

Large Format Photography in Archaeology & Art History



Tri-Linear Scanning Digital Cameras in Museum Photography

BetterLight + Cambo Large Format Photography at Copan, Honduras

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Introduction

There are three major kinds of cameras that are available to utilize in archaeological recording:

- 35mm cameras, typified by Nikon and Canon
- medium format cameras, best known for Hasselblad, Mamiya, and Rollei
- large-format cameras: Linhof, Cambo, Arca-Swiss, Sinar and others.



35mm Camera



Medium Format Camera



Large Format Camera

Lighting for photographing sculptures in museums

The primary problem of photographing anything in a museum is the lack of electrical power. Even museums in Europe and the US often lack enough electricity to support professional quality studio lights. The situation at Copan is that due to the several rebuilding's of the structurally problemed Museo de Escultura, there are only two electrical outlets in the entire museum that function: both are near the office and toilets (so both in one corner of the museum).

There is no electricity on the second floor. There are no functioning electrical outlets in any other corner or anywhere near the other end of the museum.

Plus the outlets that exist can support only about 1200 watts, which is not enough for even two photography lamps. Most professional lamps are 750 to 1000 watts—per lamp. It takes an average of four such lamps to professionally illuminate an average sculpture. In other words, there is not enough electricity at most museums to fully light a sculpture.

Fortunately, as a backup, FLAAR brought four lamps that use bulbs of 50 watts each: each fixture has five bulbs: so total of 250 watts each (half the power of a single tungsten-halogen fixture). So total of 1000 watts for all four lights.

The further benefit of these fixtures is that they are cool lighting: they are so cool that you can put your hand directly onto the lamp. There will be a separate FLAAR Report on this lighting technology. It is fluorescent lighting but specially made for digital photography. We also use these lamps for photographing flowers, since flowers do not like hot lights. The coolness of these fluorescent lights is an asset for flowers, and for thousand-year old Maya sculptures.



Westcott Spiderlites are cool fluorescent, not hot tungsten halogen. You can see me putting my hand inside the light fixture, directly on the lamps. No heat.

Tripods for photographing sculptures in museums

Over the past 40 years I have used many brands of tripods. I currently have about six different tripods: one size and shape for each of our various cameras.

A large-format camera is heavy. So it needs a sturdy tripod.

A large-format camera is expensive: you do not want it on any tripod that might slip.

After years of testing cameras in museums all around the world the camera tripod that I find is the best to hold a 4x5 camera is the Gitzo. This company makes about 50 different models of tripods: I recommend their top of the line model for holding a 4x5 view camera: we have two



Gitzo Tripods

Tripod heads for museum photography

There are dozens of different sizes and shapes of tripod heads. When you buy a normal tripod it already has its own head on top. But when you are a professional photographer, the tripod head is usually completely separate. Almost none of my tripods have a head that is the same brand as the tripod on which it sits. For most of my own photography I am still using a tripod head made over 27 years ago: no head since then is better (not even from the same manufacturer).

Because there are so many tripod head sizes and shapes, there is no real classification, but to provide an introductory guidance you can classify tripod heads as follows:

- Ball-head: Arca-Swiss is the best known, but almost all manufacturers make ball heads today: Gitzo etc.
- Pan-and-tilt head: these are available from scores of manufacturers. They are mainly for video or TV cameras
- Geared tripod heads: these are the best for a large-format camera.
- Unique kinds of tripod head such as the horizontal action-grip head and the vertical action-grip head of Manfrotto.



Arca-Swiss Ball-head

For a large-format camera placing it on a ball-head varies between risky and suicidal: sooner or later the head will not be adequately locked and the entire x-thousand dollar giant 4x5 camera will fall over. I would never even consider using any large format studio camera on a ball head. But I use my ball head for Nikon, Canon, and medium format cameras because you can move the camera quickly. In a studio you rarely need to move your camera quickly if you are photographing sculpture. If you are photographing models you probably won't use a tripod anyway!

When my baggage gets lost by an airline and I have to borrow a tripod, the kind that is offered to me is almost always a pan-and-tilt head. These are (for me) terrible to use: uncomfortable and time consuming. Yet this is probably the most common size, shape, and kind of tripod head in the world.

For a heavy 4x5 studio camera the best tripod head in the world is the Manfrotto geared head. I bought one of the first ones that arrived in Germany and since then I have bought a second one (I use one for the 4x5 and the other for the tripod that holds the objects to rotate when doing circumferential rollouts of round vases).

So for the photography in the Museo de Escultura, I had a Manfrotto geared head for the 4x5 Cambo camera, an ancient Arca-Swiss ballhead for my other cameras, and the assistants used a Manfrotto action-grip on their Manfrotto tripod.

There are several separate additional FLAAR Reports on tripods and tripod heads.



Manfrotto Geared-head



Cambo 4x5 on a Manfrotto Geared-head



Selection of which camera to use for Altar Q

I have been photographing in the museums and site of Copan for many decades. Actually I first arrived at Copan at 17 years of age. My photographs of Copan have been donated by FLAAR to INAH every time we have done specialized photography in the museums. Indeed every time I arrive in Honduras I see that my photographs from past decades are still being used on posters by the government. On this recent photography during 2008, all the photographs have been donated to IHAH.

To photograph Altar Q I decided to use the BetterLight. The days previously I had used a medium format Phase One P25+ to photograph the throne front up on the second floor. The downside of that system is lack of electronic focus: the BetterLight offers a sophisticated system of electronic focus (better than any Nikon or Canon lens) and the BetterLight also offers a gray balance capability that can't be beat by any other camera that I have used.

