Teach Me:
How to buy the Right Microscope

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How to buy the *Right* Microscope

An *illustrated* guide to the Microscope.

About this e-Book

When John Lind founded GreatScopes Microscopes nearly ten years ago, he found that many buyers were making expensive decisions based on a photograph and price alone. Dedicated as much to education as to supplying quality equipment, he wrote this e-Book. Constantly updated, it has been accessed and read over 1OO,OOO times on his company's popular website at: www.GreatScopes.com

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Chapter 1. Introduction

In your search for a student or hobbyist microscope, is your head spinning with questions like:

- What type of illumination is best for my needs?
- How can I tell what kind of optics I am getting?
- Which components do I need, and which can I do without?
- What are ABBE, Iris, and DIN, and why are they important?

This comprehensive guide will help you buy the right microscope for your needs. Reading this guide will be your best investment to keep you from

making an expensive mistake.

You'll learn

- The Major Components of a Student Microscope
- Important concerns about construction
- The three most common types of Objective Lenses
- The pros and cons of the three types of illumination
- Focus and gear ratio
- Lesser known components and why you might want them
- Things to consider before buying used equipment

Hello, I'm John Lind, President of GreatScopes Microscopes.

I know it can be overwhelming wading through mounds of information when selecting a microscope. Before long your brain is abuzz with options, features, and terminology.

This article is a course for folks who want to learn more about microscopes before they make their decisions. After a reading, you will be somewhat of an insider - ready to get the most for your money.

You may not end up buying a scope with all the bells and whistles, but you'll make an informed decision, and you'll spend your money more wisely.

In the end, I hope that you'll consider buying one of GreatScopes' fine instruments - we're quite proud of them. I'm sure if you compare us with anyone - you'll find we offer the most for your money - and that we are a company who stands behind every scope we sell.

We believe in an educated buyer who will buy the microscope he/she needs, with ultimate long term satisfaction.

We'll discuss student/hobbyist compound microscopes. What you will learn will certainly have some bearing on the selection of professional and stereo inspection microscopes, but our main discussion will be on the selection of a quality student compound microscope.

A picture is worth a thousand words, so let's start with one that helps to illustrate the course ahead:

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Chapter 2. Basic Construction

You'll want to buy a scope that is well built - one that will stand up to years of use. You'll want quality components and construction to last a lifetime.

Along those lines, you'll want a sturdy, well-built frame on your scope. The best are made of metallic alloys that minimize vibration, and experience minimal fluctuation with temperature variations. If a scope you are considering purchasing is made of plastic, run, and run fast!

I've seen some toy scopes that are painted or chromed to look metal - so be careful! When in doubt, ask.

Also, keep in mind that you'll want:

- Optical glass lenses
- Metal focus gears attached with metal screws to metal frames

- Reagent resistant finish (the "paint job")
- Ball bearings (not just grease) in vital moving parts.

While some aspects of construction are difficult to discern online or in a catalog, comparing actual weights (not shipping weight) and measurements can also give some indication of size and sturdiness.

All of GreatScopes' microscopes have rugged alloy frames, optical glass lenses, metal gear trains, reagent resistant finishes (painted, sanded, painted again, then baked for durability), and ball bearing moving parts.

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Chapter 3. Optics

As you might imagine, the optics, or lenses, are the most important component in a good microscope. Remember, however, they are just a part of the whole package. Great lenses without a quality focus system will be next to worthless (more on focusing later). So, while you read, remember that you'll want to consider and evaluate a scope as a whole unit, lenses and all.

DIN Achromatic Glass Objectives

"DIN" is an international standard for microscope objective lenses. "DIN" stands for "Deutsche Industrie Norm". Occasionally, you might see "JIS", which is a Japanese standard.

You would be wise to purchase a scope that adheres to the DIN standards (of threading and length). Doing so, you'll be assured that in the future should you lose or damage one of your objective lenses (the lenses usually found in a cluster beneath the head of the scope), you can replace it with a lens from nearly any microscope company in the world.

When I was a young boy, I had a nice toy microscope that was not DIN. I took it to school one day and the lenses were stolen. The manufacturer was nowhere to be found, and lenses from other manufacturers would not fit. What remained of the scope was rendered worthless - all for lack of a standard!

Another important term relating to objectives is "achromatic". This term makes reference to several things.

