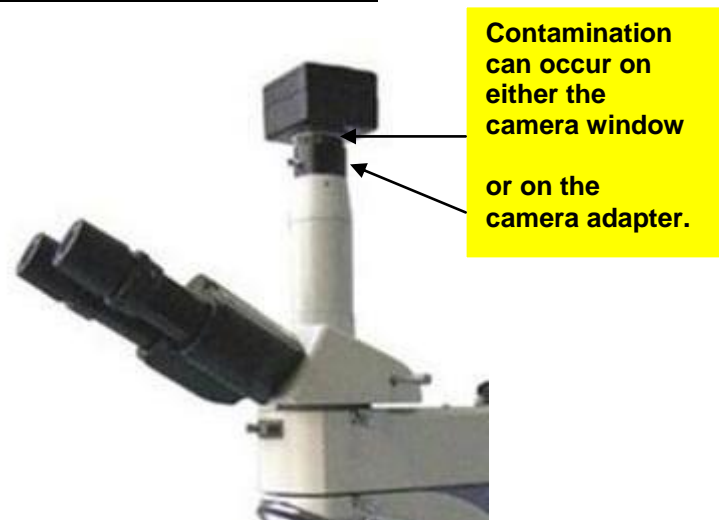
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- The safest solvents are either Sparkle<sup>®</sup> glass cleaner (which contains 2-butoxyethanol), 90% ethanol or xylene. *Xylene should be used sparingly and as a last resort, and it should be immediately diluted with applicators soaked in 90% ethanol.*

90% ethanol alone will remove the immersion oil, but you may have to use 8-10 applications of ethanol to remove all of the oil.

If you use xylene, we recommend that you use a minimal amount on a cotton-tipped applicator; follow immediately with 1-2 applicators moistened in 90% ethanol to dilute the xylene, then finally 1-2 dry applicators to remove the oil/xylene/alcohol. Repeat only if necessary; it's safer to remove any remaining oil with Sparkle or 90% ethanol.

### 8. Video and digital cameras



**Contamination can occur on either the camera window or on the camera adapter.**

**Figure 1. Most frequent sites for contamination in a digital camera system.**

Do your digital photos or video display always have spots in the same places? Either the camera or the camera adapter is dirty.

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# Focal Point

## The Newsletter from Southwest Precision Instruments

132 North Elster Drive • Tucson, AZ • Tel./Fax 520.546.4986 • swpinet.com

January, 2010

Page 5

---

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- Loosen the camera where it connects to the camera adapter, and rotate only the camera while observing the live display.
- If the spots stay in the same place, they're associated with the camera. Clean the camera's window (the clear glass that's in front of the imaging chip).
- If the spots rotate when you rotate the camera, the contamination is somewhere below the camera, almost always on the adapter. Remove the adapter and clean its optical elements.
- Use the same solvents and procedures you use for eyepieces and filters: puffs of air first, then cotton-tipped applicators moistened with 70% ethanol, water or Sparkle, followed by dry applicators.

### **Medicine:**

### **Harvard School of Public Health: Humidifiers May Help in Reducing Flu Virus**

A recently released scientific white paper suggests humidifiers may play an important role in reducing the survival of the flu virus on both surfaces and in the air.

The research suggests that homes kept at 40-60 percent relative humidity are likely to have fewer flu viruses lingering in the air and on commonly touched surfaces like sink faucets, door handles, and countertops.

By running a humidifier to raise indoor relative humidity levels, the research indicates that flu virus survival in the air and on surfaces can be drastically reduced in households, schools and offices.

[Read the full summary here.](#)

### ***Most Expensive Item Sold on eBay:***

***You can offer almost anything on eBay, and you can ask almost any price...but what is the most expensive item that actually sold on eBay?***

***It's thought to be the 405-foot Gigayacht, designed by Frank Mulder and built by 4Yacht, Inc. in Ft. Lauderdale, Florida. It sold for \$168,000,000.00 to Russian billionaire Roman Abramovitch on Feb. 8, 2006.***

***Ben Cohen and Jerry Greenfield wanted to go into the bagel business, but when they discovered the equipment would cost \$40,000, they decided to take a \$5 correspondence course in ice cream making instead. Thanks, Ben & Jerry! Good decision!***

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# Focal Point

## The Newsletter from Southwest Precision Instruments

132 North Elster Drive • Tucson, AZ • Tel./Fax 520.546.4986 • swpinet.com

January, 2010

Page 6

---

---

### **Information & Technology: University of California-San Diego: Americans Consume 34 Gigs a Day**

Collectively, we as a nation consumed about 3.6 zettabytes of information last year. A zettabyte is one million trillion bytes of information. That works out to about 34 GB per person per day.