Plus the 48 megapixel BetterLight offers high resolution. Since I wanted to offer IHAH an image at 1:1 full life size, I figured it would be good to select a large-format digital camera.

As a footnote, the BetterLight is very easy to use. Any archaeologist should be able to learn to use it within a few hours, and after several days of practice should be able to get professional results of the highest quality. FLAAR encourages the Guatemalan students who work for us to learn how to use all our camera equipment and both Eduardo Sacayon and Luis Sacayon can use all this equipment.



48 megapixel Betterlight Super 6K-HS

Techniques

Photographing the Altar Q

In this occasion the FLAAR team had the opportunity to photograph the Altar Q, located at the Archeological site Copan Ruins in Honduras Central America. This Altar has four vertical sides that are sculpted with a total of sixteen human figures sited cross-legged on hieroglyphs. The difficulty of making this rollout photograph was that the figure could not be moved, because is difficult to have a motor table to rotate a large object like a 5tons monolith sculpture. So it had to be photographed from each different side and then combine in Photoshop to do a rollout photograph.



In this report we do a step-by-step instruction guide on how to do photograph stitching, for rollout photography. For this kind of photography we used a Betterlight Super 6K-HS, Cambo Ultima 4x5 camera, Westcott cool temperature digital fluorescent spiderlites, Manfrotto tripod head and Gitzo tripod.



Close up photograph detail of Copan Altar Q with 48 megapixel Betterlight Super 6K-HS



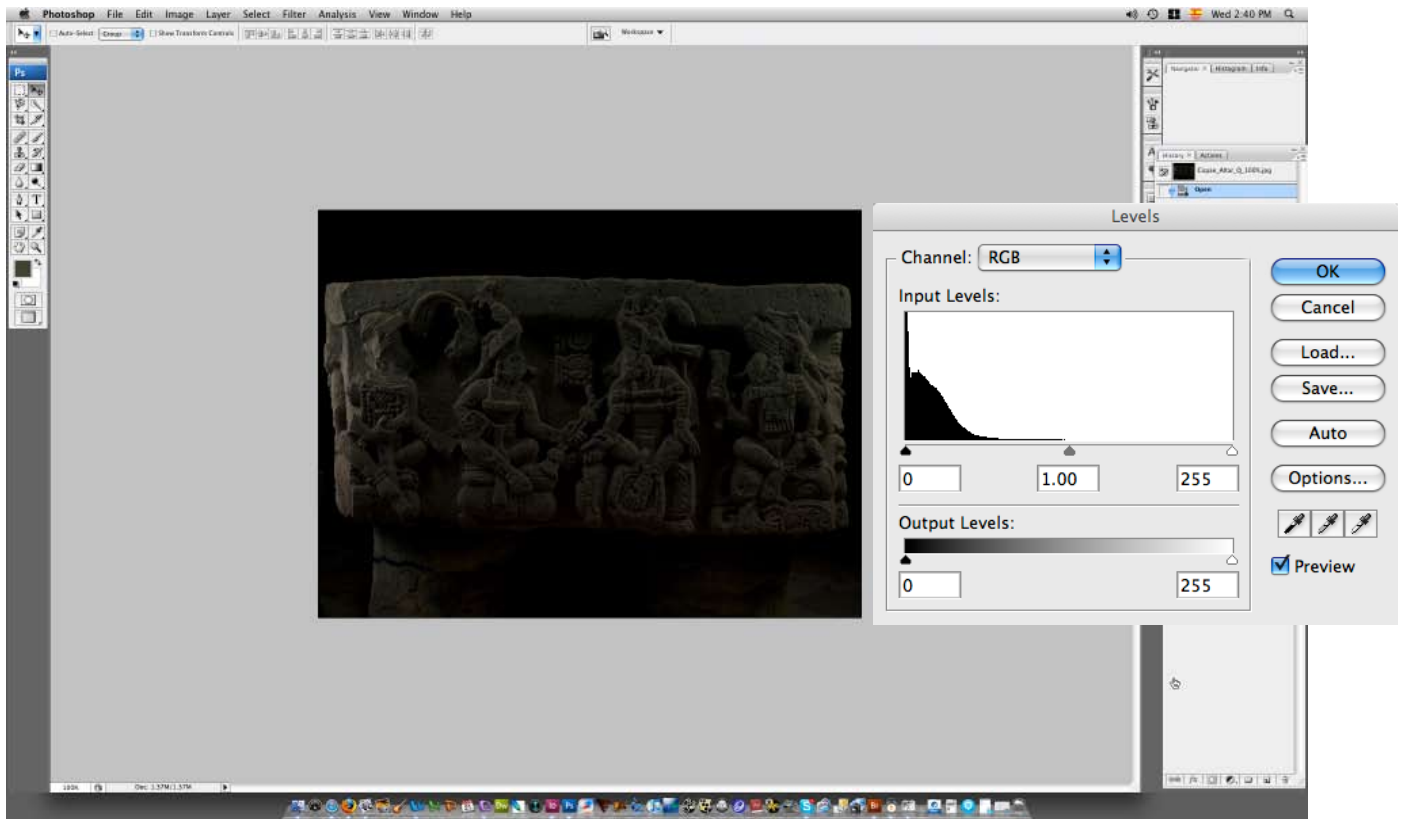
The first step is to do a gray or white balance in front of the subject you are photographing to prevent any color casts, in this case we use a Gretag Macbeth color card here on the left you can see Tina Kosir a student from the University of Ljubljana Slovenia setting it up on front of the altar, it is very important to have the card straight up, so the lighting can be even. On the right we can see Lucila Cantu a student from Mexico holding up a white piece of paper as reference to do a white balance.



