

What lighting to use for photographing flowers



Inside (in a studio)



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Introduction

Most of us photograph our flowers outside, in our own garden, or while on vacation, or in a botanical garden. Here at FLAAR Reports we have been photographing tropical plants for decades. Presently we have one of the largest and definitely fastest growing photography archives in the world on tropical flowers and plants of Mesoamerica.

Plus this botanical reference archive of photographs is of higher resolution than of most universities and institutes, and even more important, is one of the few botanical photography resources in the world that is all done by experienced photographers who are specialized in flower and fruit photography.

I would hope that the leading botanical gardens, MOBOT, New York Botanical Garden, Kew, and comparable also are doing good photography, but it is sad to see most of the reference photographs for botanical research. 90% are snapshots. Rarely do you see studio quality, and rarely do you see an understanding of layout, setup, positioning. Hardly ever do you see planning in the lighting.

It is the same with archaeological photography. Commercial photographers have all the equipment and the studio, but don't know what part of the artifact to feature with their lighting. And the capable field archaeologists, whose research I respect, generally bring back snapshots of their findings. It is almost unknown to see professional equipment, especially good lighting equipment and sturdy tripods at any archaeological field project (and worse back in their home universities).

I can still remember the photography I did on my first field projects, at age 30, in the tropical rain forests of Yaxha, El Peten, Guatemala. My lighting fixtures were the aluminum clip-on fixtures which you buy in any hardware store for about \$3.50 each. I sure have learned a lot since then. Today I use Westcott, Lowell, and in past decades used Dedolight. If I had a larger studio I would consider using Elinchrom (studio flash units).

In the field we use the best flash units that Canon or Nikon can offer (especially ring flash for macro and dual-light macro flash), but when we need serious light we use Metz off-camera flash (60CT4 from decades ago still work fine). I would be interested in testing portable lighting from Quantum.

We have a 21 megapixel Canon (EOS 1Ds Mark III, a 21 megapixel medium format digital back for our Hasselblad, with original Zeiss lenses. And we have recently invested in a Nikon D800E, 36 megapixels.

Our goal is to
Record the 400 species of plants which were utilized by the Maya
Record the diverse eco-systems of Guatemala
Publish this material so that botanists, Mayanists, students, and interested lay people can see the full range of Maya interaction with the plants in their environment.

There are several reasons we make special effort to obtain photographic results that are different than normal botanical images

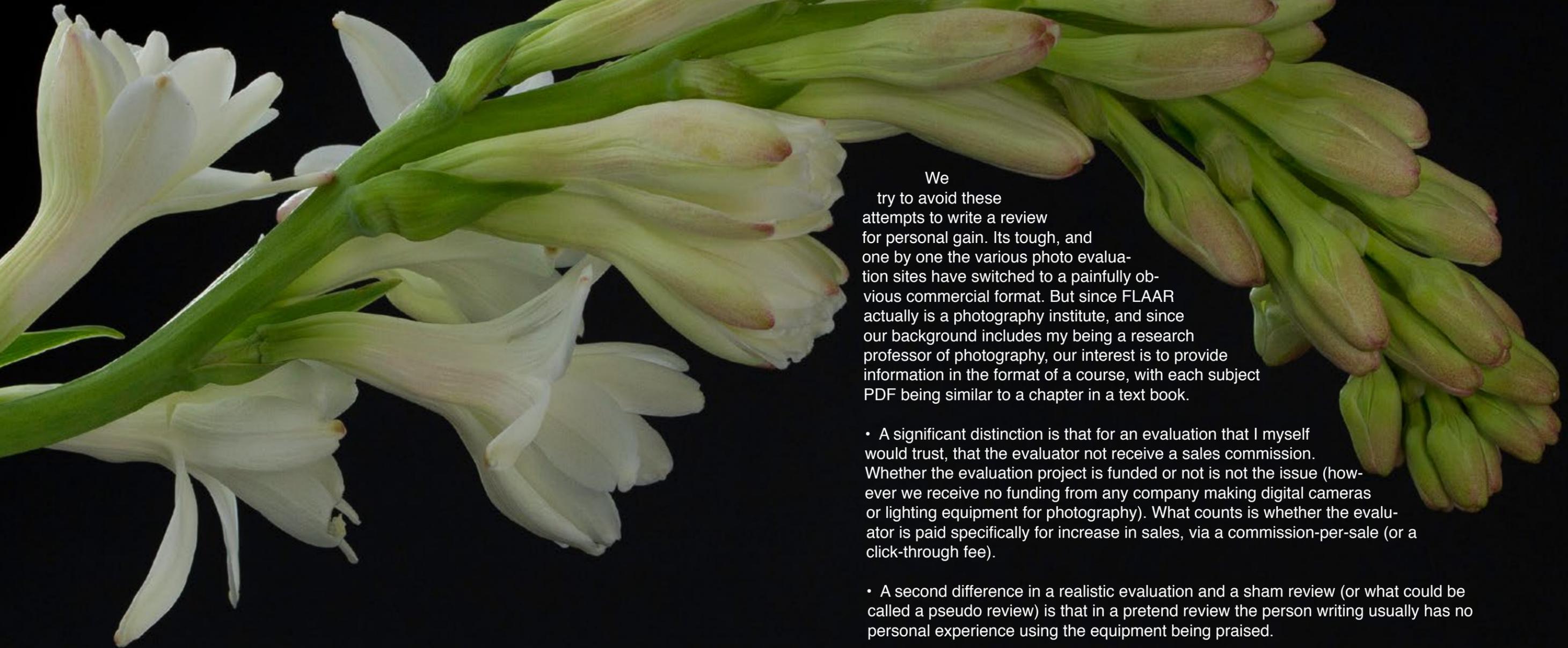
- We wish to preserve for posterity images that can assist in public education
- Since there is competition for readers' attention, it helps if the photographs are better than average. For example, if you are soliciting funds for a project in indigenous agriculture or nutrition or ethnobotany, it sure helps if, up front, in the original research proposal, you can show that you are different (frankly that you can do things better, in this case do better photography).
- And most of all, the flowers of Mesoamerica are gorgeous. Of some their beauty is subtle, and so it helps to do bring out this beauty with careful lighting, high resolution camera and lenses, and with the flower or plant part nicely arranged on the photo table.
We write reviews of equipment so we can share our findings with botanical gardens, universities, and the millions of lay people who like to do photography of flowers.