The major portion of our 34 Gig dosage: 4.9 hours of TV per day. The smallest portion: 0.45 hours of recorded music. Printed media and talking on the telephone rank just above listening to recorded music, near the bottom of the list. Computer usage and computer gaming together add up to about 3 hours per day, slightly less than our daily dose of television.

[Read the complete report on UCSD's \*How Much Information\* project here.](#)

### ***Goat Testicles to Go: Some National Delicacies***

***Cena Molida (Belize) contains roasted mashed cockroaches.***

***Fried, roasted or boiled guinea pig (Ecuador).***

***Rat meat sausages (Philippines).***

***Boodog (Mongolia): goat cooked inside a bag made from goatskin. Usually either barbecued over an open flame or cooked with a blowtorch.***

***Salted horsemeat sandwiches (Netherlands).***

### **Science and the Public: The Case of the Toxic Gingerbread Man**



It all started after Hill Air Force Base in Utah installed vapor removal systems to remove chlorinated solvents from groundwater near the base. The main compounds were 1,2-dichloroethane (DCA) and trichloroethylene (TCE).

Two problems: The vapors weren't being removed properly from some homes in the area, and the ratios of DCA and TCE didn't match the ratios in the groundwater.

A team from Utah State University discovered that unsafe levels of DCA were outgassing from Christmas ornaments in the shape of cute little gingerbread men. In fact, one ornament could raise the levels of DCA in a house above what Hill AFB considers to be safe.

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# Focal Point

## The Newsletter from Southwest Precision Instruments

132 North Elster Drive • Tucson, AZ • Tel./Fax 520.546.4986 • swpinet.com

January, 2010

Page 7

---

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This becomes highly significant, considering many homes didn't have just one offending ornament, but several.

The majority of the outgassing ornaments were manufactured in China. DCA is a plastic resin hardener, but it is not permitted in plastic resins for consumer goods in the United States.

[Read the whole detective story here in the Science News Blog.](#)

### *Things Invented by Women*

**The windshield wiper** (Mary Anderson, 1903).

**The Apgar scale** (Dr. Virginia Apgar, 1953). *The standardized test that is given to newborns at birth to evaluate their physical status.*

**Kevlar** (Stephanie Kwolek, 1971).

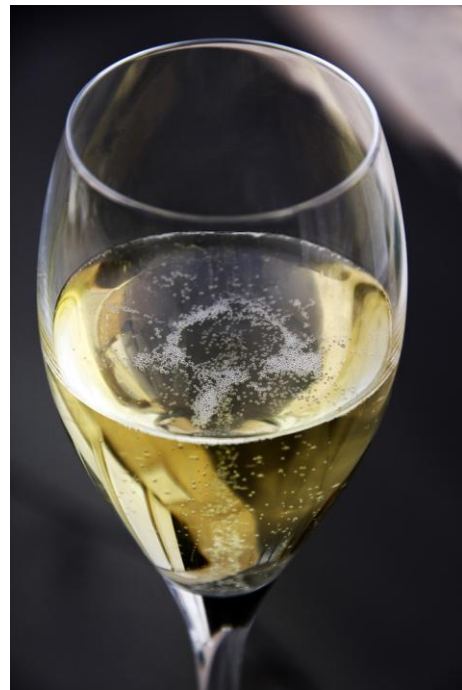
**World's first disposable cell phone** (Randi Altschul, 1999).

**Laser cataract surgery** (Dr. Patricia Bath, 1988).

**Coatings for non-reflective, non-glare glass.** *Used today in eyeglasses, telescopes, microscopes, camera lenses and projector lenses to remove distortions and surface reflections* (Katherine Blodgett, 1938).

**Scotchgard®** (Patsy Sherman, 1973).

### **Medicine and Health:** **Champagne is Good for Your Heart, Study Suggests – But Only in Moderation**



Research from the University of Reading suggests that two glasses of champagne a day may be good for your heart and circulation. The researchers have found that drinking champagne wine daily in moderate amounts causes improvements in the way blood vessels function.

Champagne contains polyphenols, and these chemicals increase the availability of nitric oxide, a vascular active molecule which controls blood pressure. Polyphenols appear to slow down the natural removal of nitric oxide from the blood.

[Read the full news article here.](#)