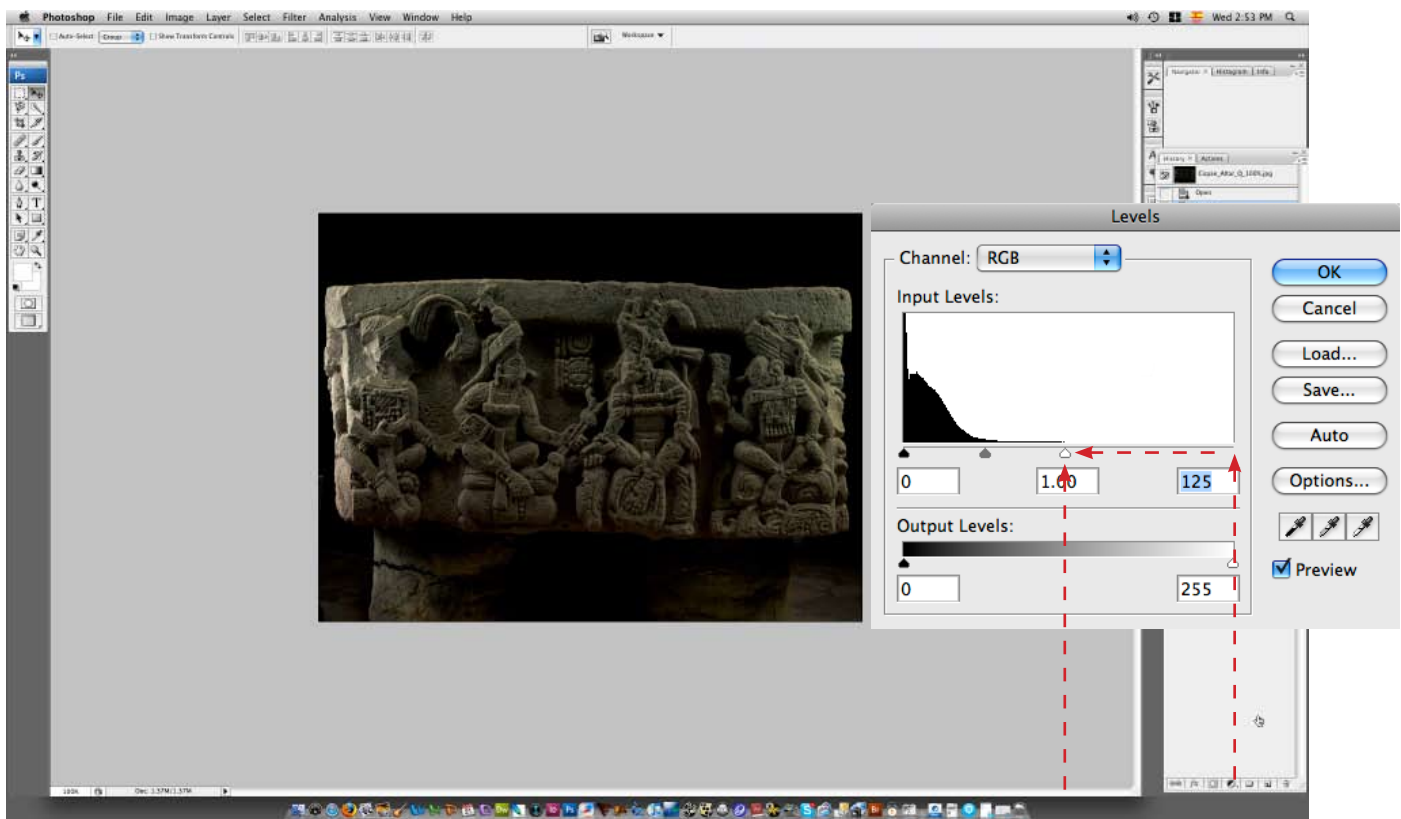
In this step we can see Tina doing measurements so they can be process on Adobe Photoshop and have real life dimensions on the photograph.



Here are the photographs of the 4 sides of the Altar Q, taken with the Betterlight Super 6K-HS, you can see they are a tad underexposed so the next step will be to go, to the levels option on Photoshop and pull the highlights arrow down to the start of the curve in every photo, so you can get better highlights.

Adobe Photoshop

Go to the menu bar on top and select: Image/Adjustments/Levels



Pull the highlights arrow to the beginning of the curve and see how the image get's brighter

Apply this technique to all the photograph's



The next step will be to do gray balance and apply it to all the photographs. Go to the menu bar on top and select: Image/ Adjustments/ Curves. Select the eyedropper in the middle and go to the gray template on the Gretag Macbeth color card. Select it and see how the image is gray balance.