Setup 600 watt Spiderlite TD5 at
FLAAR Studio



The difference between a reliable evaluation and a sham review

For the last several years there has been a surge in sham reviews. These vary from a pseudo-review to merely a PR release using the keyword “review.” There are also photo equipment dealers issuing “reviews” (of equipment they themselves eagerly sell).



We try to avoid these attempts to write a review for personal gain. It's tough, and one by one the various photo evaluation sites have switched to a painfully obvious commercial format. But since FLAAR actually is a photography institute, and since our background includes my being a research professor of photography, our interest is to provide information in the format of a course, with each subject PDF being similar to a chapter in a text book.

- A significant distinction is that for an evaluation that I myself would trust, that the evaluator not receive a sales commission. Whether the evaluation project is funded or not is not the issue (however we receive no funding from any company making digital cameras or lighting equipment for photography). What counts is whether the evaluator is paid specifically for increase in sales, via a commission-per-sale (or a click-through fee).
- A second difference in a realistic evaluation and a sham review (or what could be called a pseudo review) is that in a pretend review the person writing usually has no personal experience using the equipment being praised.
- A third difference is that an actual true review mentions good features of other competing technologies and brands.





Unfortunately, the way search engines function, spam and sham tend to get high positions in search engines. Content farms are the most pathetic situations.

We at the FLAAR institute actually use the equipment we write about, or at least we have inspected the equipment at Photokina or PhotoPlus. In the era when PMA actually functioned we attended PMA about every second year (and out of curiosity attended the sad remnants of PMA@ CES 2012).

Plus we normally use several different brands of equipment, or at least we know of competing brands. We make this effort since we are well aware that photographers in North America and actually in Europe and elsewhere, make their buying decisions based on what we say. Mentioning competing brands is a major distinction in what we prefer as an evaluation that is the most useful for a photographer who seeks tips, help, and assistance to decide what equipment to utilize.

Lighting in your studio Compared with lighting out on location

The following evaluation is for lighting in a studio. We discuss in separate reports what equipment we use out on location. For many photographers on location means the streets of a big city. For us it means waist deep in a mangrove swamp inland from the Pacific Ocean, in a crocodile reserve. Or perhaps deep in a tropical rain forest. But for the present FLAAR Report we are speaking of studio photography, which can have comparable equipment anywhere in the world.

We have evaluated equipment in our university-based studio as well as outside the university (nowadays most universities lack funding (and thus also tend to lack space) to partner with an independent institute such as FLAAR).

For several years we used lighting for Balcar. Unfortunately their carrying cases did not hold up well, and their lights were clearly conceived decades ago and not meant for frequent traveling. Their web site is no longer functional; not even the dot.fr one. But the system itself provided great light, just that the units were clunky. Whether Cokin still offers them I have no idea. With all the competition from China in recent years it is unlikely that products made in EU can survive unless they are outstanding. Balcar was functional but the units were definitely not of French sophistication: they were more like a Citroen.

Lighting in your studio

Our studio needs to be portable, since we photograph in remote areas around Guatemala and occasionally we photograph in Copan Ruinas, Honduras. On a few occasions we do photography in El Salvador. During the 1970's through 1990's we did decades of photography throughout Belize and half of Mexico. So it is essential that a studio fit into a vehicle, at least into a van. So even though for the last ten years about 80% of our photography with a studio has been in our own building (in our own studio), we do still take the equipment to Honduras or to distant locations within Guatemala.

Lowel was the first set of portable lighting that we used, since in the 1970's onwards we did primarily photography of stelae, altars, and artifacts in museums. We were using Kodachrome, Fujichrome, and Ilford for black and white. We had Hasselblad and Leica cameras in that era. We added Linhof 4x5 and Linhof 8x10 in the final years (1990's) before digital reality).

