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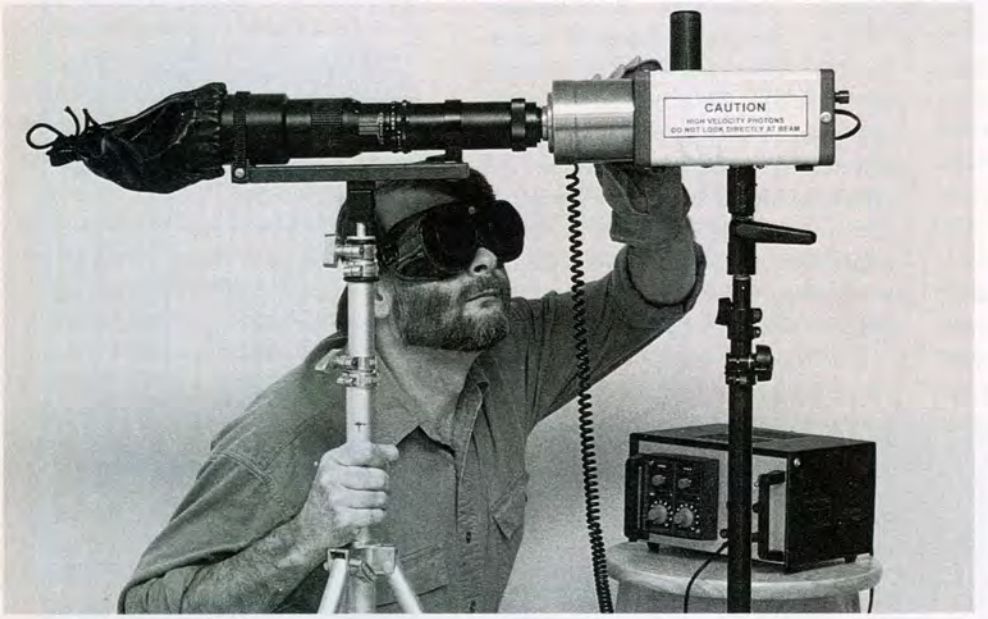
Avoiding Photonic Impaction

By Homer LaFluts



THE AUTHOR PREPARES TO DISLODGE IMPACTED PHOTONS FROM A TELEPHOTO LENS USING A BEAUGOSS DIGITAL LIGHT PUMP.

Although you may think camera-store customers who peer into lenses with a loupe and a flashlight are comical, they will more than likely have the last laugh. These careful individuals are checking for photonic impactation, one of the most unusual and least understood robbers of image sharpness and color fidelity. This phenomenon can impair any lens, but those for 35mm and medium-format cameras tend to show the effect most dramatically. The following tips will help you protect your current lenses, as well as identify problem equipment on the used market.

Experimenting with headlights for horseless carriages, Austrian inventor Otto Baroque observed in 1896 that the protective glass cover gradually blackened with time. He initially attributed this to layers of soot from the carbide light source, but became intrigued when it continued after upgrading to the new electric lamp. Microscopic analysis showed that the darkening was actually caused by photons (the basic component of light) accumulating in the pores of the glass from unidirectional light passage. Further work proved that the impacted 8x8" covers would lighten if installed backwards on the headlamp, and led to Baroque's drafting of the Inverse Square Law.

The same thing happens in camera lenses. Traveling at 186,000 miles per second, photon streams penetrate the single front element with little difficulty, but begin to decelerate as they hit thicker and/or grouped elements within the barrel. By the time the light reaches the last element in a typical lens, its speed has been severely cut and the total photonic mass reduced to only a fraction of its original size. Light throughput is further minimized by the use of small apertures, ND filters and special-effects lens accessories.

The problem is also exacerbated by the so-called Funnel Effect, where the larger front element admits more photons than can be moved at reduced speed through the smaller surface area of the rear element. Fisheye lenses are the most susceptible, as is seen by the round central image left after rapid photon build-up has vignetted the corners. The result in any lens is a softer image from the clogged elements, a loss of effective speed and, because blue-end spectral photons have greater penetrating power, a cyan shift on color-slide film.

The type of illumination a photographer uses directly affects the life expectancy of his lenses. Spherical solar photons pass most easily through optical glass, distended tungsten photons cause a moderate amount of impactation, and icicle-shaped electronic flash photons accumulate very quickly. If you think of the action of light as being similar to that of a basketball, it will be easy to believe that a bounced photon loses speed with each deflection and that soft studio lighting therefore takes its toll the quickest.

It is interesting to note that photon dynamics have been understood even by lay people, as is evident in the well-known story of Margaret Bourke-White's portrait session with Gandhi during which he demanded that she use only natural light to take his picture. Contrary to popular belief, the Mahatma's objection to the photographer's flashbulbs was not dictated by cosmic principle, but rather by his heightened sensitivity to nature and the desire to avoid a barrage of ragged photons to his minimally clothed body.

Here are a few plausible techniques that will help retard impactation in new lenses, and if photon accumulation is not

too dense, restore old or carelessly handled equipment. Outfit each of your lenses with a snap-in front cap, remove it just before taking each picture, and replace it immediately after. A collapsible rubber hood guards against stray photons that strike the lens at a steep angle and embed directly in the front element. Shoot with 2-3 element straight focal lengths instead of complex zooms whenever possible. For complete protection, consider blocking all visible light from the lens with a #87 filter and using only infrared sensitive films.

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A lens can be dephotonized simply by mounting it on a camera with a reversing ring and exposing the rear element to sunlight. Remove the back, lock the shutter open on "T," and open the aperture all the way. The light passing through the barrel in this position will dislodge extant photons, but be careful not to overexpose and end up with reversed impactation. Determine the time by multiplying the focal length by the *minimum aperture*, dividing by the age of the lens, and adding the square root of the filter size. Lenses needing times of more than six hours should be sent to a repair shop for vacuum or pulsed light extraction.

Your camera gear represents a major investment, and it makes good sense to take care of it. Follow the manufacturer's operating instructions, have it professionally serviced at recommended intervals, and don't be fooled by the outrageous articles some magazines publish to see if anyone is reading. Keep an eye over your shoulder, and have a good month.

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