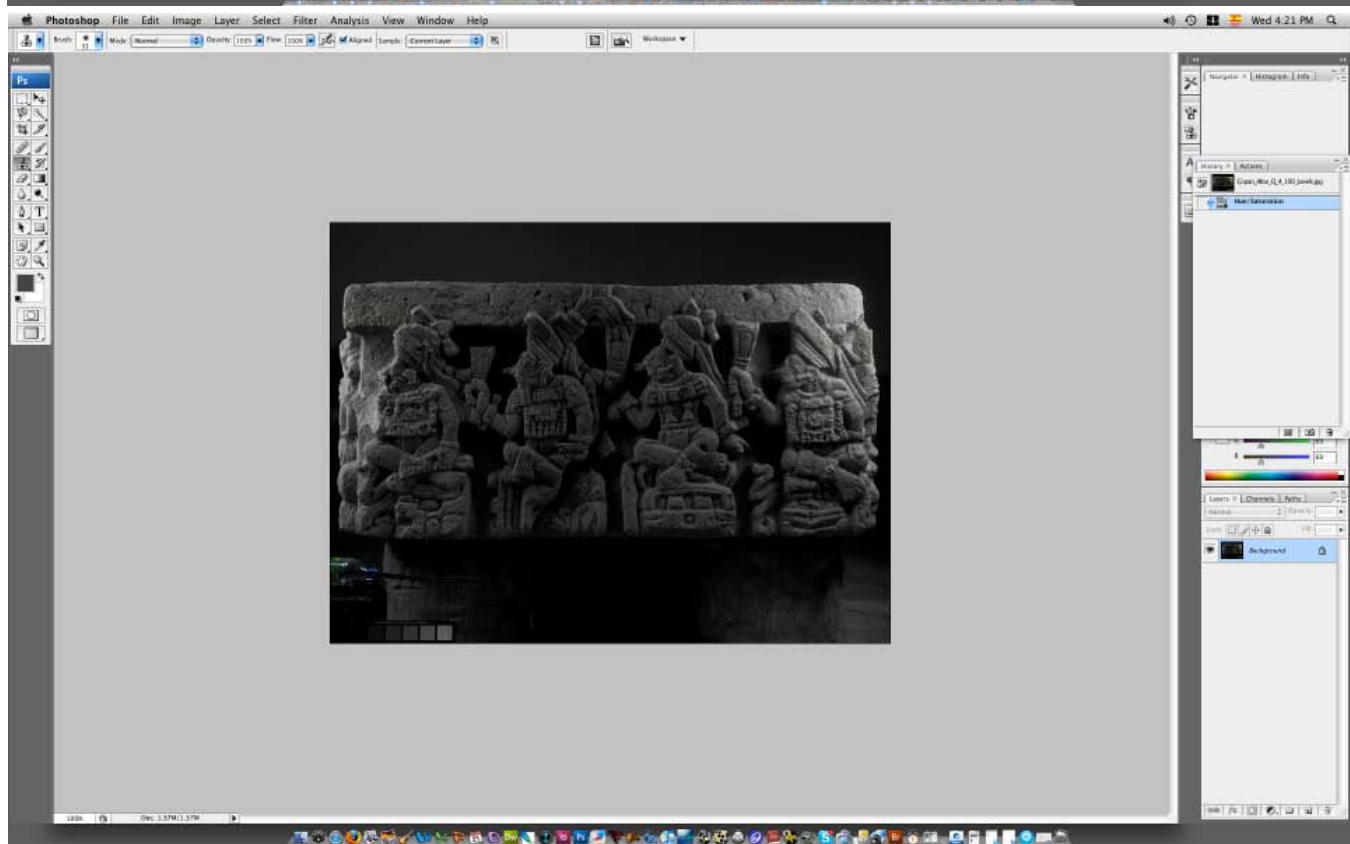
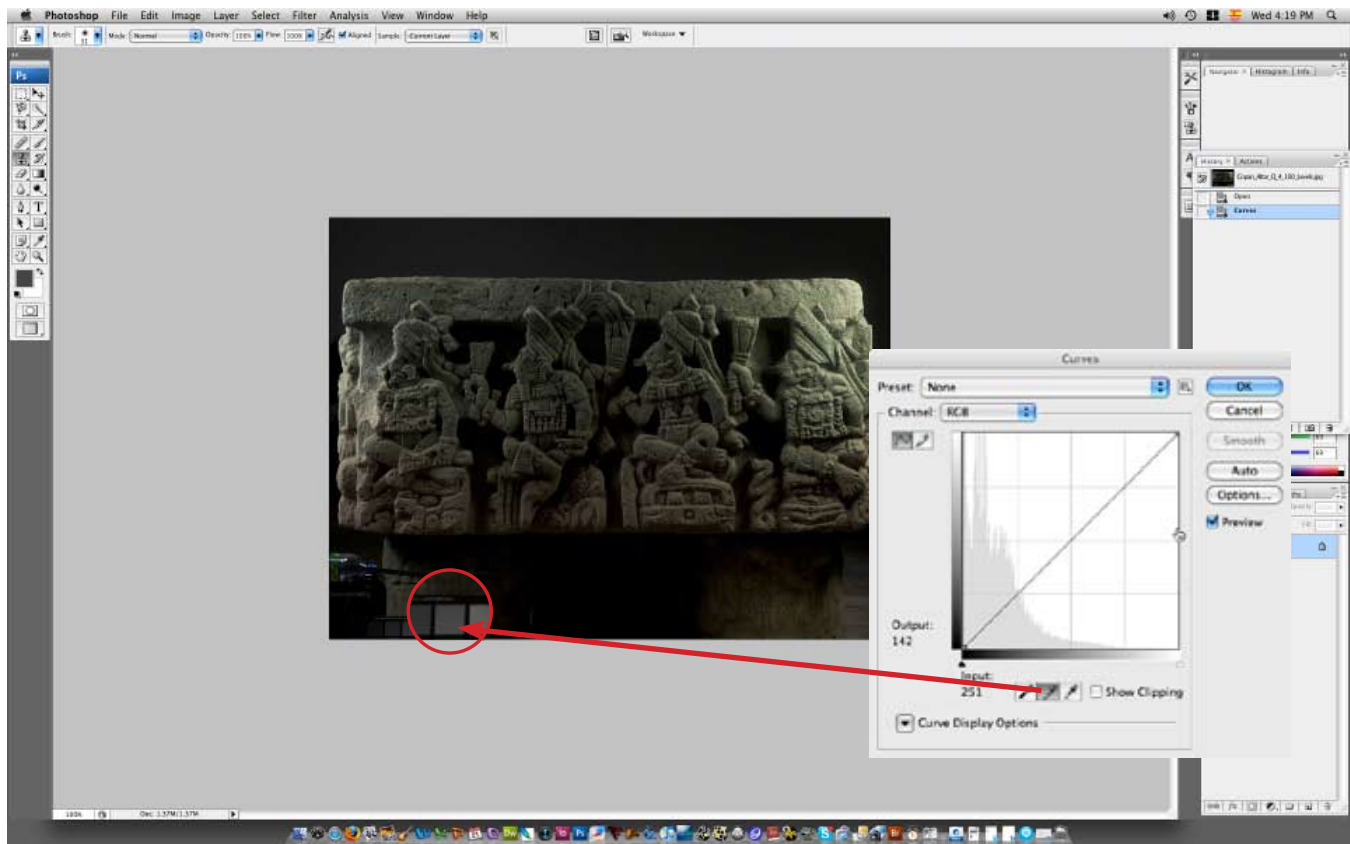
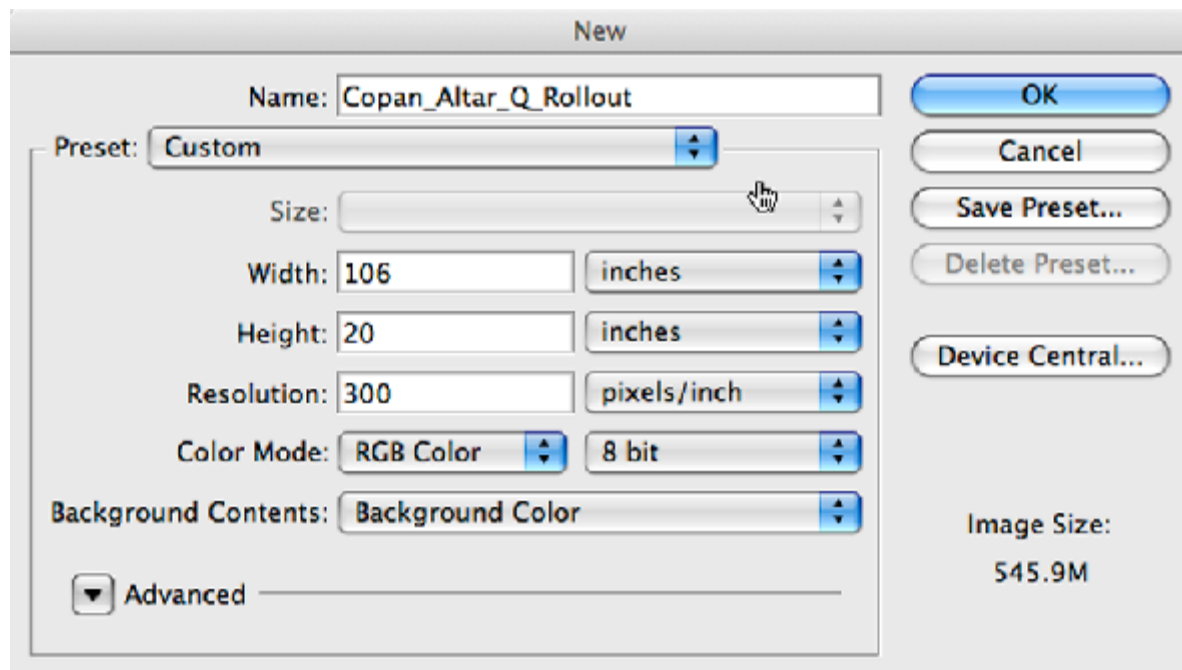