- Lowel Tota-lights (these last forever; ours are over four decades in use and still great)
- Lowel DP lights (when you need even more power than Tota-light)
- Lowel Omni-light (also when you need lots of light)
- Lowel Rifa, current models are eX series) (when you wish soft lighting).

I do not yet have experience with Lowel ViP Pro-light series, but I would enjoy testing this class of lighting. I also have not used Lowel L-light, V-lights, ViP I or id lights (because I was so occupied using the Tota, DP, Omni, and Rifa which we have. The last three kits are courtesy of Marvin Seligman, who donated a set for our archaeological photography a decade ago.

Now we also do photography of flowers, so our needs are different

FLAAR is a research institute dedicated to the study of Maya culture of pre-Columbian Mesoamerica (southern Mexico, Guatemala, Belize, adjacent El Salvador and Honduras). As indicated earlier in this introduction, we concentrated on photographing artifacts (primarily ceramic plates, vases, and bowls) and carved stone monuments of the ancient Maya civilization for decades. For photographing sculptures and ceramics the Lowel lights were perfect.

Now, for the past nine or so years, we do more photography of flowers and animals. We have a long range project to identify, list, find, photograph, and publish all tropical flora and fauna which was utilized by ancient Maya civilization from 600 BC to AD 900. We are also working on identifying, finding, and photographing all plants and animals mentioned in the most important Maya mythical heritage, the Popol Vuh (more or less equivalent to their Bible of their Maya religion, especially their deities, and especially the Hero Twins battles with the multitude of evil deities and devils of the Underworld). If you Google Tedlock, or Christenson, you can get English translations of the Maya Popol Vuh from the Internet.





Flowers would wilt if near the heat of the kind of tungsten halogen lighting that an archaeologist or architectural interior photographer would tend to use. So we still use the Lowel lights for archaeological photography, but for flowers we had to go out and do research and evaluations to figure out what best lighting to use.

- We visited Photokina and inspected all the lighting offered there.
- We visited PMA and inspected all the lighting offered there.
- We visited PhotoPlus Expo (aka PhotoEast in New York) and looked at all the different kinds of studio lighting offered there.

Based on this research I selected fluorescent lighting. This was soft light, and was not hot. Eight to ten years ago there were only a few brands of viable fluorescent lighting at the pro studio level: Scandles (by Gary Register) and F. J. Westcott.

In these early years there was no easy way to get Scandles directly from the photographer who developed them, so we opted for fluorescent lighting that was more readily available by a major company, namely F. J. Westcott. Westcott offered fluorescent lighting while most other companies were still concentrating on tungsten halogen or studio strobes.

Today of course you can obtain fluorescent lighting from many brands (and in subsequent years Scandles became available via Lowel) but in the years that we needed the lights, F. J. Westcott company was the most readily available source in the USA. Plus, F.J. Westcott world headquarters were only a few miles from our FLAAR facilities, in those years, circa 2001-2006, at Bowling Green State University (in Ohio).

Plus, since Westcott started with fluorescent lighting early on, and as a result has the most experience, they are today in 2012 already on generation three or four.

Models

The models of Westcott Spiderlite which we have are TD5. We definitely need the added wattage of this 5-lamp system. But if your style of photography, and your effects work well with less power, there is also the Spiderlite TD3.

We use the tilter bracket (the connecting unit). This tilter bracket is absolutely essential in a busy studio, since each subject may require a slightly different lighting angle.

The Westcott TD6 series did not exist when we received the TD5; there would be many benefits of the TD6, especially for photographing trees, for sculpture: so for objects larger than a small sprig of a plant.

