

# Telescope Hunting?

January 2005

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## *The Eyes:*

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If you have just caught the astronomy bug, your natural reaction is to think your first step should be to buy a telescope, right? Wrong. Your first step should be to head outside and look up.

Amateur astronomy is more than just looking through a telescope; it is knowing the night sky like an old friend. It is looking up and noticing what constellations are visible, knowing which "star" is really a planet and which is actually a star, seeing how faint an object you can see, taking note of how bright naked eye variable stars are, watching meteor showers and generally being comfortable in knowing what is happening in the sky. Learning the night sky should be done before you buy a telescope, as being familiar with the sky will make the job of learning how to use your telescope much easier. It will also allow for the "telescope fever" to wear off a bit as you take some time learning the sky and allow more time for researching your purchase before you spend \$5,000 and risk your marriage on a telescope you might end up only using once.

It is also nice to realize when you are naked eye observing, that you are doing what the ancient peoples did for thousands of years before you; observing the sky, timing the rise and set of the moon, sun, constellations and planets, watching for signs from the gods - comets and supernovae.

## *The Options:*

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### **Binoculars**

I suggest that you buy a GOOD pair of binoculars. Probably the most overlooked type of "telescope." A good pair of binoculars is a cost-effective way of introducing yourself to the night sky. All serious amateur astronomers own a good pair of binoculars. Don't rush to buy a telescope -- learn your way around the sky first. You can also take a tiny amount of the hundreds of dollars you saved and buy a beginners sky guide book and a subscription to either Astronomy or Sky and Telescope magazine. ("Astronomy" is the more introductory of the two, but both are good.) Go to your local book/magazine store or library and look at both and see which one you like the best. Both magazines contain monthly star charts, diagrams, and descriptions that include objects that are good for viewing in binoculars.

For astronomy, the binoculars should be about 10x50 (the 10 refers to the power, the 50 to the diameter in millimeters of the lens, or the ability to gather light) with higher diameters, and hence higher light gathering ability, showing more detail at the expense of weight (use of very large binoculars generally requires a tripod). I'd strongly recommend that you also buy a camera tripod and make sure the binoculars have a tripod mounting screw hole on them or have an (optional) accessory bracket/adaptor so that you can mount the binoculars to the tripod. (Note, you could also use 7X50's but lower magnifications are not as satisfying. 12X50 is also a good choice, powers much beyond 10 to 12 become difficult to hold steady. I have also tried the fancy image stabilizing binoculars by Cannon and they do a nice job but are quite expensive.)

Expect to spend between \$100 and \$200 for a good quality pair of binoculars. You can start by going to camera stores and looking at their selection. Avoid cheap off brands, the quality of the optics and optical coatings are where they save their manufacturing costs. Generally, the best brands are the same as the brands of high quality cameras and telescopes, e.g., Nikon, Cannon, Pentax, Minolta, Meade, Celestron, etc. Expect to spend about \$30 to \$80 for a good strong, stable tripod. Finally, expect to spend about \$30 for an introductory astronomy guide book and a magazine subscription. In summary, expect your present to cost between \$150 to \$300. (Note that this is less than many department store telescopes!) Don't forget other sources too, such as pawn shops which often have both binoculars and tripods for very reasonable prices. (My family owns several pair of binoculars, but my favorite binoculars for astronomy are my wife's 11x80's which cost about \$400.)

## Telescope

Once you are ready to buy a telescope you will want to know where to start. I recommend joining your local astronomy club. There you will meet people with experience going through the same thing you are - telescope fever. They will be able to guide you and give you advice but most importantly, they will let you look through their telescopes! This is very important because while the general idea behind all telescopes is the same; collect light, focus it and magnify it to enable you to see celestial objects you would not otherwise be able to see. There are as many ways to accomplish these goals as there are stars in the sky. Without some experience first it will really be a miracle if you manage to choose the best telescope to fit your needs the first time you purchase a telescope.

