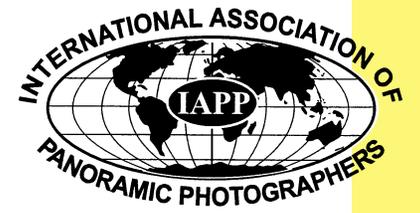


# PANORAMA



the Magazine of Panoramic Imaging

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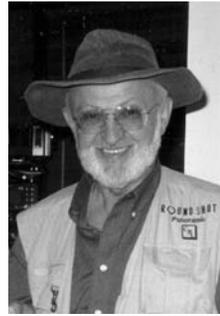
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## President's Message

On Tuesday, September 11, 2001 the United States was violated by unfathomable acts of terrorism, wounding and killing innocent human beings. We are a strong nation and along with our worldwide allies, will overcome the evil forced upon us. To our members living and working in New York and Washington D.C., know we are thinking of you. Our sympathies lie with the families of those killed by this attack.

Your officers and board have been busy planning the next International Convention. I wish to personally thank Jan and Peter Burg and Richard Schneider for their help in investigating new sites. The Board made the final decision. So mark it down on your calendar, October 8-13, 2002 in Shepherdstown, WV. The area has a number of attractions such as Harper's Ferry National Historic Park, and is accessible from a number of areas including Washington, D.C. and



Baltimore, MD.

One of the major reasons members attend a convention is for the speakers and presentations. It would greatly facilitate matters if I hear from you on the subjects you would like to learn about. Also, please contact me if you are interested in speaking. I know it's early, but the convention will be here before you turn around and we need to plan ahead for a successful program.

We are heading into the end of 2001, signifying renewal time. Don't wait until December to renew. Do it now to make sure you receive your March issue of Panorama. We are also working diligently to increase our membership. New members bring fresh ideas we can all gain from.

*Peter*



*This photo of Harpers Ferry taken from Maryland Heights, was one of the first pictures Mark Crabtree took with his #10 Cirkut Camera. The film was GAF aerial film.*

## Secretary's Message

### Membership Renewal Time Approaching

By Richard Schneider, Secretary / Treasurer

With autumn approaching, we are looking forward to our annual membership renewal season. Unlike last year, membership forms will be mailed to all current members as opposed to being printed in Panorama. We hope this will help in members renewing on time.

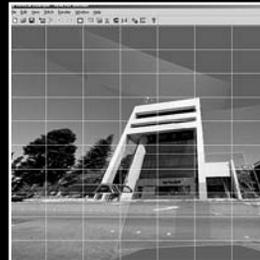


When you receive the forms, it is of paramount importance to fill them out entirely. Please do not respond with "same as last year" or assume that we have information on you dating back several years. Accurate and up-to-date information will serve us all well and ensure that your magazines and other correspondence arrives to you on time. This request applies to ALL members, be they rank-in-file, Charter and Life Members of IAPP.

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*...please take this opportunity to consider joining and becoming active...*

We would like to welcome the following new (and old) members of IAPP:

**Douglas Collins**

Brownsville, Texas

**Stephen Comer**

Columbia, South Carolina

**Jan Faul**

Tuscarora, Maryland

**Nicholas Hellmuth**

Bowling Green, Ohio

**Jordi Llobet I Piero**

Barcelona, Spain

**Charles Waldron**

Austin, Texas

If you are a reader of this issue of Panorama and not a current member of IAPP, please take this opportunity to consider joining and becoming active in the oldest non-profit organization devoted to panoramic photography. For a membership form or other information, please contact the IAPP Secretary directly or visit our web site at [www.panphoto.com](http://www.panphoto.com).

Advantages of membership include, but are not limited to:

- The quarterly publication of Panorama Magazine.
- The on-line and printed versions of the Membership Directory and Network.
- The opportunity to have personal work featured in Panorama Magazine, the [panphoto.com](http://panphoto.com) web site, and in photography exhibitions conducted as part of our International Conventions.
- Lower registration fees for IAPP International Conventions and regional conferences.
- The opportunity to vote for and hold elected office on the IAPP Board of Directors.
- Knowledge gained from meeting face-to-face with some of the world's best and most experienced practitioners of panoramic photography and panoramic digital imaging.

We hope to see you this October at the Boston regional conference and later on at the Chicago regional conference. Best of luck to the organizers and safe travels to the attendees! ■■■

## Richard G. Fowler Foundation Update

By Alan M. Bank-Chairman

When you think of IAPP, remember we are a viable organization, wanting to grow, and needing to create a quality mission and purpose in order to serve all our members.

Part of that growth should happen through the Richard G. Fowler Foundation, which was started two years ago to help us provide same funds in the future for a worthy cause.

The original goal still stands and that is for 100% of the members to donate a minimum of \$5.00 per member per year. So far over 50 members have contributed, and we

now have about \$2000.00 in the fund.

This is not philanthropy at its pinnacle, but like anything else it's a start. Who knows maybe some day a well-heeled member might throw the foundation a bone or another member might get some inheritance that we might watch that would make a real challenge for all our members.

The money is being managed by our secretary / treasurer, Richard Sch-

neider, who suggested we file with the IRS and make the foundation a 501-C-3 non-profit fund, which we are trying to complete this year.

There are many ways to give without actually giving cash dollars that I will write about in our next issue of Panorama. I will list a dozen or more ways that you can contribute that are legal and would help the foundation.

Lets role up our sleeves and make a commitment, and as a result of working together make this avenue of IAPP a big success. Please tell us what you think and write me or our President, Peter Lorber, of any ideas you might have. I can be reached by fax at 662.566.7207, telephone 862.566.2699, P.O. Box 1456, Topelo, MS 38802 or, email [alanbank@hotmail.com](mailto:alanbank@hotmail.com). ■■■

*Lets role up our sleeves and make a commitment, and as a result of working together make this avenue of IAPP a big success.*



## IAPP Mentor Program

We have also decided to start a mentor program. Mentoring means giving advice, answering questions about various panoramic cameras, the technical aspects of creating a particular photograph (ie: film type, exposures, locations, area labs) familiarity with various VR/stitching programs and/or how to enhance images through computer manipulation. If you are interested being a

mentor please contact Peter Burg at 932 N. Maitland Avenue, Maitland, FL 32751 USA or [pete@burgphoto.com](mailto:pete@burgphoto.com). He will make sure that you are included in the mentor list in Panorama magazine and on our Panphoto web site. Please include the following information: Your name and address, telephone number and email address, type of camera specialty, type of manipulation specialty (PC or MAC). ■■■

## Exhibitions and Gallery Spotlight

### A Different Perspective: Vaniman, the acrobatic photographer

The State Library of New South Wales  
Macquarie Street, Sydney NSW Australia 2000

*A Different Perspective: Vaniman, the acrobatic photographer*, officially opened at the State Library of NSW on July 11 and will run until October 14, 2001.

This exhibition presents 21 panoramas by the multi-talented 'Yankee' who went to outrageous lengths – not to mention giddy heights – to photograph Australia's

major cities and scenic sights.

State Librarian & Chief Executive, Dagmar Schmidmaier said: "The State Library houses the world's finest collection of Vaniman's beautiful and intricately detailed panoramas which can only be fully appreciated when observed close-up." "Vaniman's work represents the pinnacle



*Sydney Harbor - taken from a tethered balloon at North Sydney, 1904, by Melvin Vaniman. Platinum Print, 16 x 48".*

of black and white panoramic photography," says exhibition curator Alan Davies.

Melvin Vaniman (1866-1912) was a photographer with a head for heights. His panoramic photographs were nearly always taken from high above the ground and if a nearby building or ship's mast was not at hand, he erected his own 30 meter pole to achieve a bird's-eye view. His antics atop a pole in Katoomba Park in 1904 earned him the nickname 'the acrobatic photographer'. When his trusty pole didn't give him the height necessary to photograph the entire city of Sydney in a single sweep, he imported a balloon from America and spent months tethered 180 meters above North Sydney, experimenting with the new perspective.

Vaniman even built his own camera, able to record panoramic views on film up to 2 meters in length and 50cm wide

in a single shot, to utilize the higher viewpoint. He had always intended that his panoramas be seen as massive enlargements up to 5 meters long, but none are known in that format. Fortunately, the majority of Vaniman's panoramas survive as platinum prints, contact printed from the original negatives. These prints were expensive to produce and required exposures of between two and four hours in sunlight to produce, but their longevity and exquisite tonality have made Vaniman's persistence with the technique worthwhile.

As a pioneer aeronaut, Vaniman made two attempts to cross the Atlantic Ocean in an air ship, and was tragically killed on his second attempt in 1912, in an explosion off the coast of Atlantic City.

*A Different Perspective: Vaniman, the acro-*

*continues on page Six*

## Chicago Conference

**December 6th - 9th, 2001**

By Shane VanBoxtel

Don't forget to reserve a room for the December IAPP Conference in downtown Chicago at the Seneca Hotel. All suites are \$89/night.

The hotel sits one block off of Michigan Ave. "The Magnificent Mile" right behind the John Hancock Center. Chicago's downtown transforms into "The City of Lights" in the winter and Navy Pier is a scenic 10 minute walk from your doorstep.

Photo excursions are on Saturday the 8th and start immediately when you walk outside. Five restaurants are in

the hotel from deli to fine dining. Shopping and Chicago's history and style surround the hotel and if we reserve 25 rooms, the conference room is free which will make registration costs next to nothing.

Just be sure to mention the IAPP conference. All fine details are being worked out and should be finalized by early October.

Questions and information on speakers and volunteers, etc. can be emailed directly to Shane Van Boxtel, [svanboxtel@imagestudios.com](mailto:svanboxtel@imagestudios.com).



Visit IAPP on the World Wide Web  
>>> [panphoto.com](http://panphoto.com) <<<

## Fall Conference in Boston Area

October 25-28, 2001

IAPP members and guests are cordially invited to spend some time in the Greater Boston area October 25-28, where there will be plenty of time for photography, sightseeing, learning and relaxing, or whatever suits your fancy.

**Hotel** –The wonderful Sheraton Colonial Hotel and Golf Club in Wakefield, MA – a 220 acre resort offering an 18-hole PGA-Certified golf course (bring your clubs), racquetball at the 60,000 square-foot fitness complex, indoor tennis, indoor basketball, step aerobics, massage, saunas and more. Rooms are \$95 per night by mentioning the International Association of Panoramic Photographers when making your reservation. The hotel cut off date for reservations is October 5<sup>th</sup>. The numbers are 800-325-3535 or 781-876-6056.

**Transportation** – to and from Logan is available through the Air Porter, and reservations can be made direct by telephoning 877-899-6161. One-way fare is \$25 per person, plus \$8 for each additional member of your group. If you are coming in on the same airline at about the same time, they will try to give the additional rate to each additional IAPP member. Just mention you are with IAPP when you make your reservation.

**Wednesday, October 24** – A casual dinner is planned at a highly recommended local seafood restaurant for those interested in starting early on the chowdah and lobster.

**Thursday, October 25** – A day trip to several quaint North Shore towns

like **Rockport** (Motif #1, Bearskin Neck, Pigeon Cove/Halibut Point), **Gloucester** (the waterfront with excellent colors on the fishing boats, Rocky Neck Art Colony, Fitz Hugh Lane House), **Essex** (excellent birding/natural beauty on the Essex River), **Ipswich** (Castle Hill/Crane Estate, Crane Beach) and the surrounding areas to explore panoramic opportunities.

**Friday, October 26** - is a day of learning from several speakers and demonstrations. The schedule is still being worked on, but so far, we have:

**Linda Thompson, Creative Director/Internet Solutions at Remote Reality**, will go over some 360-VirtualTour samples using QTVR and JAVA outputs and explain what software/hardware was used to create them.

**Peter Burg, IAPP President Elect**, will discuss and show images from his

China/Tibet trip.

**Stephen Delroy**, will discuss and show images from his recent Africa trip.

**D. John McCarthy, FUJI**, will talk about scanning panoramic images with the new Fujifilm Finescan 2750 flat bed scanner, as well as how to create 360 degree immersive images.

**Arthur Rainville, Portrait Department Chair at New England School of Photography, and owner of Studio Rainville**, plans to discuss Digital, friend or foe - the good, the bad and the ugly; stretching the portrait boundaries with panoramas; and other topics.

Alternate events for spouses on October 26 are also planned. These include a trip to Boston's North End, shopping at Filene's Basement, Newbury Street or Copley Plaza, walk the Freedom Trail,

lunch (or whatever).