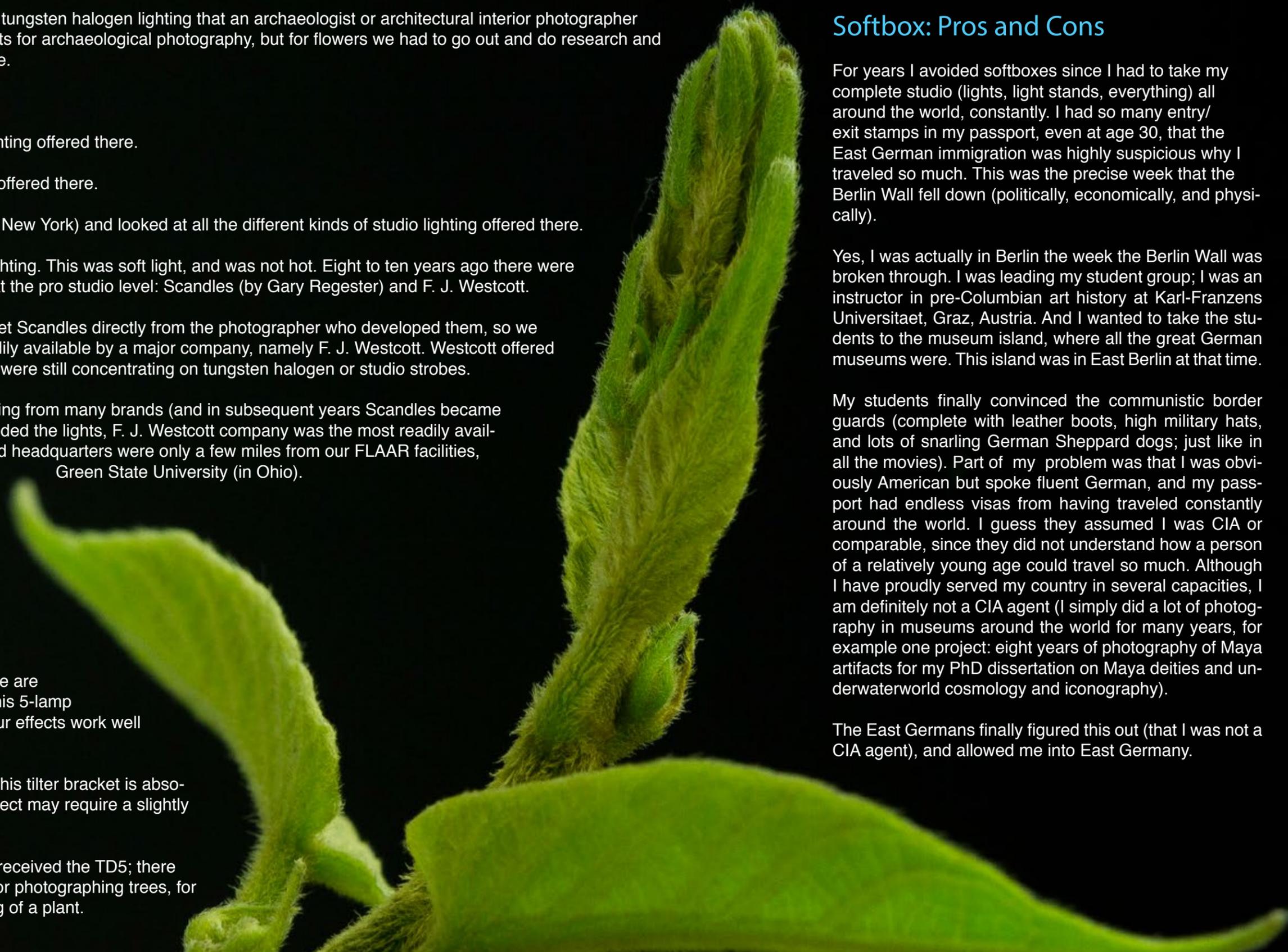
Softbox: Pros and Cons

For years I avoided softboxes since I had to take my complete studio (lights, light stands, everything) all around the world, constantly. I had so many entry/exit stamps in my passport, even at age 30, that the East German immigration was highly suspicious why I traveled so much. This was the precise week that the Berlin Wall fell down (politically, economically, and physically).

Yes, I was actually in Berlin the week the Berlin Wall was broken through. I was leading my student group; I was an instructor in pre-Columbian art history at Karl-Franzens Universitaet, Graz, Austria. And I wanted to take the students to the museum island, where all the great German museums were. This island was in East Berlin at that time.

My students finally convinced the communistic border guards (complete with leather boots, high military hats, and lots of snarling German Sheppard dogs; just like in all the movies). Part of my problem was that I was obviously American but spoke fluent German, and my passport had endless visas from having traveled constantly around the world. I guess they assumed I was CIA or comparable, since they did not understand how a person of a relatively young age could travel so much. Although I have proudly served my country in several capacities, I am definitely not a CIA agent (I simply did a lot of photography in museums around the world for many years, for example one project: eight years of photography of Maya artifacts for my PhD dissertation on Maya deities and underwaterworld cosmology and iconography).

The East Germans finally figured this out (that I was not a CIA agent), and allowed me into East Germany.



Within 24 hours the entire Berlin Wall was breached. Actually the next day I drove into East Germany through an official border station entry, but that evening (after I had lectured in Dresden or Leipzig), when driving back the border station was in too much confusion (because of the political turmoil) so we simply drove through a hole in the Berlin Wall. Officially I have no departure stamp from East Germany!

Sorry for the adventurous digression, but all of the above is why I did not use any softboxes in thirty years of photography around the world: too much to carry.

But now I use a softbox on the Westcott lights. They are essential.

Nowadays I use a van to carry my equipment, and go with an entire team of assistants. So now I have space for a transporting a softbox; one for each of our four lamps. Plus I do not photograph flowers in Germany! I did photography in Germany 30 years ago because their museums have thousand-year old stelae taken from Guatemala in the 1800's.

Softbox or parabolic umbrella?

Best is to try each style of lighting and see which you (and your clients) prefer. Since we only seldom do photography for a client, we select the style of lighting that we wish to express our personal style. Even more important than our personal style however, is our wish to bring out the natural beauty of the flowers, insects, exotic tropical fruits or unusual size, shape and color of the indigenous vegetables of Guatemala, Honduras, and Belize.

Personally I prefer a soft-box. And for two of the units we often use with no softbox, to get a more targeted light. I use these as backlights. My style is significantly focused on backlighting and side lighting. I rarely use direct frontal lights whatsoever.