A word of caution here: department stores generally sell poor quality telescopes. To buy a good one you should talk to a reputable telescope dealer. That being said do a survey of astronomy club members and you will probably find that the majority of them started with a "junk" department store telescope and they were not scarred for life. I have heard some people say that under no circumstances should you buy a department store telescope. I happen to disagree and think that if that is all you can afford and it will get you or your young one going along a path of lifetime interest in the stars then, as long as you are careful about what you buy - go for it. You should however, at least consider buying binoculars instead of a cheap telescope. They will show thousands of stars and hundreds of objects and are by far easier to use than a poor quality, wobbly telescope. They can also be used for more than just astronomy.

A question I am often asked by people looking at my telescope is "how much power does that have?" People say this assuming that "more power" is better. In astronomy, this is not the case. The term "power" equates to magnification and the best magnification to use is the one that shows that particular object the best. This is the reason why people have sets of eyepieces and focusers designed to allow for the quick changing of an eyepiece in the dark. Astronomers are much more interested in gathering large amounts of light so that they can see fainter objects. This is why a large aperture, the size of the primary mirror or lens, is more sought after than high "power".

There are three main categories of telescopes to choose from: Refractor, Newtonian and Schmidt-Cassegrain. Refractors are the oldest of the telescope designs. They work by bending light to a focus point using lenses. A form of refractor that most people are familiar with is binoculars. Newtonians use mirrors to focus the light. They have a primary mirror to collect the light and a secondary mirror to project the light to an eyepiece. Newtonians were developed by Sir Isaac Newton. Schmidt-Cassegrain telescopes are a combination of the Newtonian and Refractor designs.

Before you buy a telescope, you will need to consider what you want to do with your telescope. Do you simply want to look at the sky? If so then, you can do away with mounts that have motors to track the sky and put your money solely into the aperture of the scope. Do you want to take

astrophotographs? If you do, then you need a telescope that will follow the movement of the sky. Do you only want to look at planets? Then maybe a high quality refractor is what you need. Deep sky objects require a larger aperture to view.

Other factors you will need to take into consideration are: will it fit in your car, will you be able to lift and carry it in the dark, are you willing to spend an hour setting it up or are your observing sessions going to be short mandating a quick set-up time? Remember the best telescope for you is the one you are going to use!

**Refractor:**

*Pros:*

- excellent image quality
- no collimation required
- good for astrophotography (apochromatic)
- good for daytime use too

*Cons:*

- expensive
- poor for astrophotography (achromatic)
- can be quite long

**Newtonian:**

*Pros:*

- by using mirrors you avoid color aberration.
- you can get a large aperture for the same price as a small telescope of the other designs.

*Cons:*

- need to collimate(align the mirrors)
- need to clean the mirror about once every two years
- usually poor for astrophotography
- poor for daytime use
- can be quite long

**Schmidt-Cassegrain:**

*Pros:*

- the most versatile design
- pack a large aperture in a small package
- will allow for astrophotography easily
- good for daytime use too
- relatively inexpensive (compared to Refractor)

*Cons:*

- need to collimate (align the mirrors)
- lower contrast than the other designs
- can suffer from mirror shift when focusing
- relatively expensive (compared to Newtonian)

If all of the different types of telescopes are making your eyes roll back in your head just remember this; Newtonians are probably the best all round telescope you can buy for the buck followed by, or surpassed by, depending on what you want do, Schmidt-Cassegrain.

## The Specific Answer:

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I would recommend the following as a 1<sup>st</sup> telescope – A 3 inch or 4.5 inch Newtonian telescope. Here's a little information on one type called the Space Probe 3. It's not only affordable, but its optical quality will make the night sky's treasures accessible right from your backyard. The 3"-diameter primary mirror gathers enough light to reveal the faint glows of many star clusters and nebulas, as well as Saturn's rings, Jupiter's moons, and the stark, cratered terrain of the Moon. The aluminum Newtonian optical tube features a 1.25" rack-and-pinion focuser and two Explorer II eyepieces - a 25mm (28x) and a 10mm (70x). The included EZ Finder II finder scope helps you locate objects with ease. The equatorial mount allows easy manual "tracking" of objects with the turn of a knob (or optional electronic drive for hands-free tracking).