**Saturday, October 27** – is a day for shooting, sightseeing or attendance at the Boston Camera Show, one of the largest and best-known camera shows in the country for the sale of used and collectable cameras. Located in Waltham, MA, it is an easy drive from Wakefield.

As a special bonus, poster versions of this issues cover photograph by David Marlin will be provided to all attendees of the Boston Conference, courtesy of David.

For further information, contact IAPP member Kevin O'Malley and his wife Barbara at 617-479-2767 evenings, or check the IAPP website at [panphoto.com](http://panphoto.com).

We look forward to your joining us for this special event. ■

### IAPP Conference Boston, Mass - Registration Form

Registration Fees	Pre-Registration	After 10.17.01
Members	\$25.00	\$35.00
Non-Members	\$30.00	\$40.00
Spouses/Students	\$15.00	\$15.00

Name \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Country \_\_\_\_\_ Postal Code \_\_\_\_\_

Telephone \_\_\_\_\_ E-mail \_\_\_\_\_

Credit Card Type (Visa or MC): \_\_\_\_\_ CC Number: \_\_\_\_\_

Exp. Date: \_\_\_\_\_ Name As It Appears On Card: \_\_\_\_\_

**MAKE CHECKS  
PAYABLE TO IAPP**

**Send Registration form  
and Checks ONLY to:**

**Kevin O'Malley  
42 Carlson St.  
Quincy, MA 02169**

## Exhibitions and Gallery Spotlight

from page 4

*batic photographer* is a FREE exhibition at the State Library of NSW. For further information, please contact Vanessa Bond at: vbond@slnsw.gov.au or Alan Davies

at: adavies@slnsw.gov.au. Visit the exhibition on-line at [www.slnsw.gov.au/exhib/vaniman/](http://www.slnsw.gov.au/exhib/vaniman/)

Jane Keehn of the State Library of NSW Library Shop ([jkeehn@slnsw.gov.au](mailto:jkeehn@slnsw.gov.au)) for further details.

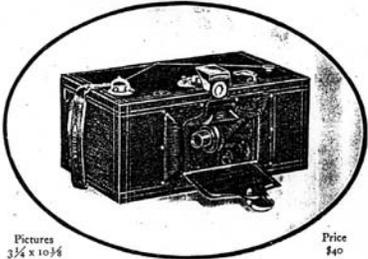
*Article reproduced with permission.*

Catalogs of the exhibition are available on request from the IAPP Secretary while supplies last. The booklet Melvin Vaniman: A Biographical Note (item #02-9273-1811) is available for \$15.00 AU. Please contact

From August 25 until September 15, Alberto Gandzas of Buenos Aires, Argentina will have an exhibit with some of his panoramic photographs from La Patagonia at the Agora Gallery in New York City. Next December Alberto will be participating at the "Biennale Dell Arte" in Firenze, Italy, also with panoramic photography.



**A DIFFERENT**  
Vaniman, the acrobatic photographer  
**PERSPECTIVE**



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# Stitching Panoramas Using REALVIZ Stitcher 3.0.1

By Alan Kafton

One of the exciting activities at the Napa IAPP convention last March was the fundraising “silent auction.” For this event, a large number of companies donated items, with all proceeds going directly into the IAPP coffers. One of the auctioned items was a copy of Stitcher, a stitching software package donated by REALVIZ. I was the winning bidder and am reporting on its capabilities.

## Introduction To Stitching

Panoramic imaging as practiced by most IAPP members falls into two categories: rectilinear images shot on cameras with a wide aspect ratio (such as the Linhoff or Fuji 617’s, or XPan), or cylindrical images shot on swing lens (Noblex, Widelux) or rotational cameras (Round-shot, Hulcherama, etc).

Stitching is the process of combining multiple overlapping images into a larger, wider-angle image. Most often, the stitching source is a series of rectilinear images from a standard digital, 35mm, or medium-format camera. These are combined to emulate the cylindrical output of a swing lens or rotational panoramic camera. Stitching software automates this process – and by using complex math, can significantly enhance the results and offer many options not available to Photoshop-level stitching. Using Stitcher, the process boils down to three basic steps: loading the rectilinear images, stitching them together, and rendering/exporting the stitched image.

## Loading The Images

This is the simplest of the steps: with your mouse, select **File > Load Images**, and then select those images from the

file manager that you want to stitch. Thumbnails of the loaded images will appear in the Image Strip located at the bottom of the Stitching Window (Figure 1). Stitcher can import a host of file formats including TIFF and JPEG. It’s important to note that all images must have the same pixel dimensions.

## Stitching The Images

To understand the power behind Stitcher, it’s important to understand that each rectilinear image is first converted so that it maps on the inside of a sphere. The sphere diameter is set by the focal length of the lens, and the film dimensions set the area each image occupies on the inside-sphere surface. Before starting the stitching process, go into the Properties panel to set the film dimensions and lens focal length – that makes sure we’re starting off on the right foot.

To begin stitching, start dragging the first image from the lower Image Strip into the upper

Stitching Window. (I like to use one that is on the horizon and will be near the center of the panorama.) Stitcher will “grab” the image from your mouse control and automatically place it in the center of the Stitching Window. Next, drag an adjacent image from the Image Strip into the Stitching Window, but this time Stitcher won’t grab it from you

– it must be manually placed and properly aligned in overlapping position over the first image. The two overlapping images are then stitched by invoking the Stitch icon. This process is repeated sequentially for each of the other images. The upper portion of Figure 1 shows the Stitching Window with one row of stitched images.

In reality, the Stitching Window is a portion of the inside of the sphere previously mentioned, and you can think of yourself as a “viewing camera” located in the center of the sphere. Stitcher gives you mouse-click tools to look up, down, along the equatorial axis,

rotate, to zoom in, zoom out, etc. This capability is needed since Stitcher allows the whole sphere to be populated with images to create a full 360° by 360° view, and the user must be able to zoom and rotate to accurately place additional images.

To add images vertically to the horizontal row already stitched, follow the same drag-and-position procedure previously outlined. For the Stitching Window shown in Figure 2a, I used the same single row of stitched images of Figure 1, but added two rows of images vertically to capture the top of the tall building. Figure 2b show exactly the same image, except this time rather than a straight-on view of the horizon, I changed the perspective by zooming in and placing the center of the view in the middle of the tall building.

There is one important additional capability worth mentioning. Accurate stitching is dependent on precisely knowing the lens focal length – and the value written on the lens may be off by several percent or more. Stitcher has an “Adjust all Images” function that uses the overlapping pixel mismatch information to recalculate the lens focal length and analyze lens distortion parameters. This reduces the possibility of stitching errors.

## Rendering and Exporting The Stitched Images

Rendering is the final process in creating panoramas. It involves taking the spherical image that has been stitched together, re-mapping it into the desired

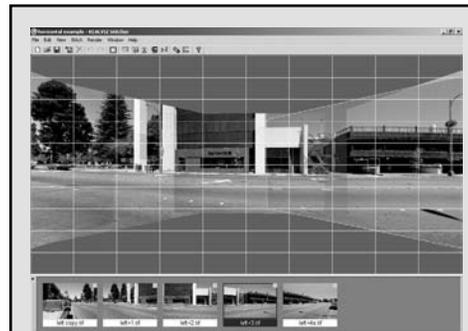


Figure 1



Figure 2a

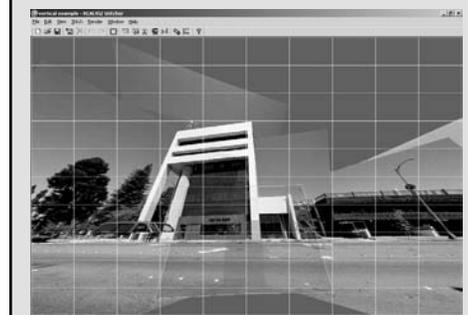


Figure 2b

*continues on page Eight*

## Stitching Panoramas Using REALVIZ Stitcher 3.0.1

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projection, and exporting it in the desired file format. This is specified in the Render Setup window (Figure 3). Available Stitcher projections include cylindrical, planar (rectilinear), spherical, cubical, VRML, Shock-wave 3D, and cubic or cylindrical QTVR. A lot of number crunching going on here!!! Output file formats include TIFF, JPEG, and others.



Figure 3

When rendering a cylindrical image, the resolution width and height must be specified – and of course they directly determine the rendered file size. The maximum pixel size

Stitcher specifies using the resolution the slider is 10,000 X 4,999, which will generate >140 Mbyte files. While this may seem adequate, it should be remembered that the 10,000-pixel width represents a 360° image, and the 4,999-pixel height represents 115° of vertical coverage. Many cylindrical panoramas will cover substantially smaller angles than the maximum, with a resulting cropped file size much smaller than 140 Mbytes. But don't be

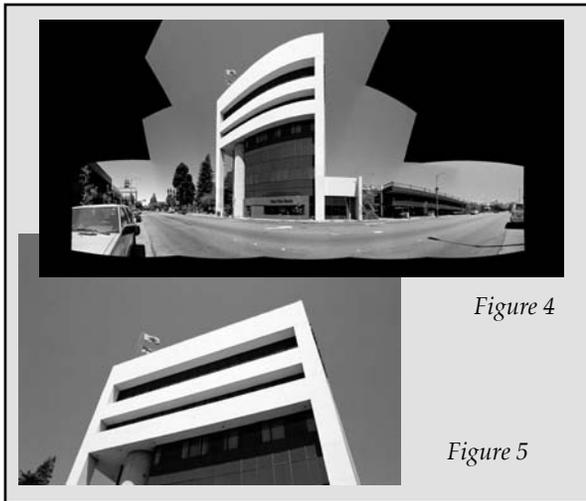


Figure 4

Figure 5

concerned, the slider settings can be manually overridden, and I have rendered up to a 570 Mbyte file. And even larger files can be rendered, subject to your computer speed, memory, and patience.

Figure 4 is the rendered version of the image shown in Figure 2a. (Since the image is less than 360°, portions of the non-stitched blacked-out area have been cropped. Also, this panorama is only partially complete since I've not stitched vertical areas adjacent to the building.) Note the cropped sky above the top of the building – this is the maximum +57.5° field of view allowed in cylindrical renderings. To gain an appreciation of how large a shift this actually is and the perspective adjustment that has been rendered, compare it with

the “falling backward” vertical lines of Figure 5, which is the actual top-of-the-building image that was stitched.

Comparing Figures 2a and 4, you can see that when

rendering a cylindrical images, the output is not exactly a WYSIWYG version the Stitching Window – and understanding how this works has been the only difficult part of learning Stitcher.

What I've learned is: 1) the perspective you see in the Stitching Window is exactly what you get in the rendered output – so pay careful attention to vertical lines; 2) the viewing angle in the Stitching Window bears no relationship to the rendered image in the horizontal dimension – you always get a full 360°; and 3) along the vertical dimension, there is a complicated correlation between viewing angle of the Stitching Window, vertical angle of the rendered image, and rendered width/height ratio.

Large rendered vertical angles required very large viewing angles in the Stitching Window, and while you can calculate the values on a trigonometric calculator or by simple trial and error, there is no easy graphical indication on the screen. This is an area for software improvement.

### Final Example

Figures 6 and 7 give a great demonstration of Stitcher's robust capabilities. Will Landon recently took a trip to Argentina

### Hints for Great Stitching

- Always use the same lens focal length for each image to be stitched. Stitching software maps pre-stitched images into a cylinder or sphere whose diameter is set by lens focal length. Mismatched focal lengths prevent alignment of adjacent-image pixels. In addition, don't change the lens focus either, since that also changes focal length.
- Use the same F-stop for all exposures. While some software (including Stitcher) makes adjustments for differing exposures on adjacent images, this is not the best approach.
- If scanning film for stitching, use the same scanning color & exposure corrections for all images. Like exposure, Stitcher color-corrects to blend hues between adjacent images, but it's best to avoid shifts in the first place.
- Shoot on a tripod, and if possible use a panoramic head designed to rotate the camera around the lens nodal point. If hand holding the camera, move your body position to maintain the center of the lens at the same position in space to simulate rotating about the nodal point. Distant subjects are quite immune to positioning errors, but foreground misalignment can complicate stitching.
- Compose your panorama so adjacent-image overlap contains texture – it's this detail that stitching software tries to align. Overlap images by 30%. Less will sometimes work, but why take a chance!
- Be careful of changing subject matter in the stitch overlap area. For example, if one image is of an unoccupied street and the second includes a moving car, the resulting stitched image will show a semi-transparent car!
- Always include a 0 degree pitch (use bubble level) image near the horizontal center of your overall composition. This can be used as a reference to simplify setting image perspective, ensuring that true vertical and horizontal lines are maintained.

and found himself at the expansive Iguazu Falls without his 5" Roundshot. So what did he do? Will pulled out his XPan with 30mm lens and shot handheld verticals – that format and focal length combine to give almost 95° of vertical coverage! Will had little hope of success stitching in Photoshop, particularly because of the “stretching effect” that happens on the ends very wide-angle rectilinear images, along with the fact that the camera was hand held. With Stitcher, I was able to stitch and render this into a modest 33 Mbyte file in less than 30 minutes – and this was while I was still learning the software. The foreground matched up, the rainbow matched up. Wow! (The color variation in the pre-stitched images was due to Will’s scanner – it’s an example of what happens if scanning software is unable to freeze color and exposure settings. While Stitcher’s blending function was employed, the final output was cleaned up – particularly the sky – in Photoshop.)



