

The Royal Photographic Society

HOLOGRAPHY GROUP

Newsletter

March 2000

Photo. Andy Pepper

Margaret Benyon, pictured outside Buckingham Palace after being appointed a Member of the Order of the British Empire, for Services to Art.

Editorial

A sincere (if belated) New Year to you all. Now we have reached Year MM, I wonder how the Beeb is going to hide the date of its ageing reissues under archaic (and, to many, arcane) Roman symbols. Not so easy, now we no longer have a plethora of Cs and Xs.

Things are looking promising. Following the generous sponsorship of the Shearwater Foundation, plans are going ahead for our symposium on Art in Holography in the spring of 2001. We hope to hold it at the Royal College of Art, with an exhibition of fine-art holograms to run at the same time.

Two meetings are planned for the near future. The first is a joint meeting with the Imaging Science Group, on the subject of three-dimensional imaging. The venue will be the Camera Club, 16 Bowman Street, Kennington, London, at 7 p.m. on Tuesday 14 March. The speakers will be David Burder, recently honoured by the RPS for his work in 3-D photography, who will be discussing ways of producing 3-D images without holography, and Neil Davies of De Montfort University, who will be concentrating on lens-array stereograms. The second meeting will be addressed by Mike Andrews, late of the former Harrow College of Technology, who will report on his investigations into the possibilities of diode lasers in home holography, and on the latest version of his portable holography teaching set-up. The place and date have yet to be fixed.

The other piece of good news is that the pioneer holographic artist Dr Margaret Benyon, who was the first person to gain FRPS for art holography, has been awarded the MBE for services to the arts. In honour of this award the Group Committee has invited Margaret to mount a one-woman exhibition of her work in the slot reserved for the Holography Group's exhibition this summer. This is to be held in the old Members' Gallery because of lighting problems in the new one (the gantries Bob and Molly Gibson laboriously constructed don't fit it!).

See you on 14 March!

Graham Saxby

Department of Partly-Baked Ideas

(This is based on a piece of mine which appeared in the Spring 1985 issue of *holosphere*. I have updated it and added some introductory material.)

When I was employed at Wolverhampton University we ran a course in modern optics, large chunks of which bore a not altogether coincidental resemblance to the Open University course *Images and Information*. One of the most interesting parts (or so the students said) was an exercise where you shone a laser beam through a tiny transparency of a simple object such as a figure 8 or a letter W and observed the diffraction pattern. The exercise consisted of looking at the diffraction patterns and trying to deduce the nature of the objects that produced them.

If you focus such a pattern using a lens with the object in its front focal plane, the electromagnetic field in the rear focal plane is the Fourier transform of the object field. If you put a photographic emulsion in this plane you will record the diffraction pattern. The snag is that you have recorded only the *intensity* field, which is the square of the amplitude field: the phase information is lost. So you can't deduce everything about the object by examining its diffraction pattern. In particular, you can't tell where in the object plane the details are situated, although you can tell what the details are. (We made things easier by keeping the object figures symmetrical.)

But you *can* rescue the phase information. If you add a reference beam you will get a *Fourier-transform hologram*. From this you can reconstruct the object precisely, by re-illuminating the developed hologram with the reference beam. This is the type of hologram used in data storage set-ups, where you can store umpteen hundred images in a single crystal of lithium niobate or some such material, and recover them individually by simply moving the replay beam around.

A Fourier transform is something that can be calculated, though doing such a calculation, even in one dimension only, may prove tough going for the average student. However, such a problem is bacon and eggs to a computer. Indeed, as early as 1965 a team in Stony Brook University was actually drawing computer-generated FT holograms which would produce poorish images of triangles and squares. The holograms consisted of patterns of dots and lines or

small rectangles, photographed down to an appropriate size. As computers became more powerful the possible images became more complicated.

But FT holograms are two-dimensional and very, very boring. The pattern produced close to an object, and without a lens, is called a Fresnel diffraction pattern, and it, too, contains all the information about the object, coded differently. By enlarging a Fresnel hologram (i.e. an ordinary transmission hologram) until the fringes are large enough to be visible, we can see their shape and structure. Indeed, by looking at enough similarly enlarged holograms we might begin to learn how to draw our own holograms, of objects that never existed. These could then be photographed down and illuminated appropriately to form the image. Who knows, there might eventually be competitions for computer-drawn holograms, in the manner of those typewriter pictures some people in the Sixties were so good at. Modern computers are now powerful enough to be able to crunch Fresnel transforms with ease.