But be aware that many clients may prefer frontal lighting or a completely different style than we have developed. Most photography schools and hence most photographers use very different placement and manner of lighting than we do. This is partially because I never studied photography either in high school nor at the university. In my entire life I have sat through only one single presentation on photo techniques (and I immediately went out and bought a complete set of Dedolights as a result). Dedolights were awesome for photographing figurines, since figurines are of complex shapes. A normal vase, bowl, or plate did not need Dedolights, but anything with deep relief or three-dimensionality was much better if illuminated with Dedolights (because you can aim a Dedolight).

But their light intensity fluctuated too much for a tri-linear scanning back to handle, so I stopped using them and never got back into the habit (they would work okay for a one-shot CCD or CMOS digital sensor today; but they were definitely not made to work with large-format Better Light technology of 1996 onward).

I have evolved a system of photography that is oriented to the subject. I use one type of lighting for museum photography of Maya archaeology artifacts. I use slightly different equipment and slightly different style for photographing flowers.

But to get back to the question asked, softbox or parabolic umbrella, I use and prefer a softbox. Probably because this is what I am used to. Plus I rarely use flash or strobe, not even in the studio (though we definitely do like Elinchrom).

For a stone sculpture or large ceramic artifact such as a burial urn or large Incensario, I would tend to prefer a softbox on all four lamps. I almost always prefer four lighting units, two on each side.

Size and shape of softbox

Full-figure photography of people would suggest a long (tall) softbox.

Head-and-shoulders portrait photography would tend to work best with a square softbox.

For flowers we suggest two small and two medium sized softbox kits.

Placement of the lighting units

If I am photographing an animal, reptile, flower, or bizarre shaped tropical fruit, I wish to bring out the personality, the color, the size, and especially the shape of the subject I am photographing.

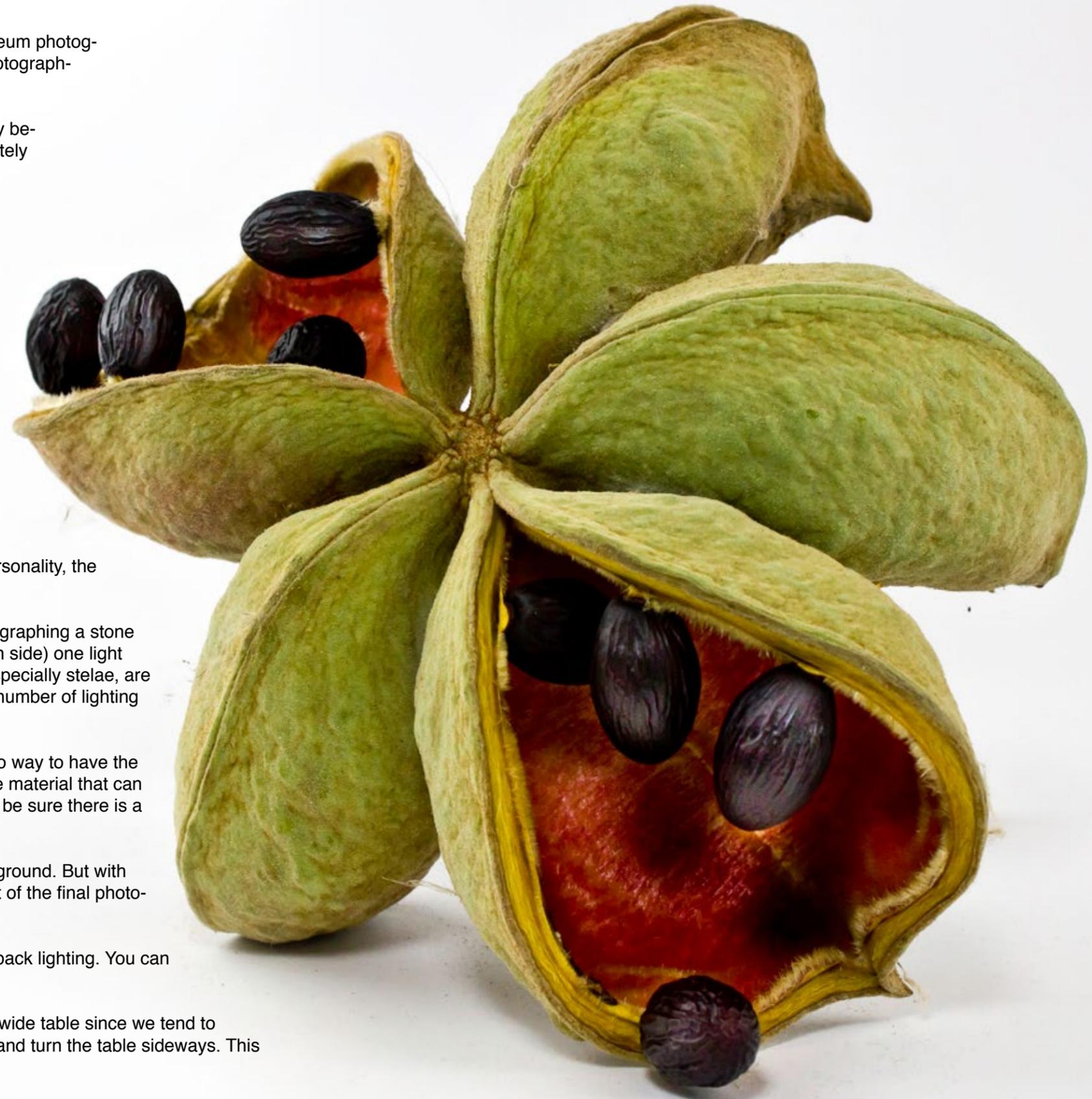
If I am photographing a stone sculpture I want light-and-shadow to bring out the detail. When I am photographing a stone sculpture in a museum, I would tend to use four identical lights; two on each side. I would have (on each side) one light about 3' off the floor and the other light about 6' off the floor, so stacked. Most Maya stone sculptures, especially stelae, are about 5 to 6' high. Some are 12' (and the really tall stelae at Quirigua would require an entirely different number of lighting units, and very high light stands or a boom).