Image gray balance



Photograph's Copan Altar Q with gray balance

The next step will be to stitch your images in Adobe Photoshop to make a rollout photograph.



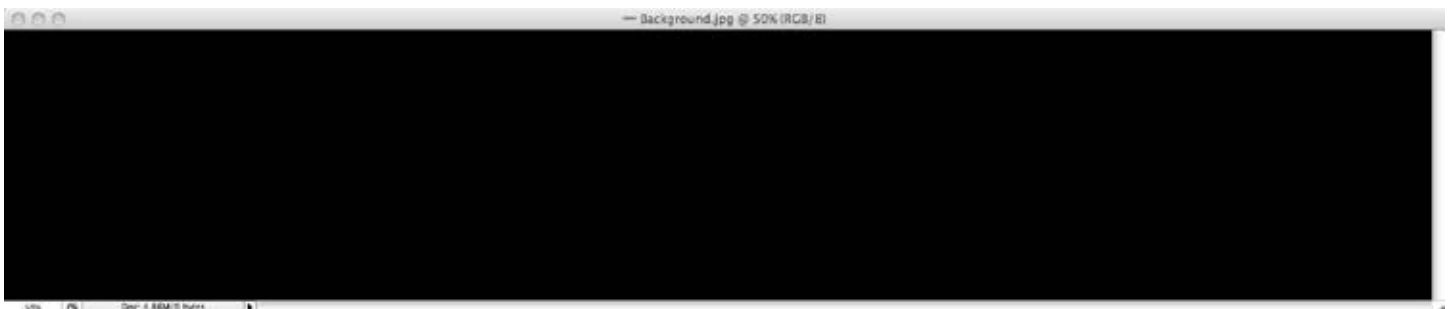
Go to the top menu and select: File / New