First, the lenses are constructed to be "color corrected". Each objective lens on a microscope can be built with ten or more glass lenses. If the design and construction is not done properly, some colors are sent out of the focal plane, and thus are unseen. (Focal plane refers to the area in focus, which is by definition a specific distance from the objective.)

If the lens is not color corrected, there are things that you simply will not see with your microscope. Achromatic lenses are color corrected.

Secondly, the achromatic standard specifies that the center 60% of the field of view appears as flat and focused without aberration. (An aberration is an optical distortion caused by a defect in a lens.)

When constructing fine lenses, very exacting processes are followed. With an Achromatic lens, any chromatic (color) and spherical (focus/flatness of field) aberrations will be in the outer 40% of the field of view. Usually, the outer rim of the field of view will appear to curve up out of focus. This is normal, and since our tendency is to center the subject, most will not even notice these tendencies.

You may think, "I want my lenses to be 100% free of aberration!" Lenses of this type (called "Plan Achromatic"), are expensive, and are usually found on the fine medical and research scopes, usually costing $1000 dollars or more.

Achromatic lenses will serve you well for most student, school, and hobbyist applications.

The next grade is "Semi-Plan". Aberrations are generally located in the outer 20% of the field of view. Finally, "Plan" optics are exceptionally flat field to the edge, and for all practical purposes, are 100% free of aberration.

By contrast, cheap toy store microscopes usually have plastic lenses with fuzzy images.

All of our scopes from the Observer and up are DIN threaded and have fine achromatic objectives. Scopes in our Revelation and M2 professional line also offer semi-plan and plan objectives.

Our customers (which have included doctors, nurses, lab technicians, pathologists, teachers, homeschoolers, and hobbyists) have been delighted with the superb optics on our scopes.

Did you know that GreatScopes has a Low Price Guarantee?

Eyepieces

We've taken a look at the objectives, now we'll talk about the lens closest to your eye, the eyepiece (also called the

ocular). You should look for a microscope with a "wide field" eyepiece. On a wide field eyepiece, the lens opening is significantly larger than one that isn't wide field.

This will help you in two ways.

First of all, it is easier to position your eye to see into a wide field eyepiece. The reason is simple. Imagine trying to peer into a box through a pinhole. It would be pretty tough. Now think about trying to look in through a half-inch hole. The larger the hole is, the easier it is to see within. It is the same way with the microscope.

The lens in a wide field eyepiece is usually 18mm, generally as large as a U. S. dime. This makes it easier to position your eye for viewing.

Best of all, it also makes it much easier for children to see. I have seen two and three year old children look into a wide field lens with no problem, and see what had been brought into focus. (Young children don't have the fine motor skills to focus and such - they'll need help with that- but they will have no problem seeing while using a wide field eyepiece.)

A wide field eyepiece will also widen your field of view, that is, the width of what you see. As a result, you will not have to move the slide as much while you are viewing.

Let's discuss the topic of changeable eyepieces.

If your microscope features changeable eyepieces, change them quickly when doing so. The reason is that each time you change eyepiece(s), you can introduce dust into the microscope in the places that are hardest to clean. It takes less than a second if you prepare for it properly.

Your best bet is to make a decision concerning what eyepiece and objectives you need or intend to use most, install them on the scope, and leave them alone as much as possible.

To keep down dust intrusion in your scope, keep it covered with the dust cover when not in use, and minimize the removal of objectives and eyepieces.

Resolution

Please understand that microscope resolution (or the ability to see close but separate points as distinct) comes from the objective lenses, not the eyepieces. All an eyepiece can do is magnify the resolution that is already provided by the objective.

Perhaps an illustration from photography will best explain this concept. If you were to take a photograph of your hand, and then magnify that photograph

1000 times, you will not see microscopic skin cells. Once the picture is taken, the resolution, or the amount of detail, is forever locked in. Intense magnification will only reveal the graininess of the film used, not increased detail in the subject photographed.

In a similar fashion, it is the OBJECTIVE lenses that provide the resolution, that is, the amount of detail that will be captured and relayed to the eyepieces. The eyepieces can only magnify that detail, but cannot add to it. By nature, a higher power objective of the same grade is going to collect more detail than a lower powered one.

A 40x objective and a 10x eyepiece will result in a higher resolution (sharper detail) image than a 20x objective and a 20x eyepiece. Total magnification is the same (achieved by multiplying the two numbers), but the detail, the resolution, will be better with the 40x objective.