Figure 6 - ©2001 Will Landon



Figure 7 - ©2001 Will Landon

both PC and MAC platforms! If you need to do serious stitching, Stitcher should be very high on your list of products to be evaluated. Fortunately, the folks at REALVIZ will give you a chance to try it out. A free evaluation copy can be downloaded at [www.realviz.com](http://www.realviz.com). ■

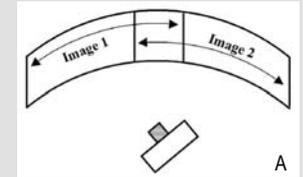
*Alan Kafton started in panoramic photography by creating paste-together images taken during his travels. After attending a photo swap meet & learning that there were actually cameras designed to make these images, he joined IAPP 5 years ago and quickly bought his first real panoramic camera. Now, Alan is spending his spare time gaining proficiency in his newly created digital darkroom. In his “real life” (the one that pays the bills), Alan does strategic business planning for the Wireless Semiconductor Test division of Agilent Technologies.*

## Stitching In Photoshop – The Good, Bad, & Ugly

Rather than buying dedicated stitching software, you might ask if stitching can be done in Photoshop\*? The answer is yes, maybe, and no way! Let’s look at three Photoshop stitching examples to create a cylindrical output.

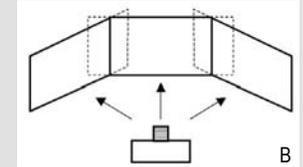
### Stitching sequential cylindrical images

Figure A shows two overlapping cylindrical images as would be taken by a swing-lens camera mounted on a tripod. By rotating the camera about an axis that runs through the center of the drum, adjacent images are really just extensions of each other, making pixel alignment easy. For this application, Photoshop is the perfect solution to paste the pieces together.



### Stitching sequential rectilinear images

Figure B shows how three rectilinear images from a “normal” camera might be combined to simulate a cylindrical output. If the camera were placed on a tripod and rotated on a horizontal plane about its nodal point, there exists a line created at the intersection of each image plane where pixels on the right side of one image will exactly line up with the pixel on the left side of the adjacent image. These can easily be matched up in Photoshop and a “panorama” created.

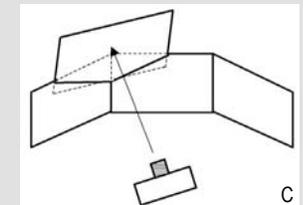


The problem, of course, is in finding that exact line. In addition, if the camera was handheld, or tipped up or down even slightly, pixels will not exactly line up. Photoshop matching can quickly become complex, with local perspective stretching or compression required. Yes, even images that require rather extreme manipulation to get them to match can be stitched – and IAPP member Joe DeRenzo has shown a number of excellent examples in Panorama – using this technique – but few have the Photoshop skills or patience to pull it off.

It should be noted too that these wide-view images are not truly cylindrical. They are simply made up of rectilinear segments with abrupt changes in the viewing angle. With medium and longer focal-length lenses, the change may not be too noticeable, but when using lenses with very short focal lengths, the change will yield images that were obviously stitched.

### Stitching sequential rectilinear images both horizontally and vertically

The final example in Figure C is similar to the second example, but is made more complex by adding an additional image to gain vertical height. In this case a second row of images is added by tipping up the camera. Merging these, with their compound angles in Photoshop is next to impossible without incredible skill and lots of time.



\*Note: The new Photoshop Essentials includes dedicated stitching capabilities, however it is not adequate for anything but web or small-print use since input file size is limited to 2 Mbytes/image. ■

## More Memorable Shots

An Essay By Michael Westmoreland

The year is 1987. The client is a large merchant bank which has taken the lease on a back-lit advertising panel 30 feet by 6 feet long in a prestige location at the London City airport, which has recently been built to take business travellers on short haul journeys to other European financial centres. I am required to fill it with a picture which incorporates and underlines its current ad slogan "Schroders take another view". The subject must be identifiably of the London financial district, but in some way different from all the usual library material then available. Panoramic photography was still thought to be quite a big deal at that time. The shot must be on a nice day weather-wise.

My problem with this is that London's financial district contains a great deal of anonymous post-war architecture which could equally well be Frankfurt, Sao Paulo, Tokyo, Cleveland, etc. None of the rooftops I laboriously reconnoitre over several weeks provide views that are distinctive in any way. It looks like a ground level shot but where? There is only one location recognisable the world

over, the space enclosed by the Bank of England, the Royal Exchange and the Mansion House. The only camera I have at that time which will work in this enclosed environment is a 6-inch Cirkut.

Without a proper viewfinder, I have a lot of preliminary visualizing to perform on how to fill the precise format in an aesthetic composition. It takes a long time to find the optimum paving stone to place the tripod, what time of day will provide optimum light and shade, what lens to use and what amount of rising front.

I have negotiated my biggest fee to date with a very prestigious agency and anxious to make it good, but I'm having to really sweat for it. The biggest problem is that on six days a week the double-decker buses and other traffic a few feet away never stops, and totally obscures the buildings. The only feasible day is a Sunday when the workers stay at home and the only time the light works is for an hour during the morning. Just when I have sussed this all out the blow falls. Instead of the two months I had been promised, the deadline has

now advanced to two weeks. This is England and the first Sunday is (of course) non-stop rain. One Sunday left and I now have a huge dilemma. Many months ago I have promised on my life to meet my sister in law who is due to arrive on that very day at Heathrow from Melbourne, Australia with her three small children and drive them home 100 miles. The plane is due in at 7.30am; there might just be time to get to the location if the plane is punctual after its 14000-mile journey.

The odds are long against a successful day when I get up at dawn, but the weather at least looks rain-free. When I get to the airport the plane is miraculously on time. The kids are bug-eyed and understandably fractious after thirty hours in a small space and everyone wants to climb into a bed. The sensible short route to bed is round the London Orbital motorway but I shoot a yarn about how its full of roadwork today and how we have to go through the peaceful city centre. Miraculously the sun comes out and lots of blue sky appears with little cotton wool clouds.

I keep my fingers crossed that nothing will have happened to the site since I last saw it several weeks ago: no unsightly scaffolding on one of the buildings, no workmen digging up the sidewalk, no crashed aeroplanes or whatever. When I draw up at the site I say oh so casually, "Just want to do a quick snap." No one argues and in twenty minutes I have the epic in the bag. At just the right moment there is a little puff of wind and the limp Union Jack on the Bank of England flagstaff stands to attention. This was the cherry on the cake indeed. But for all the man in the street knows I was driving along, saw something photogenic, stopped the car, got the camera out of the glovebox and just went click.

Soon after that it is raining. I look heavenwards and say thank you.

Just once I agreed to do a classic Cirkut 10 group shot, never again. I admiringly salute the small band of you out there who have earned a living in this way.

The city where I live has a very large Asian community and there is a sizeable section of very prosperous people. When this lot has a wedding it is not uncommon to ask a thousand or so guests with many of them dressing in very colourful traditional ethnic outfits.

I don't have facilities for mass multiple Cirkut printing so there is no profit to be made. But I like the idea of an unusual experimental shot to go in an exhibition I have planned plus a special print or two for the happy couple. I agreed to

*The final panorama created by Michael for the 30 feet by 6 feet long display at the London City Airport for Schroders.*



try a big group shot only after reconnoitering the location.

The ceremony is to be held in a big school assembly hall. This location would not be practicable in itself for a Cirkut shot, but outside there is

a very large tarmac sports area. There is no way of setting up tables and chairs as makeshift bleachers for such a crowd, so it will have to be a

one-level shot. I mark out a huge semi-circle and try to imagine if a thousand people can fit on it side by side.

Asian weddings take all day and it is late afternoon before I get a chance to try the shot. This is accelerated because I have noticed a distinct shift in the weather. Moving up from the southwest are some distinctly unpleasant dark clouds. I get the Cirkut set up with film at the ready and the master of ceremonies in the hall, who has a microphone, somehow makes it known that every-

one's presence is required outside.

Slowly and unwillingly people begin to get up from their seats. It is now that I begin to realise my inadequacies in crowd-control, oh for a microphone, or failing that a loudhailer. (Even with one

*Just once I agreed to do a classic Cirkut 10 group shot, never again.*

of those I would probably have had a shambles on my hands). The grumbling noise is substantial. People more

or less toe the line I have marked out but either bunch together or leave large gaps; there is too much moving around and I can only make myself heard to small sections at any one time. All the time I am conscious that the light level is dropping dramatically.

I adjust the f-stops and then the rotation speed before trying some more crowd manipulation. I try to remind myself that these are guests and not schoolchildren to be bossed around. Another look at the meter, another

camera adjustment. Now there won't be any more adjustments possible, I am already on the slowest speed. The sky now looks very dark indeed and the crowd in all its wedding finery is regarding it with very audible apprehension. So its now or never: I start the camera on its turn. At the same moment come enormous raindrops and then the deluge follows dramatically like one of those tropical downpours beloved of movie directors. My audience has only one thought and en masse it breaks and runs. The camera is still turning slowly, following it through the stampede

When I get home I disgustedly throw the film in the bin, no point in wasting a couple of hours of my time processing it is there?

Much later and irretrievably too late it dawns on me: I might, *might* just have had in the can an amazing and unrepeatable surrealistic picture for my exhibition. I'll never know. There's a moral in it somewhere. ■

## New Hot Button on the Website

Our website has a new "I need a photographer" link on our opening page! Visitors to the site will be able to click on the hot button, and select from two sorting categories - location, and specialty. Clients will be able to find all the panoramic photographers in a state or country, or sort by specialty - much faster and more effective than checking our entire list of websites and reading them all.

The hot-link has been lurking on the website for months, but is starving from lack of information. To get yourself on the hot-link, e-mail the following information to our webmaster Joe DeRenzo at [jderenzo@ix.netcom.com](mailto:jderenzo@ix.netcom.com).

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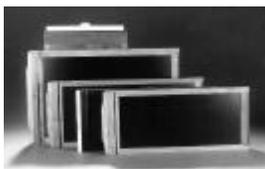
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## IAPP Goes To Italy

How does Italy in the spring sound? IAPP member John McCarthy is working on a conference to be held in Orvieto, Italy from Saturday, March 16<sup>th</sup> through Tuesday, March 19<sup>th</sup> 2002. Orvieto is 120 km (75 miles) north of Rome, and 160 Km (100 miles) south of Florence, is easy to reach by car or train.



ing (seminars, exhibitions, trade shows, photographic awards etc.) We'll have our own room set aside for member presentations.

Orvieto Fotografia is an annual international convention of professional photographers, promoted and organized by the Italian Photographers Associations

This will be the perfect place for many of our International members to get together. Orvieto located in Umbria and on the road to Tuscany is an ideal location for starting point for touring Italy. When we arrive the first flowers of Spring will be in bloom.

(SIAF - CNA and Confartigianato Fotografici) that has been held since 1999. John McCarthy gave a presentation on panoramic photography at their 2001 conference. His presentation was very well received by over 300 people. After his speech, quite a few attendees came up to him and told him that they are also doing panoramic photography.