This window allows you to make a new image in Adobe Photoshop, select the size, dimensions and resolution of the image. For this case we will select:

Width 106 Inches

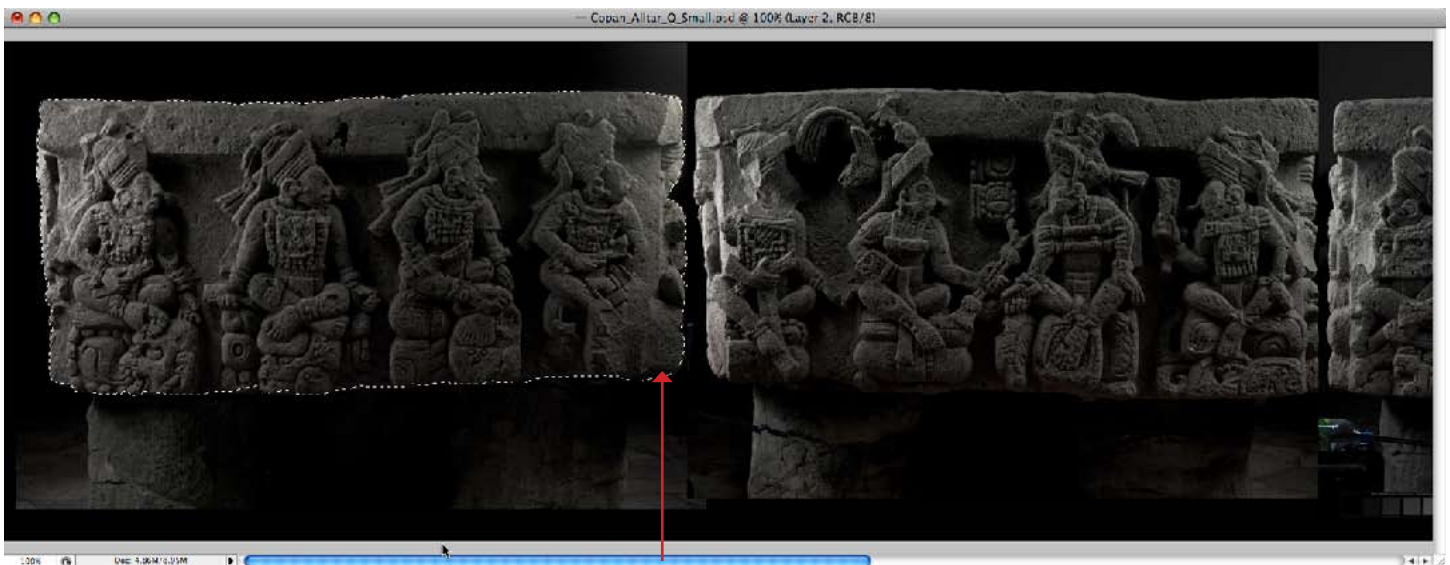
Height 20 Inches

Resolution: 300 dpi

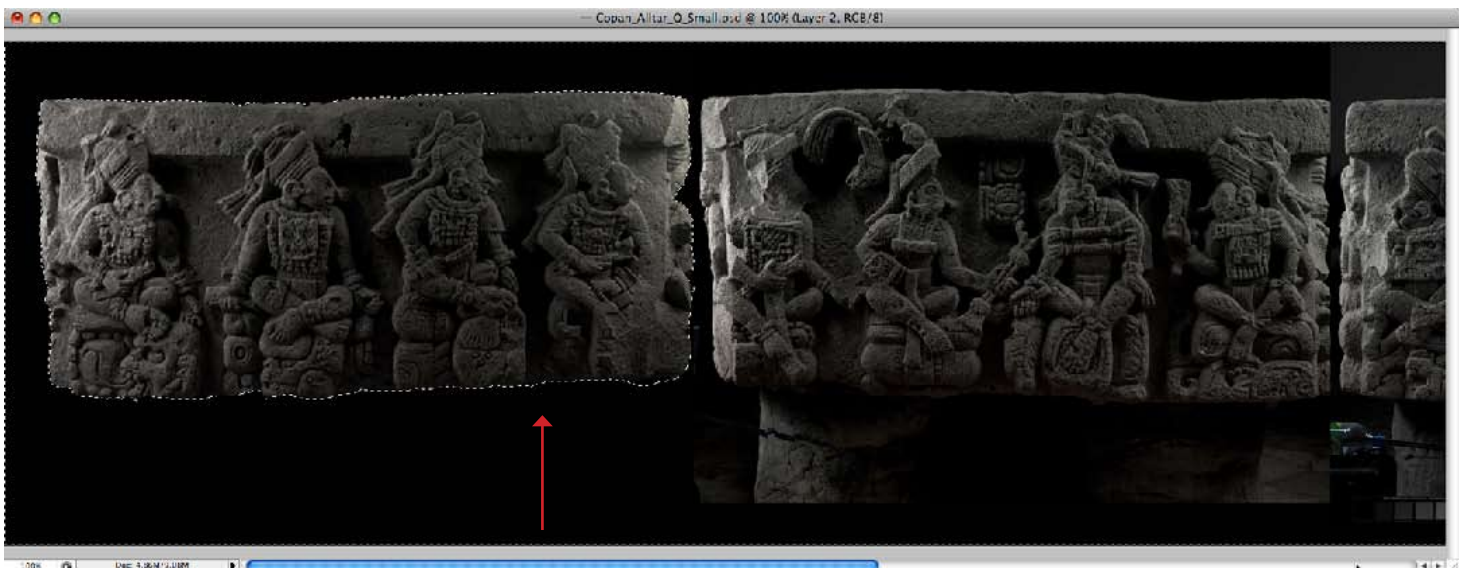


New background for Copan Altar Q rollout photography

The next step will be to drag and drop all the photos of Copan Altar Q.