GreatScopes' microscopes feature wide field eyepieces. All of our student/ hobbyist scopes employ the widely accepted 40/100/400x configuration, which provides an excellent range of magnification. The Observer IV model and our professional line also have 1000x.

Monocular or Binocular?

We are frequently asked if it is better to have one eyepiece or two.

There is not a "one size fits all" answer to this question. The answer depends partially upon your situation - that is, how you will use the scope, and on your budget.

If you will be using your microscope day in and day out for hours at a time, you need binocular (two eyepieces). There is no question about it. Binocular viewing is much more comfortable because you don't have to train your brain to ignore the information from one eye. You'll notice that just about every professional microscope on the market is binocular. Those who use these scopes need the comfort associated with two eyepieces.

That having been said, if your primary intent for this microscope is for use by a child, you actually may find that a monocular (one eyepiece) microscope is more appropriate for them. Sometimes children can have a difficult time with the interpupillary adjustment. Just like a pair of binoculars, a binocular microscope is adjustable to allow for different size people. The eyepiece distance is adjusted until a single image is seen. Sometimes little ones have a tough time with this. If you must have binocular

though, just have them move their eyes over one space and just use one eyepiece until they are a little older.

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Chapter 4. Lighting

Unless your objective is to do outdoor fieldwork, I'd advise that you stick with a scope with a good electric lighting system.

The days of struggling to collect light with a sub-stage mirror are happily gone. Having an electric light on your scope is so much more convenient, and the added expense is well worth it.

Light is light, right? Well, not exactly.

There are major differences in lighting systems on scopes today. You'll find one of three different types of lighting systems on most student microscopes.

Tungsten

The tungsten light (also known as "incandescent light") is perhaps the most common and least expensive type of bulb available today. Your home is filled with incandescent lights. They glow with light when an electrical charge is put through their tungsten filaments.

A tungsten bulb provides an inexpensive, steady source of light - but it is does have some disadvantages.

The light it produces is yellowish, which can affect the color accuracy of the specimen being viewed. This is not a big deal with a student scope.

One significant disadvantage however, is that the tungsten bulb generates quite a bit of heat, about 350 degrees worth! This heat can dry out specimens and kill live creatures such as protozoans swimming in a drop of pond water.

Tungsten lights are cheap to manufacture and install. Microscopes with tungsten lights are usually setup with an on/off switch and no dimmer, holding down expense.

Other lighting options need more equipment, and are more costly to produce.

There are other options, and as I'll discuss next, you may agree with me that the nominal extra cost is worth it.

Fluorescent

Most of us have a fluorescent light here and there in our homes. These lights consist of a gas filled tube, which when electrified, comes alive with light.

A fluorescent light is more expensive to purchase, but is less expensive to operate.

There are several characteristics that make it an attractive choice in microscope lighting.

First, the light appears to the brain as a whiter light, more like the light we get from the sun. With this whiter light, objects look more like they really do in nature.

Another wonderful characteristic is that fluorescent bulbs give off very little heat. A fluorescent system operates at about 90° F. This can be very important when looking at the pond dwellers we mentioned above. I have viewed frolicking pond water creatures for as long as three hours with fluorescent illumination. This could not be done with tungsten light because of the heat generated.

I believe, for most hobby, student, and amateur use, that fluorescent light is the way to go. The coolness and sharpness it provides make it a prime choice.

By the way, if you are comparing brightness, a 7-watt fluorescent bulb produces about as much light as a 20-watt tungsten bulb, and a 5-watt fluorescent is about as bright as a 15-watt tungsten bulb.

Halogen

Halogen is seen primarily in medical and research scopes, and infrequently on student scopes. Halogen lamps provide a very white, bright, concentrated light, and are preferred on medical and lab instruments. Such scopes are usually fitted with a dimmer, which decreases the heat as well.

If you are purchasing a binocular (two eyepiece) microscope, halogen is preferred because of its brightness.

One final "light" note:

When you buy a microscope, consider the problem this fellow had. His letter communicates a common problem.

-----Original Message-----

From: [Name removed]

To: GreatScopes

Subject: Microscope Parts

I have a [name removed] microscope. It's about 15 years old.

The lamp, my last one, burned out several weeks ago and no source I've spoken to seems to have any idea where I can get replacements. I'm hoping you either have access to the lamps I need or know of a source (U.S., hopefully) where I might obtain some.

Any assistance you can provide will be greatly appreciated.