When I am photographing flowers, I prefer more back lighting. With a stone or ceramic artifact there is no way to have the lighting illuminate the inside of the artifact (Maya sculptures are almost never of glass or any comparable material that can be illuminated from the back with light). So with stone or ceramic artifacts, the back lighting is in order to be sure there is a profile of bright edge on the profile of the artifact (to make it stand out from the background).

When photographing flowers, backlighting is also useful to make the back edge stand out from the background. But with flowers the petals and leaves are often translucent: the lighting from behind can impact the visual impact of the final photograph.

Since the purpose of these photographs is to illustrate their physical structure, it is also a benefit to use back lighting. You can better see "inside" a cluster of flowers if there is backlighting.

The snag of back lighting is that the light fixture has to be somewhere behind the unit. We tend to use a wide table since we tend to use backdrop paper which is standard width (53" probably). It would be best to use 24" backdrop paper and turn the table sideways. This way you can put the backlighting closer to the back of the flowers.





Setup of Westcott
600 watt
Spiderlite TD5
at FLAAR
Studio taking Chilly
Chocolate

Lighting depends on your subject matter

Some studios have special equipment dedicated to their particular applications:

- Product photography
- Portrait photography

With fluorescent lighting you can use this for almost any application as long as your product or subject can have the lighting fairly close. If you have to have the lighting fixtures far away, or if you have to light a substantial area, then you need high power tungsten or studio flash of significant power rating.

And if you need to do pinpoint lighting, we would suggest you look at Dedolight or comparable lighting where you can use a snoot. For example, if we are photographing an 8th century Maya ceramic figurine, perhaps 25 cm high (so less than a foot; a foot is about 30 cm). We may need lighting to go inside the open mouth, or lighting on earring jewelry of this small figurine. This is perfect for a Dedolight with its pertinent accessories.

For flower photography, and for many aspects of museum photography, we find fluorescent lighting really great. Although we do not do portrait photography very often you could certainly find the nice soft lighting of fluorescent lighting technology very pleasing.

What would be the ideal studio lighting or our next ten years of photography?

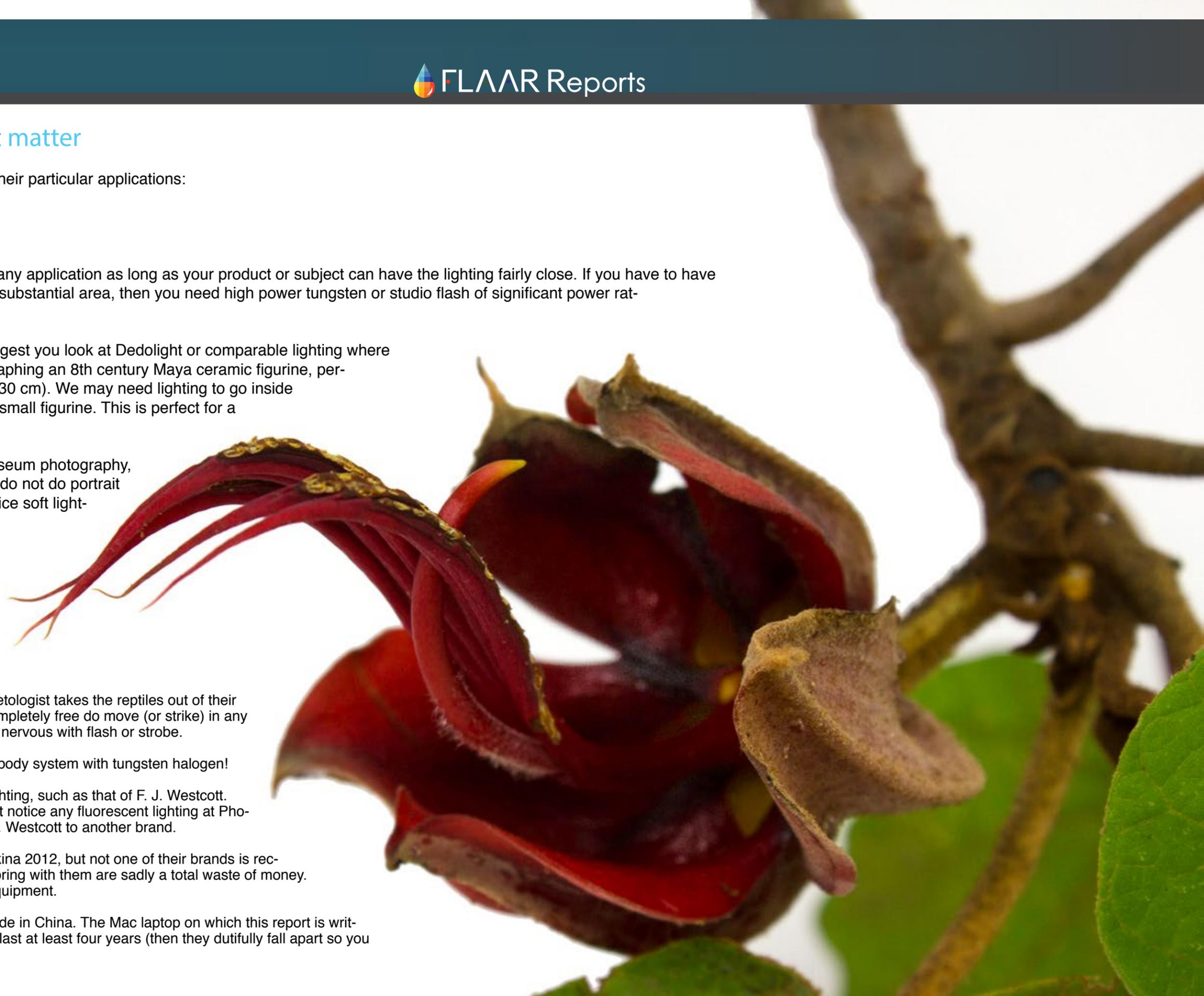
When we are photographing venomous snakes, the herpetologist takes the reptiles out of their cages and puts them on our photo table. The snake is completely free to move (or strike) in any direction. We certainly would not want to make the snake nervous with flash or strobe.