Our conference will be held in conjunction with the Orvieto Fotografia International Convention of Photography and Imaging, "Photography in the Pacific Area". Plans are for our conference attendees to have the option of attending the Italian conference that will include events related to the world of professional photography and imag-

For more information about the conference and Orvieto go to: <http://www.orvietofotografia.com/eng/Default.htm> or contact John at [djohn\\_mccarthy@fujifilm.com](mailto:djohn_mccarthy@fujifilm.com). ■

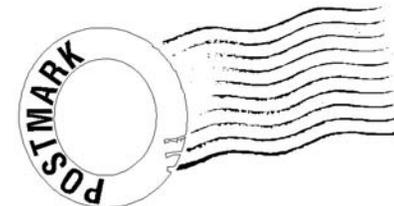
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Please keep your letters to 400 words or less, and please avoid personal attacks. Remember, the idea is to suggest improvements that help IAPP. The board will certainly listen and make every attempt to respond to legitimate complaints or problems but better yet, good ideas might surface in "letter to the editor" for the benefit of all. ■

Letters To The Editor should be sent to:

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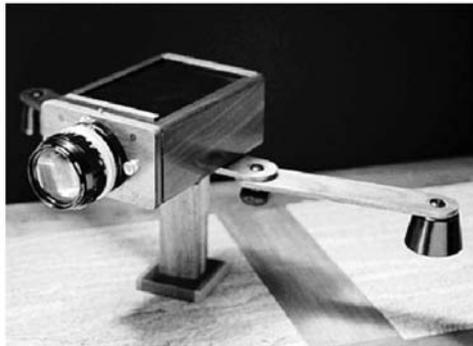
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## Inventions, Gadgets and Gizmos

# Improvised Scanning Digital Camera

By Andrew Davidhazy

My interest in scanning photography started in graduate school when I was under pressure to produce interesting photographs of sports events. This was in the mid-1960's and had recently discovered the photographs George Silk had made of Olympic events with a specially modified camera constructed by Marty Forscher. It was identified simply as a "photo-finish camera" and a brief caption explained its operation. It did not take me long to decipher the instructions, make my own version and start making not only sports photos but exploring the entire field of scanning photography from photo-finish to peripheral to linear and then panoramas.

As digital cameras started to be introduced it did not take me long to realize that the two approaches to image recording that existed with film type cameras were being duplicated by digital systems. The 2-dimensional CCD array cameras behaved like "snapshot" cameras, capturing the image of the whole scene all at once. Large arrays were difficult to make and thus expensive. Then manufacturers realized that

they could achieve high quality without having to make a large chip by simply moving a CCD array made up of a single row of sensors across the focal plane of the camera. In this fashion they accumulated image information across the field of view of the camera over time. This is essentially how focal plane shutters expose the image in film-type cameras.

As digital counterparts of the film cameras started to become available I soon saw the connection between the two systems and started referring to the possibilities afforded by digital strip cameras in my lectures and publications. Unfortunately getting my hands on a digital strip camera would prove to be more difficult than expected as the price for such cameras was beyond what I could afford. On top of it all, the manufacturers did not see the potential of strip technology as being applicable to their linear array camera designs and they made them strictly to serve the advertising/commercial photography market.

My efforts finally were rewarded when I noticed that Kodak make a simple print

scanner whose function was to pull a snapshot through while recording its surface. The price was \$45. I bought one on a hunch that it just might have the makings to help me improvise a demonstration quality digital camera of the scanning type.

Before long the device was disassembled, reduced to it's basic components and began doing things its designers probably never foresaw. All indications were that the scanner simply imaged the passing surface of the snapshot by passing it in front of a stationary linear CCD array with the image of the print being reduced optically to match the size of the sensor. Sure enough, at the end of a plastic funnel serving as a light shield sat the CCD array. It did not take long to remove it and install it in the back of a camera. Soon after I was proving that one could make demonstration quality images that bore all the earmarks of traditional film type strip cameras when used in similar applications.

There were certain limitation to the Kodak scanner in terms of quality and operation, the worst of these being the

intermittent nature of the scanning process that it was designed with. This posed no major problem when scanning as intended but in my applications it was evident the scanner lost track of the images thrown upon it by the camera lens every so often. The scanner used these "dark" periods to transfer data to the computer. This left somewhat disconcerting discontinuities in the final images.

I invested in another small scanner. This time it was a cheap hand operated model, the kind that a person pulls slowly over original material and in the process records the passing features of the image over time. Just what one would expect of a scanning camera! It was a KYE HandyScan Color Deluxe hand-driven rolling scanner costing \$10 during a promotion! The advantage of this scanner was that one would not have to stop during a scan sequence. The scanner software / hardware would work in combination to limit the rate at which the scanner moved over the surface to one that the device could deal with in uninterrupted fashion. This proved to be the case and it was not long

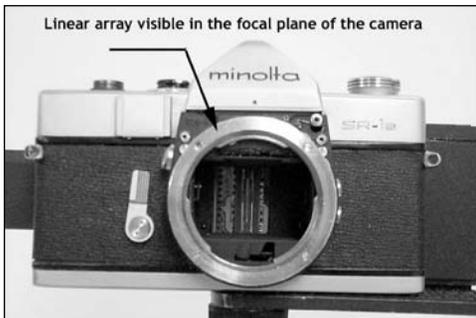


Figure 1

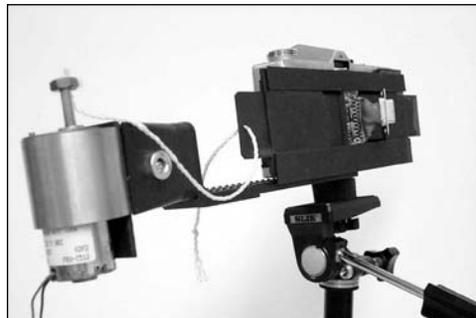


Figure 2



Figure 3

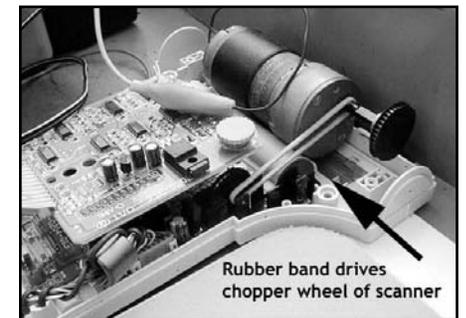


Figure 4

*"My interest in scanning photography started in graduate school when I was under pressure to produce interesting photographs of sports events."*

before this scanner's linear CCD array was installed in the back of a Minolta. The camera's focal plane was gouged out with a Dremel tool leaving flat surfaces on which the printed circuit board of the scanner bearing the CCD array could be attached (figure 1).

The CCD array itself is normally connected to the rest of the scanner body and hardware with a short 12-wire connector. I cut this wire in half, bared each of the ends and carefully numbered each so as not to lose track of the proper connections. I made an extension cable to enable the array to be installed in the camera at a distance of about 4 to 5 feet from the scanner body itself.

Unlike the Kodak array, when I fixed it in one position, this time I chose

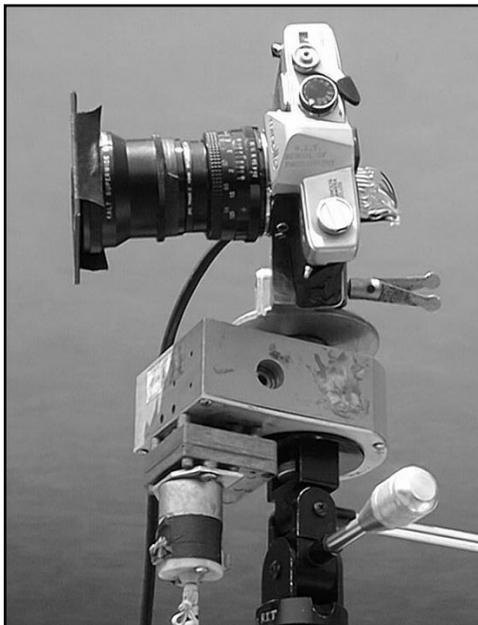


Figure 5

to attach the array in the middle of a tongue-like device that could slide within a "C" channel glued to the camera body. This allowed the CCD array to be moved across the focal plane of the camera. I planned to slide the array from one side to the other by taking up a string attached to one edge of the sliding tongue onto the shaft of a small variable speed DC gear-head motor. This would allow me the capability of "focal plane scanning" (figures 2 and 3).

To recap, then, the array itself functions as a "slit" shutter and the data extraction process of the scanner is the memory or digital film. This is reminiscent of my special interest in traditional photographic life strip cameras.

By way of further explanation it is important to mention that this scanner device is designed for movement over a surface. This causes a chopper wheel to turn giving the scanner information about the rate of motion of the scanner over an original. The moment the scanner is modified it is not really practical to move the body by hand. Therefore, I fitted a rubber band over the shaft of the chopper wheel and with a variable speed DC gear-head motor drove the wheel at a constant speed that was



Figure 6

within the limits that the scanner software could cope with (figure 4). Later on I removed the chopper wheel assembly completely and replaced it with an LED driven by a variable frequency oscillator. This provided a steady signal to the scanner's software that was not prone to be interrupted by broken rubber bands!

## APPLICATIONS

### 1. Panoramic Photography

As you might expect the earliest application that I looked into was that of making a panoramic photograph. This is achieved by simply placing the camera on a tripod with the CCD array arranged so that it is parallel to the tripod's axis of rotation (meaning in a vertical direction) and while the scanner is presumably scanning an original, slowly rotating the tripod's column (figures 5 and 6). Using a very short focal length lens, such as a 14mm lens, it is possible to make an almost full 360-degree image showing acceptable aspect ratios of objects included in the scene. The aspect ratio of any image or scene reproduced through these means is roughly a function of the vertical angle of view of the lens and the horizontal angle of view that one covers. If the camera is turned too quickly or the focal length of the lens used is too long the objects in the scene will appear much too narrow or horizontally compressed.

While one can simply turn the camera by hand I also made a motorized tripod head for this camera also driven

by a variable speed gear-head motor. A big problem is the size of the files that can be generated, huge!

### 2. Peripheral or "rollout" photography

The complete recording of the outer surface of (usually) cylindrical objects has been the specialty of a very few photographers. The technique of peripheral photography was first considered, developed and applied in the late 19th century in archeological museums where Greek and other vases from antiquity were photographed "in the round" to record the total outer circumference of designs added to their surfaces.

For peripheral photography I placed the linear CCD array in the camera roughly in the middle of the film gate. Then, I stood on a turntable in front of the camera after having pressed the "scan" command on the software controlling the scanner. The idea was that as I rotated in front of the camera the lens would project continuously changing features from my head onto the linear array located in the camera image plane.

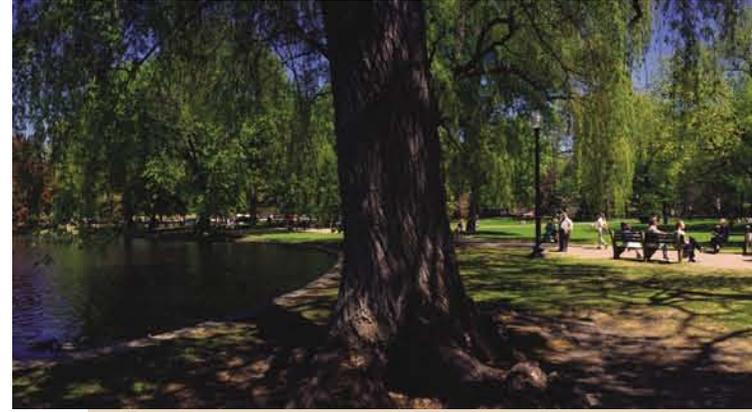
The scanner would be functioning as a "non contact" printing press where my head would supply, over time, the changes in information that the scanning array would then store in the computer's memory. I tried to make a couple of turns or so during the time it took the scanner to believe it had scanned a 14-inch long print. Success! I also applied the camera to traditional

*continues on page Eighteen*

## Member Gallery - Images of Boston, Massachusetts



*This aerial panoramic view of the Boston waterfront was taken by David Lawrence with a Fuji G617 using Kodak EPP film. While photographing Boston Logan Airport early one Sunday morning from a helicopter using a handheld gyro-stabilizer, David swung out over the harbor to get this shot of the Boston waterfront on the way back to the helipad. Copyright 2001 - David Lawrence.*



*"Boston Public Gardens" is the combined result of three images taken with a Photoshop. Neil Gordon used Fuji NPS color negative film which he then scanned. Copyright 2001 - Neil Gordon.*

*Dave Orbock used his Hulcherama camera with a 35mm lens to record this image of Fanueil Hall and Quincy Market in Boston on Fuji NPH (asa 400) 220 film. Copyright 2001 - Dave Orbock.*



*This panorama of The Boston Lighthouse, Boston Harbor was taken by AJ Weiner with his Roundshot 220. A.J. Used Kodacolor Gold 200 film to capture this image. Copyright 2001 - AJ Weiner.*





*Noblex 150 and stitched in  
anned in an Epson 1600 scanner.*

*This skyline of Boston was  
taken by Brad Lapayne with a  
#10 Cirkut Camera. The pan-  
orama was taken with a 24"  
Artar lens from near the Long-  
fellow Bridge.*



## Improvised Scanning Digital Camera

from page 15

peripheral photography by placing a vase on a turntable and adjusting the image size and the rotation rate so that a more or less acceptable reproduction of the surface features of the vase was displayed in the final image.