Sincerely,

[Name removed]

-----End of Message-----

We did our best to help him, giving him a handful of possible suppliers, but he will have to work hard to find his bulb. We wished him well, and truly hope he succeeds...but he may not.

When buying a microscope, find out what you can about the bulbs it uses. The closer the bulb is to some sort of a standard (not just a microscope standard, but a "real world" standard), the better off you will be in 15 years. A good microscope could outlive the company that manufactured it. See if you can find out if a common standard was used for the bulb and base. If a common standard was employed, you'll be happier in the long run. You might consider asking the seller "Where else besides from you can I buy bulbs for

this microscope?

All of GreatScopes' lighted student scopes have fluorescent lighting systems. Our professional scopes feature halogen lighting. You'll also want to know that our Observers, and Achievers use a common fluorescent bulb easy to find many larger home improvement centers (Home Depot, Lowe's, etc.). The Professional scopes use the common two prong Philips halogen lamp you'll find there too.

One more thing while we're at it, our Observer III, Observer IV, and Revelation III each come with an add-on mirror, so that your scope can be used outdoors with minimal hassle.

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Chapter 5. Focus

Okay, we've discussed good optics and lighting, now we've got to focus.

The focus system on a microscope brings the subject that you want to observe into the focal plane of the objective lenses. A microscope's focus system will have one or two focus knobs, and perhaps a "slip clutch" - something we'll talk about shortly.

Coarse Focus

Every microscope has at very least a coarse focus. If a scope has just one focus knob, it is a coarse focus. This knob will move the subject rather quickly through the focal plane - that is, it doesn't take a whole lot of turning to get something in focus.

At times it is more difficult to hone in on a sharply focused image using only a coarse adjustment. Nevertheless, many people find that a single, coarse focus knob is all they need.

Fine Focus

A fine focus adjustment was at one time a feature just for high-end instruments. Increasingly though, it is being seen on student microscopes - and that is good.

To understand the need for fine focus, you've got to think about what is

going on when something is under magnification.

We remember that the subject is being magnified horizontally (i.e., a pinhead is magnified and stretched out as big as a dinner plate), but we forget that vertical magnification is taking place as well.

Think about it, at 400x, something as thin as a sheet of paper, is magnified to the thickness of a 800-page book, every page with information on it! (Remember, both sides of the pages in a book are numbered, so it takes 800 pages to get 400 sheets of paper.)

Now as you focus, you need a light touch to look at the various levels (the 800 pages) of the object. Fine focus gives you that touch.

Using coarse focus to focus, at high power, on the various features of say, an ant's eye, a fly's wing, or some cell tissue, is a difficult task. In fact, without fine focus, many students never notice that those features are there. With fine focus, however, nothing could be simpler.

Here's something to remember if you are considering saving a few dollars by doing without a fine focus. If your scope was built without a fine focus, it will never have it. It cannot be added later.

Another thing to consider, if you do not have fine focus, you really should not attempt to add magnification over 400x to your scope - because focusing can become quite difficult.

A fine focus adjustment also makes a microscope easier for children to use.

When is fine focus NOT fine focus?

We recently examined a relatively inexpensive microscope that is heavily marketed on the Internet these days. While claiming to have coaxial "fine focus" we noticed right away that it was exceptionally coarse! One revolution of the fine focus knob moved the stage just over two millimeters. After measuring that, I made the same measurement on our Observer: One turn moved the stage one tenth of one millimeter. The Observer provides the finesse that is needed in a fine focus, while the cheaper scope did not.

Fine focus is standard in our popular Observer, and is found on all of GreatScopes professional scopes as well.

Focus Gear Construction

Beyond the knobs, much of the focus system on a scope is hidden from view, inside the scope, but is important nevertheless. If you intend for your microscope to serve you for many years to come, you'll want to be sure that the internal focus gears themselves are metal. Many otherwise sturdy scopes use plastic or nylon

gears, raising durability issues. If your microscope is an investment that you want to last, remember that plastic and nylon just will not hold up in the long run.

You will usually have to ask the dealer to be sure that you are getting focus based on a "metal gear system with no plastic parts in either the coarse or fine focus". You will be surprised how many otherwise "metal" microscopes have plastic or nylon gears!

(Sadly, on the cheaper microscope mentioned in the section above, the stage was held to the focus train by two metal screws - screwed into a PLASTIC bar. That may last months, it may last years. But it certainly won't hold like the chromed steel machine screws in metallic alloy components on the Observer, make no mistake about it.)

