UPDATED FAQS **LIGHT POLLUTION**

What is light pollution?

Light "pollution" is an unfortunate confrontational word denoting the inefficient use of night lighting. I prefer the term poor lighting versus quality lighting, but the term has become standard usage.

How can a light be bad? A light is a light.

A light can be used poorly in three ways:

1) By not directing it at the area that it is meant to illuminate.
2) By using a much stronger light than is necessary.
3) By running it when there is no one to see.

Can you give some examples?

Category 1) Poorly directed light:

a) Those parking lots where light is directed from a flat-pack on a pole way off to the side, but as you drive by most of the light is in your face like a permanent set of high-beams.

b) Acorn-type streetlights with no internal reflector, sending as much light up as down.

c) Pole-mounted security lights that emit much of their light at angles above the horizon.

d) Decorative lighting that mostly misses its target. A good example is yard lights shining up to illuminate the house, but are poorly pointed.

e) Glare-type lighting (for instance, a porch light that is a spotlight directed right at your face as you approach the door). Your eyes contract and you find that you still can't see anything.

Category 2) Stronger light than is necessary.

a) A trend in new gas stations is to illuminate their pump area with a dazzling array of lights that are mounted below the awning rather than inside it, as was the former practice. These shine light at three times the brightness of office illumination (far brighter than needed) but, in fact, are used as an unsubtle form of advertising. In some places they are used as an end-run around sign ordinances.

b) People often replace their incandescent porch lights with a sodium vapor light of the same wattage. By comparison it seems laser-bright.

Category 3) Running a light when there is no one using it.

a) Using a pole-type barn or yard light for "security."

b) Running parking lot lights at full blast when all the stores are closed.

c) Running porch lights all the time.

But lights do provide security!

I have heard that in the late 1950's to early 60's the electric companies noticed that they had to shut down a lot of electric generation capacity at night. This represented a poor return on investment, so they looked around for a way to encourage nighttime electricity use (remember, this was a long time before conservation or energy shortages). They called such use during off-peak hours a "load leveling" strategy. One of the more successful campaigns they initiated was to encourage dusk-to-dawn lighting in the form of automatic sun-sensing pole lights at a flat rate. Some advertising whiz came up with the idea of calling them "security" lights. This is an empty word that means nothing more than feeling safe, but is sufficiently vague to keep people from suing if a loss actually occurred. Thus, "security lights" is very similar to Linus's "security blanket." Until recently, no one was ever able to prove that they help.

Then they proved that security lights actually worked?
Recently, a British study showed that there was a *slight* improvement in having a light over not having one, but in the UK the mix of crimes is somewhat different. For instance, over there they have something called a "hot burglary" or invading a house when the residents are actually present. In this country, such invasions are greatly reduced by the prevalence of guns (not that crime is less here, only different). Over here, the burglars prefer to break in when people are less likely to be home, i.e., daytime. Then again, maybe the reason that some criminals think lights are protection is because everybody else thinks that, too. In any case, superior results can be attained by other, less wasteful techniques, including alarms or motion sensors.

If lights don't help, why are muggings most common in dark alleys?
I don't know that they are more common there, but an alley is a favorable place because it is screened from view in most directions by fences and buildings, not because it is dark.

Then you disapprove of lights?
It's not that astronomers disapprove of light -- we use them ourselves! -- but we feel that the poor use of lighting to perform jobs it can't do is incredibly wasteful. We are mystified why the frugal people of the 1960s (remember how your Dad used to yell at you when you left your room light on) bought into this notion that they would somehow be safer if they burned a 175 W light outside all night, yet hardly ever peeked out between the shades. Furthermore, we are concerned that the feeling of false security brought on by illumination makes people walk into unsafe situations more often just because their surrounding are brightly lit.