### 3. Linear strip photography ("photo-finish" and moving array over subject applications)

The idea this time is to aim the array at some location in space and have a subject go across that location or take the camera as a whole and move it past a stationary subject. This particular application of the system seems more limited than most because the data capture and transfer rate are relatively slow and thus any real application to photo-finish photography is somewhat far fetched.

Nevertheless, if the objective is to move the image of whatever subject one aims the lens (normally one would adjust the data capture/transfer rate) at a speed so the image compiled by the scanner has the same aspect ratio of height to length as the original, then the system "works". Even if there is some slight discrepancy between the reproduction and the original that could amount to as much as 50% in either direction, the reproduction will usually be recognizable as being an image of a particular subject.

### 4. Scanning array 2D photography (moving array across film plane)

I also decided to try duplicating "focal plane scanning" as is done with sophisticated scanning camera backs such as some made by Phase 1 and by Fine-light, and others and typically used in 4x5 cameras.

For this the camera is aimed at a par-

ticular scene and the linear array is slowly moved from one side of the camera's image gate to the other while the scanner accumulates the changing image information. In commercial cameras the linear array moved across the image plane by sophisticated transport mechanisms at a rate that is predetermined by the software controlling the scanner.

### 5. Infrared sensitivity

Another "problem" that the designers of this scanner (and most other scanners as well) had to deal with was the inherent sensitivity of CCD devices to infrared. Most manufacturers of scanners deal with this in a similar way. They light the subject with light that contains little infrared or they include an IR absorbing filter in front of the array. Not even this filter is totally effective in eliminating infrared. This is acceptable however, because all one needs to do is to make sure that enough of the infrared is removed so that the color response of the device is not noticeably adversely affected by the presence of residual infrared.

But once the array has been removed from the camera and is used to record everyday scenes, the array is bound to run across situations where there is an overabundance of infrared present. This results in an unwanted color cast to the final image. To eliminate these as much as possible one is then forced to include an infrared absorbing filter someplace ahead of the scanner's picture elements. Usually this is accomplished by placing an IR absorbing (but light transmitting) filter in front of

the camera lens. Sometimes a cheap heat absorbing glass from an old slide projector will work adequately.

Or, one could take this deficiency and make it into an opportunity! The scanner can be used as a rudimentary infrared imager. Think about this, an infrared-capable \_panoramic\_ imager! To make a panoramic image one rotates the camera as described above. To make this device into an infrared imager one places an Infrared transmitting, but light absorbing filter, such as a visually opaque Wratten 87

or 88A or similar, over the lens. Or simply use this as a device for making interesting images only by infrared energy.

In fact, the CCD array is extremely sensitive to IR and it is quite simple to light a scene with ordinary tungsten illumination and covering the lens with an 87C filter and, as shown in the attached illustration, experience no problems at all in making infrared images.

### 6. Infinity and beyond

I have also been on this "kick" of trying to tie some imaging artifacts

associated with scanning photography, and especially panoramic photography, to simple or simplistic statements related to the Theory of Relativity. One of these topics deals with what subjects look like "beyond infinity".

If you accept that when you make a point into a line you have achieved infinite distortion (such as when the

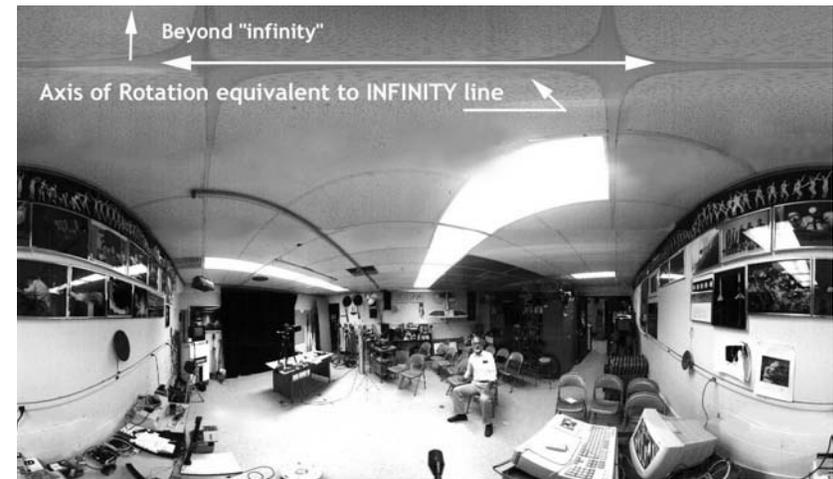


Figure 7

N and S poles of a globe are made into lines as long as the Equator when making flat maps of a spherical Earth), or when you project the polar axis of a sphere that is coaxial with a cylinder and tangent to it at the equator, then the place you'd expect the axis of the sphere to be reproduced or touch the surface of the cylinder is at infinity. Well, if you buy into this then the panoramic system, with the camera's field of view extending "behind" the camera, so it can see both forwards (reality) and behind the axis of rotation, then the resulting photograph will show those objects "beyond infinity" as

being upside down and reversed left to right (but only from the “reality” point of view) and 180 degrees out of phase with “reality”.

The illustration (figure 7) shows my lab and it is a composite of five 360 horizontal scans assembled together by hand. Up there in the ceiling tiles you are starting to see beyond infinity!

In another case the camera’s lens was fitted with one of those “through the door” surveillance peep gadgets. This enabled the camera to have a very wide angle of view along the CCD array. The camera was then pointed almost straight up and rotated. In this case (despite its minor flaws related to leveling and consistent scanning rate, etc.) the relationship between what was in front of the camera (“reality”) and what is “beyond infinity” was much more clearly evident.

Experiments are continuing. The “peephole peeper” lens will be replaced soon by a better quality fish-eye adapter and then the optics and image sharpness will, hopefully, be better. However, considering the price of these scanners the amount of photographic entertainment that I have gotten out of them has easily been worth their weight in gold!

If you have any comments of questions about this bit of digital tinkering feel free to drop me an e-line at: [andpph@rit.edu](mailto:andpph@rit.edu). You can also see some of the original articles the one above is based on the web at the following address: [www.rit.edu/text-demo-scanner.html](http://www.rit.edu/text-demo-scanner.html)

## Part II

# Central Park Views - The Ramble

By Joseph DeRenzo

The second part of the Central Park Views series covers an area known as The Ramble. Located due east from about 74th Street and Central Park West in New York City, these woods are filled with foot trails and a stone bridge along side a most placid lake. One might think of The Hobbit while passing through this quaint forest. At night, the skyline along Central Park South is reflected in the glass like water and viewable from Hearnhead.

With its turn-of-the-century gazebo, Hearnhead sports a panoramic view in all 360 degrees with The Ramble visible from across the water eastward. From the rocks over looking the lake, one can view the San Remo building as it stands over the park. This summer I had the chance to sit on those rocks and observe swarms of fireflies at twilight with lightning from a thunderstorm in the distance.

A foot trail winds around the lake to

Bow Bridge from which the Dakota building off to the west can be viewed. There is a little waterfall area at the north end of the lake known as The Gill that many people in the summer find a great place for picnics and meditation. Beyond that is Iphigene’s Walk. The stone bridge is tucked back in beyond the waterfall under a canopy of trees which in the summer keeps it well shaded. In autumn, many of those same leaves offer the panoramist a most colorful view. As one would expect, winter turns the area into something out of a

fairy-tale.

An entire day can be spent exploring this area for interesting locations from which to capture the area’s tranquil surroundings or just relaxing in a beautiful part of Central Park. It’s up to you. ■

*Top: Noblex image from The Ramble with the Dakota in the distance.*

*Middle: Noblex 360 infrared image from atop The Stone Bridge.*

*Bottom: Noblex 360 of Hearnhead Gazebo.*



# Digital Architectural Panoramic Photography in Guatemala

By Nicholas Hellmuth

During summer 2001 the FLAAR Photo Archive engaged in a project to record the impressive buildings of talented architect Adolfo Lau on the campus of Francisco Marroquin University. We realized that a digital panorama camera would provide the ideal means to accomplish the photography. The project took place here because this is the university in Guatemala where FLAAR has an office, the Digital Imaging Technology Center.

Although most panorama cameras are used to photograph either natural landscapes or urban landscapes, this project sought close-up panoramas of individual buildings, or at most two buildings at a time.

Since the university is situated in a hilly area and has dense forest around most of the buildings, finding a vantage point was a challenge. The panorama system is based on 4x5 inch large format cameras so we used Rodenstock and Schneider lenses. The Schneider 47mm was useful for interior patios or courtyards. This is roughly equivalent to a 14mm lens on a Nikon. For exteriors yet in close confines we used a 58mm lens which would perhaps be similar to a 21mm lens on a Nikon or Leica. When we had a bit more distance a 90mm was preferable. For wider panos a 120mm lens was selected, perhaps roughly equivalent to a 35mm lens. With the wide angle lenses in tight situations we used the lens without doing a panorama rotation. Rotating an extreme wide-angle lens would curve the

architecture and look distorted.

## Previous experience in panoramic photography

Like many people who belong to IAPP, I began with simple wide angle lenses on 35mm cameras decades ago, moved to the 6x17 cm class of medium format wide angle camera, and eventually traded up to a 4x5 Linhof with Schneider 47mm lens for 120 degree ultra wide angle. At the same time I also used a 15mm non-distorting ultra-wide angle lens on a Nikon F3 camera. All of these cameras were used to record ancient Maya architecture in the decades before digital technology was available.

Then I purchased a Seitz SuperRoundShot, not so much for its panoramic abilities as for its turntable capabilities, since my main interest is doing rollout photos to record the circumference of Classic Maya vases. In real life, before I moved into digital imaging, I was an archaeologist.

I took the Seitz SuperRoundShot to the Maya ruins of Tikal and got some nice panoramas, but it's difficult to get 70mm film developed in Guatemala. I have only the 70mm back for the Seitz; the 120/220 back is the one I need but it is no longer manufactured by Seitz. 120 and 220 film can be developed in Central America but our version of the Seitz can't use that size film without a replacement magazine.

FLAAR has six wide format printers

varying in size from a 24" Epson 7500, several 36" Hewlett-Packard DesignJet



*Digital scan of inside courtyard of the Edificio Academico, Universidad Francisco Marroquin, Adolfo Lau, architect. 47mm Schneider Super Angulon XL lens with 120 degree view, hence no need to rotate the camera, BetterLight Super6000 scanning back, FLAAR Photo Archive.*

printers, a 60" HP 5000ps, up to the 72" inch ColorSpan Displaymaker inkjet printer. So we are interested in printing panoramas at mural size. I tried to scan the Ektachrome transparencies that resulted from the Seitz but there were several problems. In the process of their original darkroom development in the United States the transparencies were stuck with a residue of chemicals as well as grit, due to poor development as well as contamination in the photo lab. Thus the scans merely magnified these defects from the development laboratory. We sent the transparencies to two different drum scanning companies but got poor results since in essence the 70mm photos had been ruined during development.

Besides, even if the film had been properly developed, the scans would have

eventually revealed the grain structure of the film, so digital prints would have been restricted in size and limited in quality. Furthermore, I like to develop and print my own images. Doing this at mural size and in any location on earth (without being tied down to a darkroom) is possible only with digital photography and digital printing.

The focus on digital photography at FLAAR is a result of several grants. In 1996 I received funding from a private foundation to undertake a feasibility study of scanning traditional slides and film within the FLAAR Photo Archive. That same year I also received another grant from the Japanese Ministry of Education to assist their National Museum of Ethnology in a program to digitize their slide archives of Maya culture. So within the space of one year FLAAR had a opportunity to acquire digital technology and most importantly, training.

FLAAR's experience with the Seitz rollout mode raised the interest of Michael Collette. He was in the process of developing a digital turntable rollout camera for a start-up digital imaging company named BetterLight. In effect his system was a complete digital counterpart to the film-based Seitz system. Since there were few independent institutes who had experience in rollout photography, FLAAR was selected to be beta tester for his prototype digital turntable rollout camera.