All of our Observer, Revelation, and M2 compound microscopes, as well as our Stereo Microscopes have long lasting metal focus gearing and components.

Slip Clutch

On student microscopes, at the top and bottom of their focus range, young users will at times have the tendency to want to continue cranking down (or up) on the focus once it has reached the end of its range. A microscope that is equipped with a "slip clutch" will allow the focus knob to slip (i.e. turn in place) without damaging the scope's focus gear system.

All of our student microscopes have a slip clutch.

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Chapter 6. Additional Components

Many of the components discussed below are "sub-stage" mechanisms that help manipulate the light just before it passes through the specimen. If you see a photo of a microscope with little or nothing visible below the stage (where the slide goes), it is likely that the scope has the simpler or cheaper version of the component.

Diaphragm

A diaphragm is a simple device between the light and the slide that controls the amount of light that passes through the object being viewed. There are two kinds of diaphragms generally available today. Most microscopes have one type or the other built in.

Disk Type Diaphragm

First is the disk type, it is the simplest, the least expensive to manufacture, and as a result, is the most frequently seen in student scopes. The disk is mounted beneath the stage, and usually has six holes in it, each one progressively smaller. The largest aperture is wide open, while the smallest is very small.

To adjust the light on the scope, the disk is turned...a larger hole is used for more light, and a smaller hole for less light. This works fine, but what do you do if you need a setting just between two of the given holes? My experience tells me there are times that you'll wish you had an intermediate setting.

I love looking at protozoa in pond water (I'm easily entertained), and one of the most needed tools during such times is the diaphragm. These microscopic creatures easily become "washed out" by too much light (i.e., contrast is lost).

At these times you'll reach to adjust the diaphragm...and you'll want one that gives you just about infinite adjustability.

An Iris Diaphragm provides that flexibility.

Iris Diaphragm

An iris diaphragm is constructed of a number of interconnected "leaves" that, when adjusted with a simple lever, open and close much like the pupil in your eye.

The beauty of such a device on a microscope is that it gives you almost an infinite number of settings. You are not limited to six or eight like you would be with the disk diaphragm.

Additionally, the iris diaphragm is much easier to adjust while using the scope. You can watch the changes in lighting take place while you peer through the lens. With the disk diaphragm, the lens goes black between settings...leaving you in the dark!

A good microscope is an investment in learning and adventure. An iris diaphragm is a good investment that will pay for itself over and again in many situations. If an ad you are looking at does not specify "iris" diaphragm, it probably has a disk type. The iris diaphragm is superior, and it will allow you to see things that simply cannot be seen with the disk diaphragm.

Using the iris in my Observer I can easily see the internal organelles of the single-celled protozoa I find in a nearby swamp. (Oh joy!)

All GreatScopes from the Observer III and up feature the preferred iris diaphragm as standard equipment. The Observer IIdf has a disk diaphragm.

Condenser

Just about every microscope has a condenser. This is the small glass lens you'll see built into or under the stage whose purpose is to gather and focus

light.

Light passes into the bottom side of this lens, and is focused, that is, it is condensed, into a cone of light. Since light travels in waves or particles, normally there would be fewer of those waves/particles passing through your subject at high magnifications.

A condenser directs more of those particles through your subject and into the lenses, so that you have enough light to see.

A sub-stage, movable condenser comes into play in situations where very high magnifications are used (say 1000x and more), where light starts getting extremely scarce.

You see, the location of the focal plane in relation to the light can vary, based on slide and/or subject thickness. Since the condenser is movable, it can be focused right on the focal plane yielding precise lighting. The "Abbe" (pronounced just like Dear "Abby") is the most common type.

At the risk of getting a little technical here, we need to talk a little bit about the "numerical aperture", or NA of the condenser. Your microscope manufacturer will take care of all the technical details of this for you, but if you are adding a lens (such as a 100x oil objective) to a microscope that you already own, the NA of the condenser must be greater than or equal to the NA of the lens that you are adding.

If you will be operating at 400x and below, you will do just fine with a fixed (not movable) condenser, most of which have a NA of .65. However, if you will be working at 1000x, a NA of 1.25 is common on such a lens, in which case a 1.25 NA movable/focusable condenser is required.

Again, when you buy a microscope, the manufacturer will take care of all this, but this will explain why some microscopes do not support 1000x magnification.