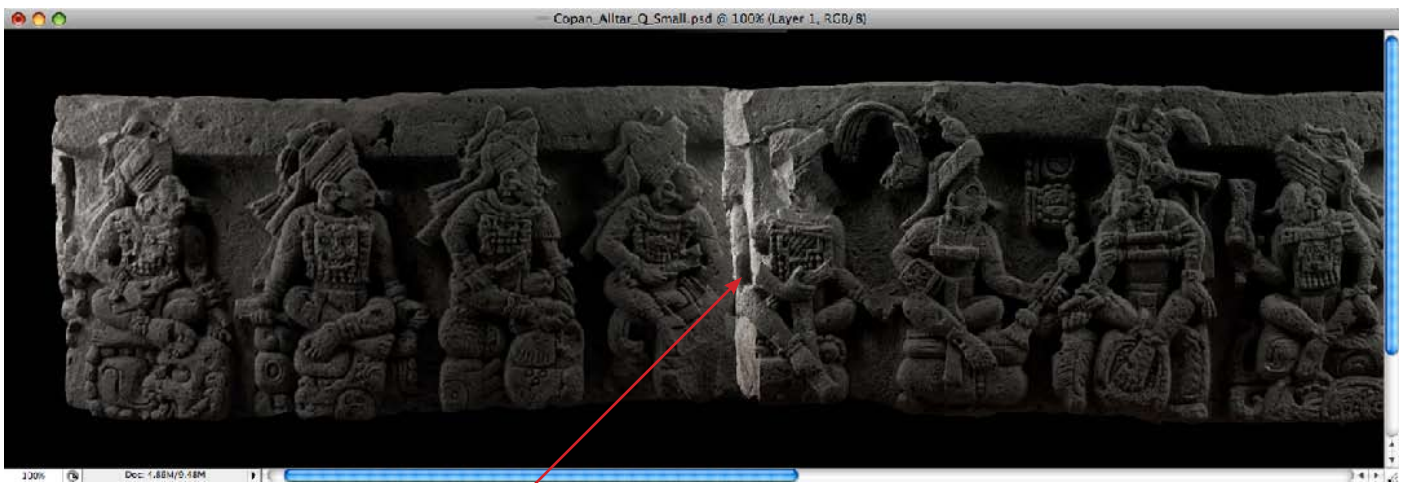
Select the area of the layer you want to keep



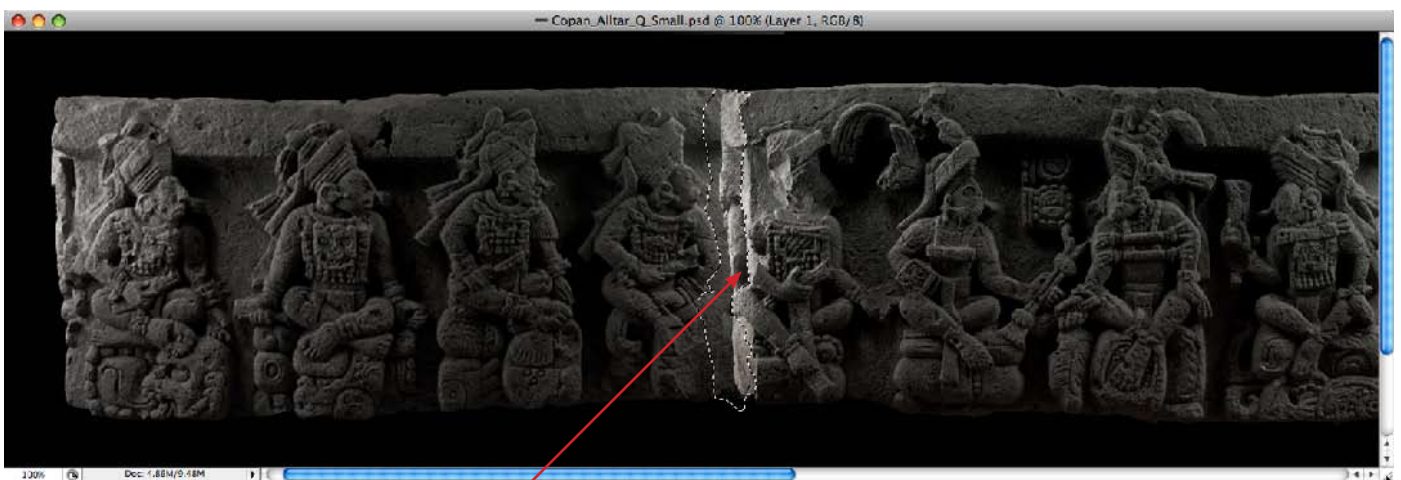
Delete the background of the layer, do this with all the layers