So by 1998 I had a digital rollout

*"We realized that a digital panorama camera would provide the ideal means to accomplish the photography."*

camera. Any computerized system which can do rollouts can usually also do panoramas, so I actually ended up with a complete system which could also take digital panoramas. This digital system is so sophisticated you can read the text on a billboard which is over a mile away. You can easily enlarge a panorama to 36 inches high by 15 feet long with any wide format inkjet printer. This was perfect for the needs of the FLAAR Photo Archive.

### **Equipment and Digital Technology Insight**

All BetterLight digital systems use a trilinear scanning back. This means that a red, blue, and green CCD sensor, each one pixel wide, in vertical arrangement, "takes" the actual picture 7 cm high. In a studio situation (non-panoramic) these three parallel sensors would be moved across the entire 9 cm width of the image area pixel row by pixel row with a stepping motor. This is approximately the same way that a flatbed scanner scans the entire surface of its glass surface. The scanning back for the camera would take over 10,000 individual vertical scans, stitch them together simultaneously, and end up with a raw image 9 cm wide by 7 cm high which is about 120 MB in size. If any of this is confusing, there is more information on [www.digital-photography.org](http://www.digital-photography.org) or you can get the actual technical specs on [www.betterlight.com](http://www.betterlight.com).

When you put this system on a rotating pano tripod head, instead of scanning across the 9 cm width of the image capture area, the sensor moves to the middle of the capture area and remains

stationary. What turns is the overall camera, so as the turntable turns one 1 pixel width, the sensor shoots one scan equal to one vertical pixel column in width. The turntable rotates another unit; another vertical pixel column is scanned. The size of a pixel unit varies depending on the focal length of the lens as well as the resolution setting you chose. BetterLight is one of the few digital panorama systems which is sophisticated enough to allow true value image capture with no interpolation. The camera operator selects the precise number of pixels you want; that is exactly what the CCD will record, true optical dpi.

The BetterLight camera is capable of scanning up to 65,000 pixel lines in width. In real life you can utilize only up to 29,000 pixels because Adobe Photoshop software can open only 30,000 pixel rows. Seemingly no one at Adobe could conceive of any image capture system that could produce so much raw data. 29,000 pixels is about 300 to 500 MB in file size for a roughly 120 to 180 degree panorama, depending on various factors. The camera will take a full 360 degree panorama but then you have to lower the resolution so as not to exceed 29,999 pixels.

The nice thing about modern digital photography is that you don't need to know anything about what is going on inside the scan back. Just point the camera and let the software take the picture.

Color balance is done by including a gray card in the prescan. The software

provides a virtually flawless automatic color balance function. Besides, since the image is digital, you can always improve the color balance afterwards in Adobe Photoshop. Nowadays Gretag-MacBeth makes color charts and software to improve color management even further. Other companies active in color management in digital imaging include Monaco Systems. X-Rite and Gretag make the industry standard color measurement tools. Further information on these useful products is available from [www.digital-photography.org](http://www.digital-photography.org); just look for the index page.

Focus with the BetterLight system can be done manually on the camera or electronically via the software. The camera software can focus the sensor more accurately than any human eye. But this is why you need a rigid camera, since any camera with sliding movements up and down an open groove can't be locked at any specific point or moved precisely enough. Merely turning the locking mechanism on these cameras throws the sensor out of focus again. Thus it is recommended not to use any 4x5 camera that lacks geared movements. Those attractive brass fixtures on those wooden cameras look picturesque, but these field cameras are totally inadequate for studio photography with a digital scan back. In the field they are sort of okay since your focus is usually at infinity. Just be sure your camera allows for a bag bellows and/or accepts a sunken lens mount, an accessory needed for wide angle lenses.

Actually the CCD sensors require a rock-stable camera platform which eliminates

all the cheap 4x5 cameras and actually rules out most of the monorail studio cameras as well. You need zero detents or a comparable locking system that has stability simultaneously on both sides of the camera. Cameras with brass fixtures or sliding movements in any metal are too lopsided. The brake on one side is not at all coordinated with the positional stop on the other side. Ironically using film did not require as much precision as does a CCD sensor. However the base area of a Wisner flat-bed camera platform is in many ways more solid than most fully metal studio cameras. Out on expedition, if you are photographing only long distance (with no close-ups), the Wisner can be a good companion. Just be sure to have a bellows that is shielded from infrared light. Test any camera at home before you go out on location.

The "camera" is merely anything that holds the scanning back. You can use a Sinar, Linhof, Toyo, Arca-Swiss or any 4x5 camera. We found the Cambo Ultima was strong enough to hold the weight of the scanning back without sagging. Another Cambo model, the Cambo Wide series have the advantage of being lightweight but if you want rise and fall perspective control functions you need the Cambo Ultima. Whatever camera body you use, don't use one with an L-shaped form like the Linhof Technikardan, since they sag with the weight of the scanning back combined with the pull of the heavy SCSI cables. However the Linhof M679 Digital would be an excellent alterna-

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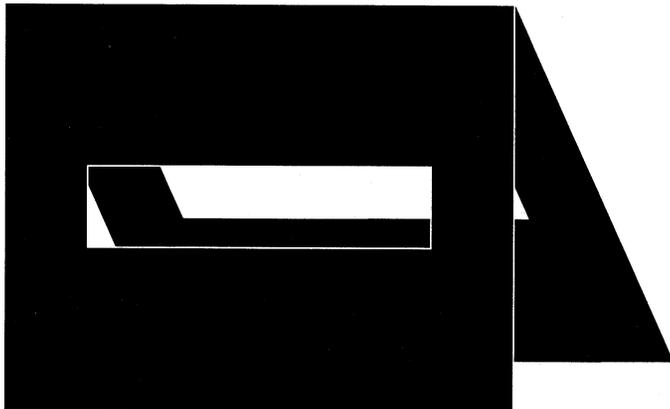
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## Digital Architectural Panoramic Photography in Guatemala

from page 21

tive. The Linhof M679 Digital offers a design which looks rock-solid. Unfortunately we don't have that improved Linhof model nor an Arca-Swiss.

The digital equipment requires a Macintosh laptop from a model 3400 to the current G4 Titanium. Best model is the G3 WallStreet since that still has built-in SCSI. BetterLight does not operate on USB nor with FireWire; only SCSI. Although you can add an Adaptec SCSI card to all recent G3 and G4 Macintosh PowerBooks, the conflicts and operating system freezes are legendary with this jerry-rigged SCSI adaptation. We actually found a Mac store that still had older generation WallStreet models of the G3, and we bought two just to get SCSI already built into the laptop.

The BetterLight system is fully portable since it operates on a battery. The turntable operates off of the same battery via the processor unit. The system fits into a small carrying case which fits under an airplane seat. All the BetterLight equipment has survived jungle humidity, tropical heat, and the rain of black volcanic ash from the constant volcanic eruptions on the horizon outside the FLAAR office in Central America.

With the Schneider SuperAngulon XL 47mm lens you get such wide coverage that we don't usually need to do a panorama shot. So we just take a still picture with no rotation. That way there is no distortion. If you rotate a lens such as this the building façade will turn out round in the panorama. You get this effect even with a 58mm ultra-wide angle lens in pano mode. However if you back further way, you can rotate the

58mm and get an acceptable image with little noticeable distortion.

With the 90mm on the Cambo Wide and the 120mm on the Cambo Ultima you can rotate them with the pano head as long as the buildings are about 50 to 100 yards away. We do not currently have any telephoto lens; if we did we could produce spectacular urban landscapes, such as city skylines, especially along a coast or along a river. However within the university campus the beautiful forest makes long-distance photography impossible.

### Rollout Potential

Just like the Seitz SuperRoundShot the BetterLight system can also do turntable photography of round objects. However the BetterLight system is not yet outfitted to do linear mode of the kind accomplished so well by the Seitz camera. Peter Lorber has done some beautiful linear shots with his Seitz system. The BetterLight, in distinction, can do QTVR object movies, that is, allow you to take 36 views of a rotating 3-dimensional object. The BetterLight software takes a product photo every 10 degrees and then stitches the results together. [www.maya-archaeology.org/VRHTML/copangate.html](http://www.maya-archaeology.org/VRHTML/copangate.html) shows what the resulting images look like.

Difference between the BetterLight and other digital panorama cameras is precisely this multi-faceted ability to do object movies and turntable rollouts. Adding linear capability would require writing the software to work with an conveyance and track such as the kind already available for the Seitz SuperRoundShot. Linear photography

is especially useful in architectural history and archaeology, for distortion free-photography of friezes and other sculpture. Unfortunately linear mode is still lacking in digital pano systems.

The principal advantage of the BetterLight software is the size and quality of the raw data files. If you

wish to do museum-quality mural-sized enlargements, most digital pano systems are not powerful enough. That's what I personally like the most about the BetterLight system, you can enlarge the pictures to monumental proportions.

What is more sophisticated in the other competing digital panorama systems is their clever lens sun shade hood. Seitz offers a slit cover that fits on the new models (but not on my SuperRoundShot). At Photokina I saw another digital pano system which had a light shade physically molded on top of the lens glass. It had only a vertical slit for the proper place up the middle of the lens. The vertical height up the center portion of the lens is the only part of the lens that is used for a pano or rollout. All the rest of the glass on both sides is just an invitation for disruptive reflections



*Digital panorama scan of Edificio Nuevo Media, designed by Guatemalan architect, Adolfo Lau, Universidad Francisco Marroquin, home of FLAAR-Latin America. 58mm Schneider Super-Angulon XL lens, Dicommed FieldPro with BetterLight digital panorama system, FLAAR Photo Archive.*

to enter and disturb the image capture. The company which makes the clever sunshade mask told me they simply got the various lenses, made a mold of each lens, and then made a lens-shade from the mold. It would be nice to have this on the BetterLight, or at least a slit-shield out in front like that of the newer Seitz systems.

Another feature that is lacking on most digital panorama cameras is "cloud control," that is, software that balances each pixel row for the times that a cloud passes over the sun. The cloud results in darkness for a few minutes. This ends up as ugly vertical bands of darker image for the minutes the pixels in those parts of the scene are being scanned. In effect your panorama is totally ruined. This means that you can only do digital panoramas on days of full sun or com-

plete overcast. Or if clouds are present, only if the clouds are far enough apart that you can shoot the entire panorama in between clouds. An average panorama with the older prototype takes about 28 minutes. The newer BetterLight 6000 ought to be appreciably faster.

The BetterLight system is developed by a leading camera company with seven years experience producing professional digital scan backs. So this scanning technology is backed up by technical expertise. The camera itself was originally distributed exclusively by Calumet; currently Kodak is the distributor but Calumet still sells the BetterLight scan backs. The pano adapter and pano software are presently available only from BetterLight.

The first scan back was manufactured by BetterLight but actually marketed by Dicommed as the FieldPro. However Dicommed subsequently went out of business; indeed BetterLight took over technical service for all Dicommed FieldPro and Studio Pro cameras. For anyone who still has a Dicommed, my best suggestion would be to update to a Super6000 BetterLight. The BetterLight has a vastly superior software interface and the CCD technology is improved as well.

There are a number of advantages in having an American-made system, namely that you can get technical assistance in your own time zone from the actual people who write the software and build the camera. Furthermore, the software is continuously being updated.

With some other digital cameras the

software is written by an outside hired engineer, who is not an employee of the company. As soon as it is believed the software is finished, the engineer moves on elsewhere. So there is no guarantee of any update, and even if so, not necessarily by the original person who knew the original software.

### **Future Equipment**

The new generation digital panorama system consists of the BetterLight digital scanning back Super6000, the new Pano/WideView adapter (the turntable which fits on top of your tripod head), and panoramic software which is still under development. FLAAR currently has a beta version of the new panorama software. You can see the new equipment on [www.betterlight.com/pages/pano\\_product.html](http://www.betterlight.com/pages/pano_product.html). The hardware and new software are an enormous improvement over the version from 1997.

Where can you get the equipment? Best place is from Calumet Digital Solutions. Contact George Zimmermann, e-mail [george@calumetdigital.com](mailto:george@calumetdigital.com), tel (630) 860-7447, ext 601. For the pano head adapter, e-mail [mike@betterlight.com](mailto:mike@betterlight.com).