And we would certainly not desire to heat up the snake's body system with tungsten halogen!

So we use, and definitely recommend, soft fluorescent lighting, such as that of F. J. Westcott. Although they do not tend to exhibit at Photokina, I did not notice any fluorescent lighting at Photokina 2012 that would entice me to switch away from F.J. Westcott to another brand.

I saw a dozen Chinese exhibiting studio lighting at Photokina 2012, but not one of their brands is recognizable and all the Chinese tripods that my assistants bring with them are sadly a total waste of money. So I am not yet ready to consider any Chinese camera equipment.

I fully realize that most name-brand equipment is now made in China. The Mac laptop on which this report is written is manufactured in China, but Apple makes sure they last at least four years (then they dutifully fall apart so you





Setup of Westcott 600
watt Spiderlite TD5 at FLAAR
Studio Diente de Perro Chilly

But equipment made in China that is sellable only because it is cheap, this is what I carefully avoid. And I definitely do not use tripods made in China and I would not yet consider a light stand made in China. The light stands of Manfrotto and Avenger are simply too good to switch.

So we prefer equipment which is engineered and designed in USA, Europe, or Japan (though being made in Europe is no guarantee of a perfect product; the second generation Arca-Swiss tripod head is over-engineered and locks itself by itself. That is the worst tripod head in the world). But based on my experience, I am fully content with Westcott lighting equipment and their softboxes. They have held up to use over many years.

- The Spiderlite TD3 has sockets for three lamps (bulbs).
- The Spiderlite TD5 has sockets for five lights.
- The Spiderlite TD6 is their third generation and holds up to six lights.

Since we need lighting for flowers some days and lighting for sculptures other days I would opt for the TD6 for an ideal studio set up.

Since our lighting style, for decades, features backlighting and side lighting (and not as much front lighting), four units are essential. In most product photography there tend to be two lights on one side and one light only on the other side. Same in portrait photography. But after watching how visitors to my photo exhibits react when seeing my photographs I opt for deliberately balanced lighting: from both sides.

I call my style, raking lighting. I want the profile illuminated (hence backlighting). But even more crucial, I want the depth and all surface features to stand out. On thousand year old Maya sculpture this is usually shallow relief. Or it may be deep relief. If all the art were three dimensional I would modify my style, but sculptures of Mesoamerica tend to be carved in relief.

Bouquets of flowers tend to look gorgeous with side and back lighting.

Plus, what I like about the Spiderlite TD6 is that it can handle tungsten lamps as well (you switch them out in a few seconds).

Since it takes four units to handle the diverse range of photography we do, an ideal studio setup would be

- One 2400-watt 2-light Spiderlite TD6 softbox kit (SKU: 6881)
- One 2400-watt Spiderlite TD6 medium 2-light kit (SKU: 6898)
- With tilter bracket accessory to allow tilting each lamp fixture





Setup of Wescott 600 watt Spiderlite TD5 at FLAAR Studio taking "Huele de Noche" flower

Why constant light? Why not strobe?