And I would recommend the following as a 2<sup>nd</sup> telescope – The Meade 8" LX90 is the first full-capability, computer-controlled 8" Schmidt-Cassegrain ever offered in its price range. The LX90 Schmidt-Cassegrain is not only a high-resolution visual observing instrument but also is fully qualified for the more advanced areas of astronomy, including long-exposure CCD-imaging and astrophotography. The Meade 8" LX90 is the first full-capability, computer-controlled 8" Schmidt-Cassegrain ever offered in its price range. The LX90 Schmidt-Cassegrain is not only a high-resolution visual observing instrument but also is fully qualified for the more advanced areas of astronomy, including long-exposure CCD-imaging and astrophotography. Meade's improved LX90 automatically levels your telescope, points it to true North and sets the time. You just enter your location or zip code. After your LX90 completes its patented Level North automatic alignment procedure it will point to the first alignment star. Use the new wide-field SmartFinder™ to center the red dot over the alignment stars for ultra-precise pointing accuracy. It's that easy.



## **The Local Optical Stores**

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### **Jackson Camera - Forest Drive**

3407 Forest Drive  
Columbia, SC 29204  
Phone: 803-782-6100

### **Ritz Camera - Harbison**

252 N. Harbison Blvd.  
Columbia, SC 29212  
Phone: 803-781-0085

### **Wolf Camera - Columbia Superstore**

2085 Beltline Boulevard  
Columbia, SC 29204  
Phone: 803-790-1167

### **Wolf Camera - Afton Court**

105A Afton Court  
Columbia, SC 29212  
Phone: 803-732-4758

### **Ritz Camera - Greenlawn**

405 Greenlawn Drive  
Columbia, SC 29209  
Phone: 803-776-7000

### **Wolf Camera - Sparkleberry Square**

10136 Two Notch Road  
Columbia, SC 29229  
Phone: 803-788-0616

### **Ritz Camera - Jackson Camera**

Dutch Square Mall, #169  
Columbia, SC 29210  
Phone: 803-772-6143

### **Ritz Camera - Jackson Camera - Lexington**

205 Columbia Avenue  
Lexington, SC 29072  
Phone: 803-957-3977

### **Ritz Camera - Columbia Mall, Unit #BL-240**

7201 Two Notch Road  
Columbia, SC 29223  
Phone: 803-736-4222

## **The Web sites:**

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Of course, there are many places you may access via the web – here's just a few:

- [Orion Telescope and Binocular Center](#) - Online catalog of telescopes, binoculars, and accessories.
- [Oceanside Photo and Telescope](#) - Telescopes, binoculars, microscopes, and more
- [Binocular and Telescopes at Best Buy](#) – Binocular and telescope accessories.
- [Astromart](#) - Global astronomy marketplace.
- [Amazon.com](#) - Contains a wide selection of telescopes.
- [Oceanside Photo and Telescope](#) - Contains major brands and accessories for telescopes.
- [Anacortes Telescope & Wild Bird](#) - Telescopes, Mounts, Eyepieces, CCD, Binoculars, and more.
- [Astronomy Quest](#) - They carry Meade, Celestron & Discovery Brand Telescopes & accessories.
- [Roger W. Tuthill](#) - Telescopes & accessories
- [Stellar Vision Astronomy Shop Online](#) – Carry new and used equipment.
- [Mountain Instruments](#) - Telescopes, mounts & accessories
- [Lumicon](#) - Carries tons of telescopes & accessories too numerous to mention

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