What about the lamps themselves? I've heard that sodium lights are of very high efficiency.
They are, but their fixtures are not. The "upside-down cakepan" frosted diffuser that surrounds the lamp does too good a job diffusing light. It has a 270 degree pattern that pours much of the lamp's output upward where it can't be used, and sideways where it produces little besides glare. Basically, the only place that an unfocused pole lamp can illuminate with much efficiency is a 100 to 120-degree angle directly below it. By using a full-cutoff fixture (that is, a fixture that reflects and emits all the light down), the brightness below it is nearly doubled. You can either replace the bulb with one of lower wattage or enjoy more light where you can really use it.

Why does the light that goes sideways produce glare?
Light used as an illuminator drops as the square of the distance. If you go twice as far, the effectiveness of the light drops a factor of four. If you double the distance again, the light weaken to a factor of sixteen, and so forth. That is why you can't see well enough to read easily except right under the yard light or a little sideways of it. However, when you look at the light, the eye seems to respond not to the illumination of the area, but to the *luminance*, or the brightness of the bulb. When you walk away from the light, it doesn't appear to get much dimmer, just smaller. It is a longer-distance effect. You can be dazzled by a lamp (example: oncoming headlights) at the distance of 200 yards, yet derive no benefit from it as an indirect light source when you shade your eyes with your hand and look around near your location.

I don't understand.
Glare is really simple. In the dark nighttime environment, if you can see the lamp, that's glare. If you see what the lamp is pointed at, that's illumination. Glare means the light moving directly

from the lamp to your eye. If it hits anything else first, it is doing its job. If it goes directly into your eye or misses the earth entirely, it is doing nothing. Outside at night, indirect lighting is the most efficient form of light. Go outside some night with a friend and a flashlight. Have him or her point the flashlight into your eyes. Look around while this is happening. That's glare. Then have the other person turn around and point the flashlight at the grass away from you both. That's illumination. It is the same with your unseen headlights and approaching headlights. Which show you the road better? The only proper use of direct illumination is when the light itself is the reason, like stoplights and taillights on autos.

Who besides some wacky astronomers cares whether the light is pointed well or not? If you need more light, just turn on another one.

Consider astronomers your early warning...your canaries in a coal mine. We are the first to set off the alarm, but everyone should be concerned. Do you like the recent instability in gas prices and our reliance on foreign oil? A 175-watt pole light consumes at least the equivalent of 30 gallons of gasoline per year (the input fuel at the power plant may be in coal or some other form, but it's *energy out of the same marketplace*). Visualize, in your head, a thirty-gallon can under every light you've ever seen. (Have you ever flown over a city at night?) Is every such light needed? Besides, the usual "cake-pan" lamp head wastes at least 10 gallons of that fuel. Wouldn't you rather save up that wasted energy to burn in your car or to lower your electricity bills? We waste an enormous amount of money in light that doesn't hit anything but is poured straight out into space. The only light that bothers astronomers is the light we waste.

I bet astronomers and lighting engineers hate each other.

No, surprisingly enough. Real lighting engineers are about as exasperated as astronomers when it comes to bad lighting. They bemoan the fact that any Bubba who installs a circuit-breaker box thinks that he can design lighting, too.

Can you give any local examples of quality lighting that has probably been designed by professional lighting engineers?

The Bailey bridge between Southport and Lynn Haven is a very good example of quality lighting. It features flat lights pointed down. From a distance, you can see them only as a sliver of light. You can see the road very well without squinting into glare. But I've noted that when excellent lamps malfunction, they are generally replaced with a glare-ridden drooping fixture instead of the flat. Too bad.

Any large-scale bad examples?

Any convenience store/gas station that has been built in the last five years is an excellent bad example. However, the king of all bad examples is the street lighting on Highway 77 between the Mall and Lynn Haven. The street is lined with side-looking lamps that serve only to pour glare into drivers' eyes. It is shocking how something putting out that much light does such a poor job of illuminating its target.

Why do companies make the bad fixtures and the power companies distribute them?

Don't know. Cost, habit, ignorance. Take your pick.