To carry power packs on my constant worldwide photography trips would have been unrealistic. Since I had to be portable, and had to be able to carry the entire studio, myself, even on a train (within Europe), it was not realistic to use studio strobe due to the size and weight of their power packs.

Plus I began with Lowel Tota-lights and got so used to tungsten halogen. Plus I want to see my light-and-shadow effects the entire time I am doing my photography. I need to move the lights to see the different effects of the intensity and angle of the light. I can make judgments quicker if there is light on the object the entire time.

Plus many museums do not allow use of studio strobes or flash (a silly rule if the object is a stone sculpture, but hey, it's their museum and if they want to do their own photography without input from innovative outside experience, that is entirely their decision).

So when I switched to digital photography of flowers, insects, and reptiles, I stayed with constant light, but merely switched from tungsten halogen to fluorescent. But since we still do museum photography, the option of using tungsten lamps with the TD6 is intriguing.

Suggested Backdrops

- Chroma Key green (widely available, including from Westcott)
- Chroma Key blue (widely available, including from Westcott)
- PVC travel case (since we are always out on field trips)

For backdrops we use Savage Widetone seamless background paper.

Lighting equipment for OUTSIDE photography;
discussed in additional FLAAR Reports

Outside we use primarily reflectors (so we can use natural sunlight). Most of our reflectors come from Westcott. Ten or so years ago they were Lastolite via Westcott. Since then Westcott and Lastolite are separate; but all our recent reflectors are still from Westcott.

98% of the time we use silver reflectors. We avoid gold reflectors but your different style of photography might prefer gold.

We rarely get sunlight which reflects well from white reflectors, but perhaps we are simply spoiled with silver reflectors. We should try the white ones more often.

There will be more FLAAR Reports on reflectors for outside photography, specifically of flowers, tropical fruits, bizarre Mesoamerican fruits and other photogenic parts of trees which are no larger than one or two meters. Anything larger and we would tend to use a Metz flash since we do not yet have equipment from SunBounce (a respected reflector company in Germany which I see every two years at Photokina).



If there is no sun, we tend to use macro-flash or camera flash (but on an extension cord; we avoid using a flash on top of the camera).

References

Manfrotto

Manfrotto and Bogen have varied their affiliations over the past fourteen years, and varied which brand is their main focus. But both Manfrotto and Bogen are still together. And their brand in USA also includes Avenger (light stands).

Their various companies have individual web sites (brand by brand) and for USA a combined distributor web site, www.ManfrottoDistribution.com

F.J. Westcott

Since 90% of my studio photography is in Guatemala and 10% in Honduras, I can't any longer drop in to visit the nice folks in Toledo, but I do see them at PhotoPlus (PhotoEast, New York).

Their web site is www.FJWestcott.com



Set up of
Tomatillo
Flower

Acknowledgements

We thank the owner and managers of Savage Universal Corporation for providing backdrop paper. Savage Widetone backdrop paper is used on 100% of the photographs you see here (only if we use a woven palm frond mat as background is the source other than Savage). Hayward Richard Pressman, Sylvester Hank, and Rich Memoli are the individuals we see in their booth, especially at Photokina.

I thank Marvin Seligman Lowel Light, for providing a set of DP and Rifa lights about ten years ago.

We appreciate the Westcott TD5 lighting system provided many years ago by Thomas A. Waltz and Kelly A Mondora. These lights have appeared in our FLAAR Reports every year since their arrival.

We at FLAAR appreciate the tripods from Gitzo and tripod heads from Manfrotto provided courtesy of Kriss Brunngripper and Jodi Palm of Manfrotto Distribution. We did not attend PhotoPlus 2012 since four days at Photokina in Cologne kept us busy, but at PhotoPlus 2011 Kriss, Jodi, John T. Mascis, Christopher Abbiss and Doug Feldner provided information and hospitality in their Manfrotto Distribution booth.

We thank Greg Lamb, Global Imaging Inc., for sending us a Phase One P25+ medium-format digital back. We still use this remarkable digital back every year for going on five years around the world.



We thank John Lorusso of Parrot Digigraphic for sending us a Canon EOS 1Ds Mark III camera with lenses and accessories (circa two years ago).

We thank Lou Schmidt of Hoodman USA for providing Hoodman memory cards for all our cameras. 90% of the photographs in FLAAR Reports are taken with Hoodman memory cards.

We definitely appreciate the courtesy of Rola Hamad, VP VisibleDust, for providing cleaning services for our digital camera sensors at each trade show where I see her (most recently Photokina 2012).

FLAAR is a non-profit institute dedicated to improving photography techniques for

- Archaeology
- Architectural history
- Flowers, plants, and trees
- Bird, quadrupeds, reptiles, insects

Our focus are the ancient civilizations of Mesoamerica, especially the Maya. We also study (and photograph) the archaeology of the Olmec, Teotihuacan, Mixtec, Zapotec, Aztec, and Classic Veracruz.

The FLAAR Reports provide tips on photo techniques but especially we offer evaluations of digital cameras and associated photography equipment so that photographers can significantly improve their photography.

www.maya-archaeology.org
www.digital-photography.org
www.maya-ethnobotany.org
www.maya-ethnozoology.org