### **Digital Reality**

We have already mentioned that clouds are a problem because when a cloud passes over the sun the lighting intensity on the building is less. If the sky is totally clouded over, then you can take photos okay, other than the difficulty of seeing much detail in the shadow areas. You can rescue some shadow detail with Adobe Photoshop software but the shadow area is usually grainy. This is the "noise" of digital scanning of any dark area.

The other thing a digital scan back system can't handle is wind blowing the tree leaves, or waves on a beach. I have taken panoramas of a fast moving stream with ripples and that came out okay, but not actual waves. If the wind is slight you can repair the image with the rubber-stamp tool in Photoshop, but a really windy day with lots of trees you simply cannot take digital landscape shots at all. But an urban landscape of just buildings, or a national park with just rocky landscape, that is where this digital system does just fine.

When people walk through the scene they show up as red-blue-green stick figures. You simply erase them with the rubber-stamp tool in Photoshop. We shot one view of the two adjacent museums on campus. Hundreds of students crossed directly in front of the camera, as well as their cars. Half an hour of rubber stamp work and they all disappeared. People who stood still or sat very still turned out okay as long as they were at a distance.

The Dicommed scan back has an inadequate depth of field because it required so much light that you had to open the lens to f 8. To get depth of field you need to put the lens at f 32. Thus we do not recommend the Dicommed FieldPro or Dicommed Studio Pro due to our continued problems of poor depth of field and focus. Sharp focus is enough of a problem in digital photography without exasperating it with low depth of field. But the new BetterLight Super6000 has a noticeably improved software and hardware. You don't need as much light as the earlier models which means you can close down the

lens almost as you would with film. That opens up the depth of field to close to an adequate level. Hopefully this situation will be further improved with the next generation of CCD sensor and its correspondingly new software.

Of course if you are shooting a distant landscape you don't notice any of these situations; thus the Dicommed does a beautiful job with long-range landscape shots as Stephen Johnson has demonstrated for years with his award-winning national parks project., But if you are doing architecture that is 50 feet to 200 feet from the camera you need adequate depth of field.

Since FLAAR is not a commercial company making profit we need at least to have some enjoyment from all this. The digital panorama system from BetterLight is a source of continuing satisfaction. If panorama photography is your hobby, then you definitely need to try out this fabulous system, especially if you do long-range landscape or long-distance urban landscapes (such as the bay and bridge of San Francisco, skylines of major cities, desert or mountain landscapes, and so on).

If you don't know Adobe Photoshop, don't worry. Almost every community college teaches that nowadays. We had students learning in a day. FLAAR already has a combined digital-pano course together with a Photoshop course: brush up if you already know or start-from-ground-zero if you are new to digital imaging. The software of the BetterLight is easy to learn. No

## Digital Architectural Panoramic Photography in Guatemala

from page 25

previous experience is required.

The student who took the summer course had never before used Adobe Photoshop nor a single digital camera. Within 8 hours he was able to operate the entire panorama system plus he knew how to prepare the images in Photoshop for printing. So if you are interested in learning how to use the BetterLight pano system, either contact them for a demo or check out [www.digital-photography.org](http://www.digital-photography.org) for FLAAR's listings of when the next course will be.

### FLAAR

FLAAR is a non-profit tax exempt institute dedicated to architectural history of pre-Columbian Mesoamerica. In reality this means to photograph ancient Maya palace, pyramid-temple, and ballcourt architecture. Beginning in 1996-1997 FLAAR moved into digital imaging. Currently FLAAR has 15 employees dedicated to digital imaging

at offices at two universities, Universidad Francisco Marroquin in Guatemala and Bowling Green State University of Ohio. FLAAR develops web sites in three languages covering flatbed scanners, wide format inkjet printers, color laser printers, and digital photography. With 12 sites and over 500 pages or reviews of hardware and software this is the largest such independent network in the world. Over the course of a single year, more than one million people will read the discussions of digital imaging equipment on the FLAAR Information network. Actually a single FLAAR site in just one month will get up to a 700,000 hits from 14,000 readers who eagerly seek information on what camera or printer is best for their needs.

Bowling Green State University's College of Technology has opened a Large Format Digital Imaging Division by acquiring FLAAR's personnel and experience and grafting this on their own educational assets already on campus.

Courses on digital photography, panorama photography, and wide format printing will be offered on this campus in the future. This program is in cooperation with BGSU's professor of printing, Chuck Spontelli, the Director of the Center for Applied Technology, Joe Catalano, the chair of the VCT program at BGSU Larry Hatch, and the Dean of the overall College of Technology, Ernie Savage.

Universidad Francisco Marroquin is the home to the Museo Popol Vuh of Mayan antiquities, hence a magnet for FLAAR's interest in pre-Columbian archaeology. FLAAR's move to campus is a result the interest of Vice-Rector Max Holzheu in bringing advanced digital imaging technology to campus.

### Acknowledgements

We thank the Wisner Company for providing a practical folding field camera, Calumet Digital Solutions for providing two Cambo cameras to this program;

Ries for providing two of their attractive wooden tripods. We thank Michael Collette of BetterLight for providing two scanning backs and two pano heads (the beta system in 1997 and the new system this year). We thank Hewlett-Packard large format printer division for providing four wide format inkjet printers. We thank Epson USA and MacDermid ColorSpan for each providing one of their wide format printers. We thank IJ Technologies, TAL, HP, and 3P Inkjet Textiles each for providing several 100-foot rolls of photo paper for printing our pictures.

The digital photographs were taken assisted by Jeancarlo Saenz, Marlon Castillo, and Eduardo Sacayon.

We thank the Board of Directors of the Universidad Francisco Marroquin, including the university, Rector, Fernando Monterroso, for providing facilities on this campus.

I thank several members of the IAPP for generously responding to our request for assistance in obtaining information on historical panorama photography for the course we are preparing. They will be credited by individual name in our report on this course syllabus on the FLAAR web sites. ■■■



*Digital panorama scan of the Museo Popol Vuh (at the right) and Museo Ixchel (at the left).*

*I believe Adolfo Lau designed the building at the right. 120mm Super-Angulon Schneider lens, Dicomed Field Pro with BetterLight digital panorama system, FLAAR Photo Archive.*



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## Exhibitions and Gallery Spotlight

# The Great Wide Open: Panoramic Photographs of the American West

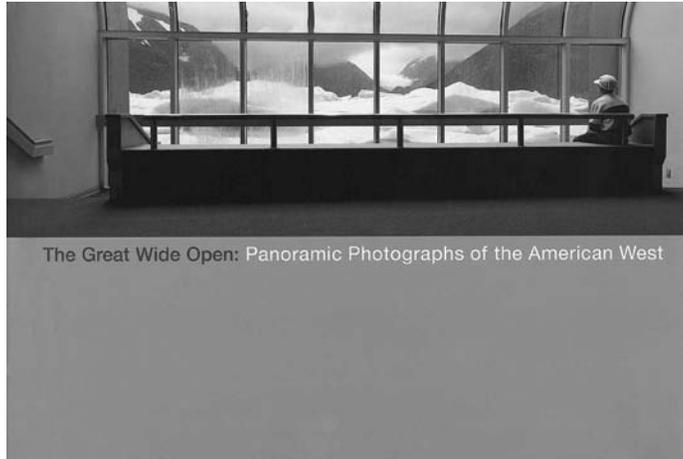
The Mary Lou and George Boone Gallery at the Huntington Library  
1151 Oxford Road, San Marino, CA 91108

Panoramic photographs of the American West were the focus of a summer exhibition that opened June 14 and continued through September 9, 2001. The exhibition was entitled "The Great Wide Open: Panoramic Photographs of the American West," and examined the dynamic relationship between the panoramic photograph and understandings of the American West from the 1850s to the present. The show featured approximately 60 historic and contemporary images of the region in a provocative installation designed to elicit new ideas and visual connections.

The panoramic images on display were drawn from the photographic holdings of the Huntington Library as well as a wide variety of other repositories and lenders. Well-known early photographers such as Carleton E. Watkins, William H. Jackson, and Eadweard Muybridge were represented, along with contemporary photographers including Karen Halverson, Mark Klett, Gus Foster, Robert Dawson, Stuart Klipper, Catherine Opie, Lois Conner, and Skeet McAuley. Albums created by amateur photography enthusiasts and the archives of commercial photographers—most notably Texas photographer E.O. Goldbeck—also yielded a wealth of historic images for the show.

The Great Wide Open focused on a single medium, the panoramic photo-

graph, as it documented, explained, and mythologized, the American West from the 1850s to the present. Photographs in this format showed a wider section of a view than can usually be captured in



a single frame. Their ratio of width to height was at least two to one, often substantially more. Artists have long recognized the unique expressive ties between this special format and the immensity of western space. Not only could a panorama show much more than a conventional photograph, it could do so in ways that mimicked the experience of looking at the landscape itself. Spilling beyond the bounds of conventional images, the panorama (meaning "all seeing") offers its own vista and encourages the eye to roam the spaces it describes. Seduced by these obvious advantages, photographers embraced the "long view" as an important ally in attempts to represent the West.

The Great Wide Open drew from a broad spectrum of both historic and contemporary images. In emphasizing the unique connections between the panoramic format and the West, the exhibit explored spatial metaphors as organizing principles. Five thematic sections—Range, Pathway, Grid, Site, and Tribe—were used to classify the ideas and materials of the exhibition, as well as to provoke new ideas and visual connections. The Great Wide Open suggested that the panorama's representation of time and space, as well as its narrative qualities, have made it ideally suited to the pictorial demands of the West's epic dimensions.

Though the exhibition closed before the publication of this issue of *Panorama*, IAPP members may still be able to see some of the individual works. Interested parties should contact Jennifer Watts, Curator of Photographs, at 626-405-2180 or [jwatts@huntington.org](mailto:jwatts@huntington.org) in order to schedule an appointment. Ms. Watts has indicated that the private viewing of these works will be conducted on an individual basis and is dependent on her work schedule. ■

*The catalog "The Great Wide Open?" may be purchased for \$50.00 (its available in hardcover only) from the Huntington Library Bookstore. To place an order, please contact Pamela Conway, Bookstore Manager, The Huntington Library, 1151 Oxford Road, San Marino, California 91108. Phone: 626-405-2130 or e-mail at [pconway@huntington.org](mailto:pconway@huntington.org).*

## Submission Guidelines for *Panorama* Magazine

*Panorama* Magazine is the official publication of the IAPP. The Board of Directors, which includes the *Panorama* Editor, seeks to continuously improve the quality and content of this publication, making it the best it can possibly be. This goal however, is impossible without your help.

*Panorama* relies on the contribution of articles and images from its readership. All articles are submitted on a voluntary basis; no one is financially compensated for their work. All articles will be read and considered, and will be published at the Editor's discretion.

It would be greatly appreciated if potential authors communicated with the Editor on articles and images they wish to contribute, preferably well in advance. This will help to eliminate redundancy and balance out the content of an issue. Last-minute submissions may not receive the same level of consideration as those submitted in advance and may be shelved for a future issue. Submission deadlines are generally the first of the month proceeding the publication month (for instance, November 1 for the December issue).

Authors may refer to the following magazine topics when considering what to submit. While it would make for a truly dynamic magazine, we do not expect every topic to be covered in every issue. Please note that certain topics are reserved for IAPP members in good standing only while others are open to any interested party. A "member in good standing" is a person whose dues have

been paid in full for the present calendar year.

**1. Cover Photograph (IAPP Members only).** This may be submitted on its own or in conjunction with an article.

**2. Members in the News (IAPP Members only).** If you or your work has been featured in a mass-media publication, please give a synopsis along with information on how to gain access to it.

**3. Upcoming Events (all sources).** This may include information such as IAPP conferences, exhibitions, book publications, contests, workshops and other venues of interest to the readership.

**4. Letters to the Editor (IAPP Members only).**

**5. Member Spotlight: Photography (IAPP Members only).** Tell us about yourself, your images and offer some technical guidance.

**6. Member Spotlight: Digital Imaging (IAPP Members only).**

Same as photography with perhaps more of an emphasis on the software and hardware you have been using.

**7. Exhibitions and Gallery Spotlight (all sources).**

Specific information on current or future exhibits featuring work by an individual photographer or group of photographers. Images may be contemporary or historic. This section may also include general information on galleries, libraries or museums that may feature panoramic photographs in their collections.

**8. Historic Panoramic Cameras (all sources).** Specific information on a camera, manufacturer and/or inventor. May also include technological informa-

tion on cameras' design, construction and operation.

**9. Historic Panoramic Photographs (all sources).** Information on an individual image or a body of work by 19th or early 20th century photographer/studio.