GreatScopes' microscopes feature optical glass Abbe condensers. Our popular Observer and professional scopes come standard with movable/focusable Abbe condensers, except the Observer IIdf which is fixed.

Filter Holder

A simple filter holder and filters is built into with many microscopes. These can be useful in providing enhanced contrast and light color correction. In some cases, colored filters can be a simple substitute for staining, which would kill live specimens.

Our student and professional compound microscopes from the Observer III up have filter holders and filters. The Observer IIdf does not have a filter holder.

Mechanical stage

Many of us are used to moving the slide around on the stage with our fingers. In a lot of situations, that is just fine. However, there is a gadget that is made for smooth, accurate movement of the slide. It is called a Mechanical Stage.

A Mechanical Stage is a nice convenience, usually optional on student compound microscopes, and usually standard equipment on medical and lab scopes.

A mechanical stage has two knobs. One moves the slide up and back, while the other moves the slide from left to right. These controls move the slide slowly and precisely, giving you exacting control of slide position.

If you are serious about looking at things under higher magnification, you will need a mechanical stage (as well as the fine focus discussed above). A nudge of the slide while using 1000x magnification will take the subject completely out of view. Some folks wouldn't be without one at 400x - it just depends upon how nimble your fingers are!

Mechanical stages can be added to most student scopes by means of a thumbscrew, which holds it in place. Some scopes are not pre-drilled to accept a mechanical stage.

In most cases, you will not need a mechanical stage, but it can be a nice option to have. (While the mounting holes are somewhat standard industry-wide, you are advised to obtain your mechanical stage from the same manufacturer as your microscope to guarantee proper fit.)

Built-in mechanical stages are standard on professional microscopes.

All of GreatScopes Observer student scopes are pre-drilled for mechanical stages. We offer mechanical stages as an option with each of these scopes. Our professional microscopes have mechanical stages as standard equipment.

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Chapter 7. Used Microscopes

From time to time, folks ask us if they should buy a used microscope, or if we offer them for sale.

I imagine there are some decent used scope bargains out there. The problem is that most of us are not qualified to properly determine a used scope's condition. A scope may look sound, and you might think, "Hey, this is a cream puff!"

However, problems might lie in the optics and elsewhere, which might have undergone years jarring bumps and destructive impact in the hands of uncaring users. Such use can put a scope in pretty poor shape.

I once showed our Observer to the head of the Biology department at a large Southeastern university. After listening to his favorable comments, especially about the optics, he told me the Observer optics were better than those on the $2000+ scopes at his school.

"How can that be?" I asked (remembering our $200+ price tag).

"Because of the way that ours have been treated. Students don't handle our scopes the way they ought to. They're all out of whack."

That conversation reminded me of a few things.

First, that we have some nice scopes.

Second, not to buy a used microscope from an educational setting. You might get a great deal on a thousand-dollar scope, but the optics could be in shambles without you knowing it.

There is always a reason a microscope is being sold. Schools don't get tired of microscopes. They always will need microscopes. The students tear them up and wear them out! They are replaced when they are no longer fit for service.

Most of the people who use microscopes don't actually own them. Many are used by students who don't treat them as well as an owner would.

Unless you know how to evaluate and repair fine optical instrument, you might be well advised to steer clear of used microscopes.

All equipment sold by GreatScopes is brand-new and factory fresh.

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Chapter 8. Conclusion

Congratulations! You made it!

Now you know more about microscopes than 99.9% of the general population, and more importantly you have what it takes to get the most microscope for your money, and the best one for your needs.

I hope you will consider GreatScopes for your upcoming purchase. We have selected the scopes that we carry because they meet a stringent set of criteria, and offer a lot of scope for the money. Won't you please stop by www.GreatScopes.com and see what we have to offer?

If I can be of any further assistance in helping you select a microscope for your studies, research, or hobby, please contact me directly at johnlind@greatscopes.com. I'd be happy to hear from you.

If you would like to see a nice student microscope that meets all of the criteria mentioned above, while still fitting most budgets, have a look at our Observer III & IV.

If a professional level instrument is what you demand, have a look at our Revelation III and M2, two beautiful instruments.

If we have been of assistance to you, we would love to have your business. We have a low price guarantee - so if you see a scope you like at GreatScopes.com, there is no reason to buy elsewhere!

We look forward to meeting your microscope needs.

Best regards,

John Lind, President, GreatScopes Inc.

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