

## Suburban Visual Astronomy

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### Introduction.

I am a fairly experienced visual amateur astronomer, who likes dark sky as much as anybody. Yet during the forty years or so of my observing career, I have done a fair amount of observing from suburban sites, and I find that even deep-sky observers can do a good deal of interesting work from such locations. I have written this article to pass on some of what I have learned.

A beginner can do this kind of observing, but I have not written this article for complete beginners: I have not included basics about how to choose and use a telescope, how to find your way around the sky, or how to develop visual skills. There are plenty of other good places to find that kind of information, and if you are not already up to speed with those matters, you should go study them first.

### Problems.

If you are a suburban visual observer, you face some very specific problems. Let me list them all before I address any of them.

First, even in what passes for "nighttime", the suburban sky is often so bright that it is difficult to find the objects you want to look at.

Second, even when deep-sky objects are square in the field of view of your telescope, the sky may be so bright that it is hard to see them.

Third, you may not have a lot of sky accessible. Trees, buildings, and localized sky glow often block much of it.

Fourth, very local lighting, like street lights and the lights of adjacent buildings, often shine square in your face and make observing that much more difficult.

Fifth, you may find yourself doing a lot of observing in short sessions, which can be difficult if you do not have a telescope that is easy to transport and set up, and if it does not adapt itself to observing temperatures rapidly.

Finally, there are some issues of human interaction: Basically, you might wonder if local thugs are out to get you, and concerned neighbors may wonder if you are out to get them.

Now let's look at those issues in more detail.

## I. Sky too bright to find objects.

The classic solution to this problem is to look only at bright stuff, and if your targets are the Moon or the bright planets, you are likely home free. If not, some useful tricks include:

A. Keep a binocular handy -- around your neck -- and learn to use it without a second thought. Even an inexpensive drug-store or department-store model, that you might not want to be caught dead with if any other observers were around, will do a fine job of finding enough stars so that you will know where to point your finder.

B. Learn to use a magnifying finder. Unit-magnification finders, such as the popular Telrad, decline rapidly in usefulness as the sky gets brighter so that visible stars get farther apart. Yet even the simplest magnifying unit will likely show most stars which would be naked-eye in darker sky, and that is enough to get you going with star-hopping. One big problem with finders in bright sky, though, is knowing where to point them in the first place, for which see trick (A), above.

C. Align, and use setting circles. There is no doubt that a well-aligned mount with good setting circles will help find things rapidly, and if you are not fond of star-hopping, you might consider using one. Also, do not forget that even a rough alignment will solve the problem of where do you point your finder to get to a recognizable starting point.

D. Use digital setting circles or a go-to mounting. Digital setting circles are about as useful as non-digital ones, and their use makes alignment easier. And a good go-to mounting will of course do most of the work of finding things for you.

## II. Sky too bright to view objects.

Again, the classic solution is to look only at bright stuff, such as the Moon, planets, double stars, and perhaps some globular and open star clusters, but there is a collection of tricks and technology that can

assist in finding fainter things.

A. There are several kinds of light-pollution reduction (LPR) filters on the market. Some are called "broad-band", and some "narrow-band". (There are also more specialized types of filters.)

The usefulness of broad-band filters depends on what kind of light pollution is present; they are designed to reject specific spectral lines, such as those produced by particular kinds of outdoor street lighting, and pass all other colors of light. If they work at all, they will help with all faint objects. Yet you will probably have to try one out at your specific observing site to see whether it can help very much.

Narrow-band filters, on the other hand, will work almost no matter what kind of light pollution is present, but they work only on specific kinds of objects, whose light falls within the narrow spectral range that the filters pass. These objects include planetary nebulae and other kinds of emission nebulae.

B. You might try increasing magnification enough so that the background sky "looks dark". This works tolerably well with some kinds of objects, but not with others, and you will soon find out what magnifications work best at your site with various objects. Normal galaxies that are not highly obscured, star clusters of all kinds, and planetary nebula are among the deep-sky objects that "stand" magnification reasonably well.

### III. Limited area of sky visible.

A. The basic fix here is preparation: Plan your observing for the sky available. Have a list of objects you want to observe, and use a planisphere or a planetarium computer program to see what is visible at the time you intend to observe.

B. If you have a light-weight telescope, you can perhaps move it around your yard and thereby see more of the sky than from any one fixed location. Small aperture and an altazimuth mount may help here, and remember that a quickie equatorial alignment will do for visual work.

### IV. Local lighting -- in your face!

A. Try to keep your observing eye shut when you are not observing. If you are unable to shut one eye and not both, an eyepatch may help.

B. When you are observing, keep a hand over the non-observing eye. Or move your eyepatch there.

C. Rubber cups that fit over the eye end of your eyepieces may help shield your observing eye from stray light. Yet they may also transmit vibration from your body to your telescope.

D. A square yard or so of dark cloth -- or perhaps an old towel -- will provide a useful observing hood. Put it over your head and the eyepiece end of your telescope while you are observing. Be prepared for some very strange reactions from neighbors, though.

## V. Quick Looks.

A. It will help to have a highly portable telescope. It may simply be a small one, preferably one whose size and appearance permit it to remain set up in your living room or garage, so you will have less fussing to do when you want to observe. A tripod with legs that fold together may expedite carrying. How about wheels for a Dobson-style mount? Or maybe a hand truck with bungee cord for moving bulky components?

B. One problem with quick looks is getting your telescope to come to thermal equilibrium with the outside temperature. If you only observe at low magnification, or have a small telescope that cools quickly, you may not have a problem of this kind. Note also that simple refractors -- with doublet objectives -- are usually less sensitive to being out of temperature equilibrium than reflectors.

It is also possible to pre-cool the telescope. You might put it in an unused room, with a window open and the door shut. Or on a porch or balcony. Or inside a car that is not parked in the sun.

## VI. Interacting with Other People.

A. It can help to let your neighbors know what you are doing. They might appreciate a look themselves -- you may acquire some observing company that way. At the very least, if they know what you are up to they will be less likely to call police, and perhaps more likely to turn off their own contributions to the local light pollution.

B. Plan what to say if police or other civic authorities do show up. Odds are they will be interested and will appreciate a look through your telescope.

C. I can't tell you what to do about personal security, but at least think about how safe your suburban site is likely to be, and how much risk you are willing to undertake in order to enjoy your hobby.

Clear sky.