**10. Inventions, Gadgets and Gizmos (all sources).** If you would like to share your discoveries, a place has been reserved for you.

**11. Panoramic Painting and other Fine Arts (all sources).** Generally overlooked in the past, this section is reserved for information on historic and contemporary panoramic painters, studios and places where these works can be seen.

**12. Product Review (IAPP Members only).** Please describe a product and your experiences with it in this section.

**13. Book Review (IAPP members only).**

**14. Essay (all sources).** Aesthetics, observations, experiences and thoughtful opinions on the panoramic image.

**15. Marketplace (all sources).** Advertise (text only, no images) a product or service for sale or trade. Advertise you desire to purchase a product. Advertisements are free for IAPP members in good standing. Non-members pay \$15.00 for a 1 x 2 1/2" sized notice.

## GUIDELINES

### Articles (text):

Article submissions are accepted conventionally (handwritten or typed) and digitally either as e-mail, word processing file (Microsoft Word 98 is the preferred software program) or as an Adobe Acrobat file. E-mailed text can appear either in the body of the message or as

a Word (.doc) or Acrobat (.pdf) attachment. Hard copies of digital submissions may be submitted on floppy disc, CD or Zip. PC and Macintosh platforms are accepted.

### Illustrations (photographs, drawings and digital images):

Illustrations may be supplied as prints, transparencies or in digital file format.

Prints and drawings – images on paper of any size may be submitted (including Cirkuts), but images less than 14" inches in length are preferred.

Transparencies- transparencies no larger than 10" x 8" may be submitted for publication.

Illustration submissions are accepted digitally either as a TIFF, Adobe Photo Shop or as an Adobe Acrobat files. Images should have a resolution of 300 dpi. Size illustration images to 10 1/2" wide max. Size cover photographs to 21" wide max. There is no need for compression. Grayscale, RGB and CMYK files are accepted.

Hard copies of digital submissions may be submitted on CD or Zip. PC and Macintosh platforms are accepted. Illustrations may be sent as e-mail attachments as long as the file is 10 Mb or less.

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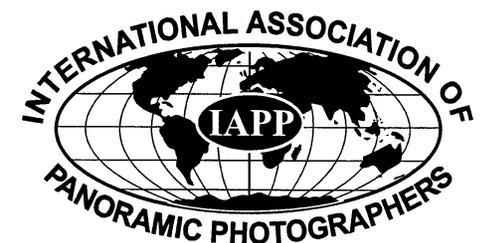
Original written articles and supporting materials, such as photographs or image files, shall be submitted to the Panorama editor for consideration. Articles may be edited and may or may not be published

at the discretion of the editor. Submissions will be returned only if a self-addressed stamped envelope has been provided. IAPP is not responsible for any loss or damage to the original materials that might occur during handling or while in transit. Articles and supporting materials are for one-time use unless other arrangements have been made between the creator(s) of the text and images and IAPP. The author / photographer retains full credit and copyright to their submissions in an edited or unedited form.

All submissions, articles, ads, etc. must be sent to:

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richard.schneider@nara.gov

It is desired to have a magazine that is comprehensive, a magazine that addresses the past and present, a magazine that considers the artistic, the technological, and the inventiveness of its readership. We welcome your input and involvement. ■



## Historic Panoramas

# The Art of Scientific Photography: The Panoramic Photographs of Charles D. Walcott

By Michael J. Horsley

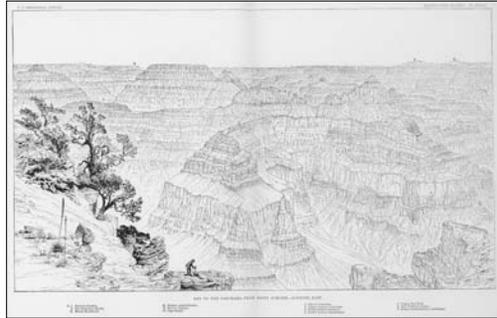
One of the more significant photograph collections in the Smithsonian Institution Archives are the panoramic photographs taken by Charles D. Walcott (1850 to 1927) who served as the Institution's fourth Secretary (1907 to 1927). Walcott took most of these images during expeditions to conduct geological research and collect fossils in the Canadian Rockies. Although Walcott had little formal schooling, he became an important leader in the scientific community, and among his many accomplishments he is perhaps best remembered for the discovery of the Burgess Shale near Field, British Columbia—a rich fossil record of an evolutionary big bang during the Cambrian period. His images are fine examples of panoramic landscape photography, serving as visual documentation of geological features and executed with a high degree of artistic skill.

As a young man in upstate New York Walcott developed an interest in paleontology which led him to build a large collection of trilobite fossils. In 1879 he joined the newly created United States Geological Survey (USGS), a federal scientific bureau of the Interior Department, tasked with the geologic exploration of the American west. For the next fifteen years Walcott continued to work for the USGS and eventually was promoted to Director of the Survey in 1894. In 1897 Walcott was appointed Assistant Secretary of the Smithsonian, and served for 18 months while at the same time he continued as Director of the USGS. In 1907 Walcott was appointed Secretary of the Smithsonian

where he served until his death in 1927.

Walcott's first experience as a professional geologist in the west was during Captain C. E. Dutton USGS survey party of the Grand Canyon Region in 1879. The work of the USGS was a continuation of the "Four Great Surveys of the West" led by Clarence King, Ferdinand V. Hayden, John Wesley Powell, and George Wheeler. During these surveys photographers and artists such as, William Henry Jackson, Thomas Moran, Timothy O'Sullivan, Carleton Watkins, and William Henry Holmes, created iconic images of the natural beauty of the western frontier. These artists often used panoramic perspectives in their work to illustrate both the sweeping vistas of the western landscapes, and the complex geological relationships found in the rock strata. The line between scientist and artist was sometimes blurred such as in the work of William Henry Holmes who was primarily a geologist, as well as an artist with the Hayden Survey and later with the USGS.

The illustration "Key to the Panorama from Point Sublime" [illustration 1] by Holmes as found in Dutton's report "Tertiary History of the Grand Canyon"



serves as a prototypical example of combining illustrative skills with scientific description. The "Key" is a panoramic drawing from a scenic overlook on the north rim of the Grand Canyon, and it contains scientific annotation to signify geological structures depicted in the image, but also includes an artistically rendered foreground complete with small figures from the survey party (possibly Holmes and Dutton) lounging on the rocks. Similar compositions can be found later in Walcott's panoramic photographs as he chose to include small details in the foreground of his images, such as members of his survey party or his packhorses foraging.

Advances in photographic technology such as the introduction of the gelatin dry plate negative in the early 1880's meant that photography in the field was much easier than the wet collodion process employed by photographers such as O'Sullivan and Jackson during the earlier surveys of the west. Relieved of the burden of traveling with a mobile darkroom out in the forbidding western landscape, scientists such as Walcott could easily document their work without having to develop the photographs in the field. During the 1880's photography quickly became a major tool for scientific illustration, and scientists inevitably became as adept with the camera as they were with the pencil to illustrate their work.

Although Walcott did not take any photographs until his fifth field season in 1885, he was most likely introduced to photography while conducting fieldwork with Captain C. E. Dutton and through his close association with fellow geologist Grove Karl Gilbert. Both Dutton and Gilbert were veteran scientists from the earlier surveys, and both of them utilized photography to document their scientific explorations. In typical laconic style Walcott describes taking his first photographs in his 1885 diary: "Went to Rock Canyon 12 miles south of Workman's Spring. Examined Section. Photographed junction of Permian and Carboniferous..." For the next 10 years Walcott became more proficient with the camera, and most of his images were straight views of geologic formations recorded on 6"x 8" glass plate negatives.

Walcott's first attempts to create panoramic images occurred during his 1891 trip to Colorado where he took 3 sequential images and then mounted the prints to create a wider view of the landscape. A survey of Walcott's meticulously kept negative logbook indicates that between 1891 to 1903 he took over 13 segmented panoramic views, but it was not until Walcott's 1905 field season that he photographed with a true panoramic camera. Although there is no record of the type of camera Walcott used at this time, it is likely that he had an Al-Vista 5. [illustration 2] Walcott's negatives in the Smithsonian Institution Archives collection measure 5" x 16" which is one of the Al-Vista negative formats.

Walcott took his first panorama while conducting fieldwork in Montana's Rocky Mountains. The negative log entry reads "No. 709 Ridge west of Camp Creek, illustrating upper portion of the sec-

tion of the Algonquian rocks beneath the Cambrian. The point in the foreground is on the Continental divide. For location of Camp Creek, see Ovando Quadrangle, Montana. C.D.W., July, 1905". All the 33 photographs that he took during the 1905 field season were panoramic photographs, and it is possible that he wanted to concentrate on learning his new photo outfit. He writes in his diary entry for July 7, 1905 "Washed up, wrote out notes, put up photo films etc." It is curious to know what he meant by "put up photo films etc.", but he may have been testing his equipment and loading film.

There are two photo albums for the 1905 field season in the Smithsonian Archives; the first album contains a select number of views that have geological information inscribed by Walcott on the photo print. The second album is probably a presentation album, because the print quality is much better and they are mounted on linen backing. The photograph depicted here is from the second album and is negative number 718a. [Illustration 3] The description in Walcott's negative log reads: "718



illustration 2

illustration 3

Northwest end of Scapegoat Mountain from the Continental Divide on the North. Ovando Quadrangle, Montana (6 negatives) (5 inch film) C.D.W. 1905". The term "6 negatives" indicates that Walcott took six variations of a scene from the same locality, and "5 inch film" refers to the images taken with his panorama camera instead of his 6 x 8" sheet film camera.

Walcott did not take any photographs during the next two field seasons but he was certainly a busy person during this time. He was burdened by administrative duties as director of the USGS, and in 1907 he was elected Secretary of the Smithsonian. By his next expedition to the Canadian Rockies in 1908 he had acquired a Cirkuit #8 camera that he used along side his older AL-Vista. From 1908 to 1925 Walcott would alternate between the two cameras to create over 650 panoramic images.

Although it may be a stretch to consider Walcott as an artist, it can be argued that his superb technical skill elevated his work beyond dry scientific documents. Many of his best images are comparable

in aesthetic quality to the work done by other panoramic photographers. His work appeared in the National Geographic Magazine, brochures for the Canadian Pacific Railway, newspapers, and to illustrate popular lectures at the Smithsonian. He was surrounded by some of the best scientific illustrators of his day, and as a preeminent figure in Washington D.C., he was no stranger to the world of culture. Perhaps the greatest artistic influence on his later panoramas was his third wife Mary Vaux Walcott whom he married in 1911. Mary Vaux Walcott, who later became a noted illustrator of North American wildflowers, accompanied her husband on his expeditions to the North American Rockies where she would create paintings of rare and fragile alpine flowers while they were in bloom. She is often depicted in photographs with a camera, and many of the photographs of Charles can be attributed to her.

This is part one of a two part series concerning the panoramic photography of Charles D. Walcott. Part two will concentrate more closely on the technical and aesthetic aspects of Wal-

cott's photography, as well as some of the conservation issues encountered by the Smithsonian Archives where most of his photographs are stored. The Charles D. Walcott Collection

(Record Unit 7004) is located in the Smithsonian Institution Archives. The finding aid for the Walcott collection may be found on the World Wide Web at: <http://www.si.edu/archives/archives/faru7004.htm>. Due to the fragile nature of the original panoramic photo prints, use of this collection requires prior arrangement with the Archives staff. The Smithsonian Institution Archives is located in the Arts and Industries Building, Room 2135, 900 Jefferson Drive, S.W., Washington, D.C. 20560 202-357-1421 OSIAREF@OSIA.SI.EDU.

Michael Horsley is a fine art photographer and serves on the Preservation Team for the Smithsonian Institution Archives. ■

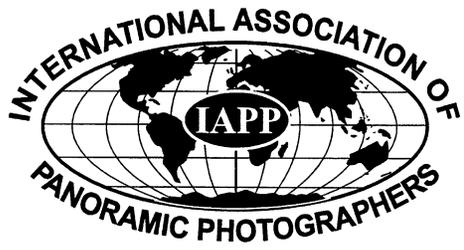
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## Boston By Night

This issue of Panorama's cover entitled Boston By Night, was photographed by David Marlin from across Boston Harbor with a Fuji G617 on Fuji NHGII 800. Posters were made using this panorama...and if you attend the Boston Conference (see page Five) you will receive a poster for FREE!