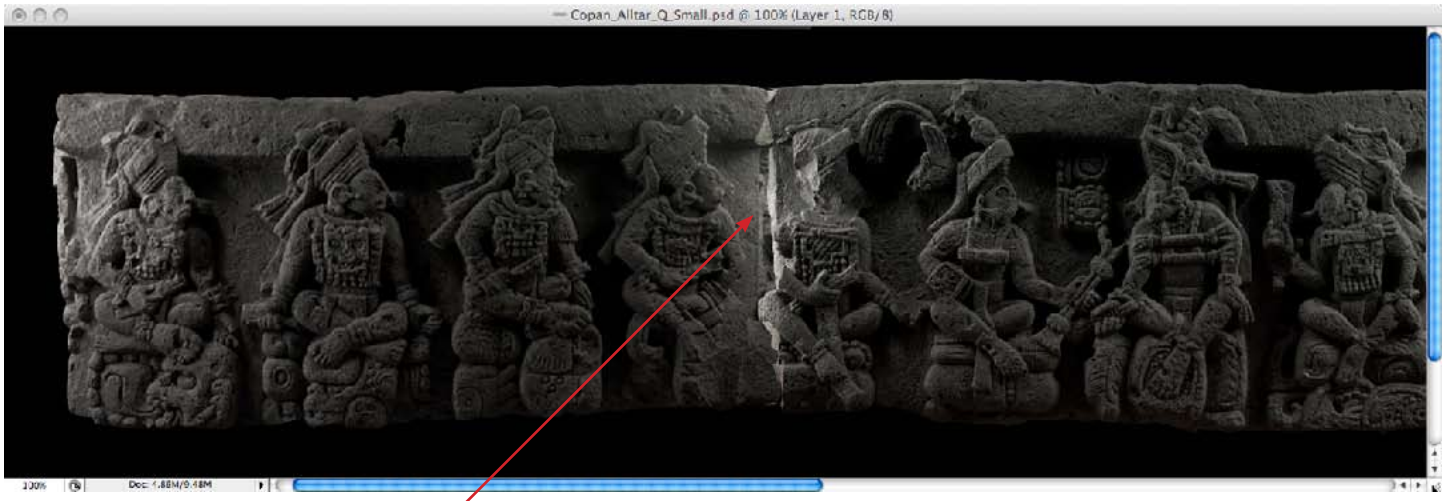
Layers with deleted backgrounds



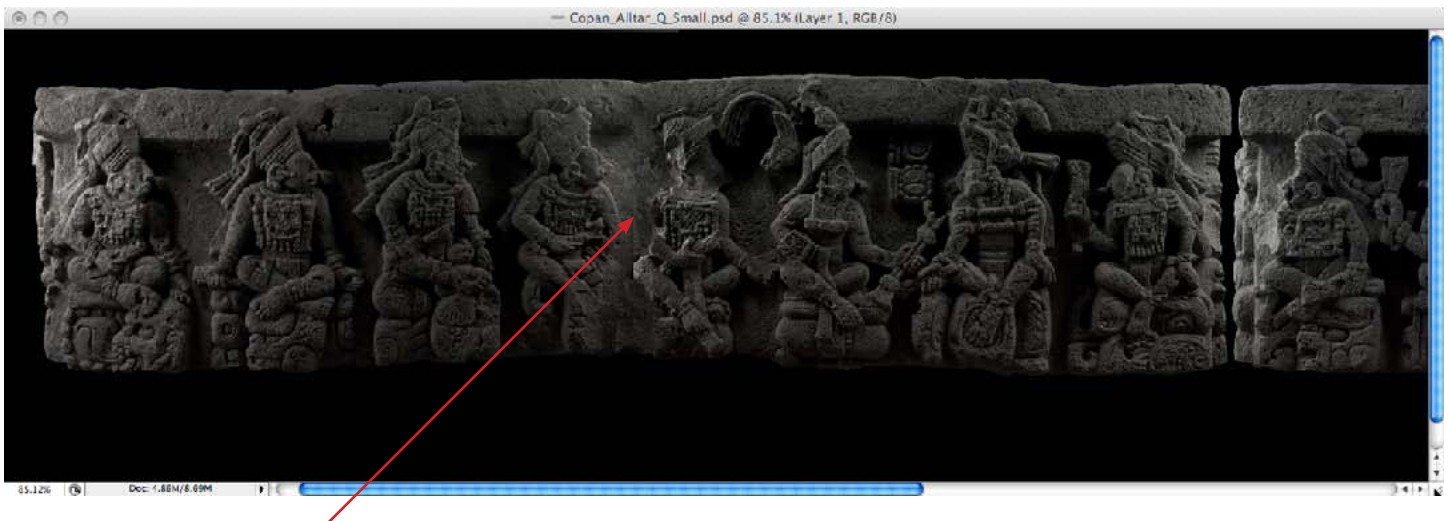
The next step is to overlap the layers



Select the area you want to delete



Deleted area of the layer



Use the clone stamp tool and clone part's of both sides of the layers



Copan Altar Q before rollout photograph



End Result Copan Altar Q rollout photograph

Appendix A



Dr. Nicholas Hellmuth photographing Skyband Structure 8N-11 bench



Dr. Nicholas Hellmuth and Tina Kosir setting up for accurate gray-balance (color balance) to record the true colors of the Skyband Structure 8N-11 bench



Dr. Nicholas Hellmuth and Tina Kosir in front of Altar Q

Eduardo Sacayón setting up the Cambo Ultima 4x5 large format camera and Cambo sliding back adapter preparing to photographing the Moon Goddess, Rabbit Companion, Scorpion Constellation and other personified 6th-8th century AD Maya astrological characters on the Skyband Structure 8N-11 bench. Copan Sculpture Museum, Copan Ruinas, Honduras, Central America.



Appendix B



Cambo Ultima 4x5 camera 48 megapixel Betterlight Super 6K-HS



Cambo sliding back and P25+ Phase One digital back



Manfrotto tripod head and Gitzo tripod



Hoodman 16GB Card



Westcott Spiderlites

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