Flushed with excitement at the idea, the DPBI is working on the principle of the handcrafting of reflection holograms using stacks of cellophane. To date, though, it has not solved the problem of shrinking the stack by the required two orders of magnitude in all three directions.

Graham Saxby

A QUICK TRIP TO THE RUSTBELT

An Exhibition at the Butler Institute of American Art

I was checking my email one day at the end of November and found a message there from the improbably named Lon Zona (I thought he sounded more like a place than a person) who made some courteous remarks about my support of the art of holography and introduced himself as director of the Butler Institute of American Art in Youngstown, Ohio. He said that the Institute had “a true commitment to art based in technology” and that in mid January they would be opening a gallery which would be exclusively used for the display of holography and other modes of technological art. Would it be possible for them to host an exhibition drawn from my collection? He told me that the Butler was “known for its priceless collection of paintings covering three centuries” but was quickly becoming known for its exhibition program which currently featured the work of Nam June Paik (internationally regarded high-tech artist who makes installations based on recycled TV sets). He directed me to their website at **www.butlerart.com**.

A website is really the best way of introducing oneself. You do not have to call in person, you do not have to post anything and you can put in as much information as anyone could want to know. The Butler’s site told me enough to realise that I was dealing with a reputable establishment and that it would certainly be interesting to do something with them. I also realised that I knew some people based in Youngstown, the estimable Chromagem Inc., originators of embossed holograms, two of whose directors I had once met at Lake Forest. I emailed back to say that in principle I was interested, stipulated a few conditions and asked when they had in mind. ‘Next month’ came back the reply. Fortunately I had nothing major planned for January so I offered to bring some work over in person as it would turn out cheaper than airfreight and I could oversee the installation.

The Butler sent me plane tickets, arranged a shipping broker to see me through customs at New York and sent someone to meet me at the airport in Pittsburgh, where I arrived on January 12th in a tiny plane with eighteen of my favourite holograms packed in one large trunk, holding my breath and praying for a smooth landing.

The following day I was driven to the Institute (my enquiry as to whether it was walking distance was met with laughter - nothing is and nobody walks) and introduced to Lou, who is a very charming fellow, and to the museum staff who would help me unpack and hang the show. As holographic installations go, this one was a piece of cake. The work was to be hung in a wide corridor with a central lighting track which conveniently provided a 45 degree reference angle at eye level so, apart from having to tilt one hologram up and one down to afford maximum brilliance, one might just have well been hanging any other kind of picture in a frame. My assistants were friendly and professional and one, who had been at the museum for twenty years, remembered a hologram show coming from the Museum of Holography in New York in the early 80s and occasioning queues down the street. I thought that would probably not happen in the 00s.

Because of having to transport them myself, all the holograms I had chosen were on the small side, from 4"x5" to 30cm x40cm - nothing larger, but they included works from 1978 - 1996 and incorporated a bit of everything from portraiture to abstraction by way of stereograms and morphing, so I felt it was a fairly good cross-section of work for a small exhibition and at the end of the day felt pleased with the way it looked, encouraged by the appreciative remarks of the museum staff who all seemed to pass by and have a look at some time during the installation. (See www.ho1onet.khm.de/jross for full details)

In the evening I was taken out to dinner with some of my fellow exhibitors and found myself in pretty exalted company. Nam June Paik was not around but, showing in the original museum building were Paul Jenkins, a celebrated abstract expressionist of the second wave (he is in his 70s), and the doyen of caricaturists, Al Hirschfeld, a 96 year old legend whose drawings of theatre life have been a part of American culture since the 30s.

The following day I got to look around the museum and to visit my friends at Chromagem who were in the process of moving studio to larger premises but took the time to show me some of their recent work which ranges from postage stamps for Grenada to large format rainbow holograms. Tom Cvetokovich, one of the holographers, also had some of his personal work on show at the Butler and had made a full colour stereogram portrait of the lady who had funded the Art & Technology gallery.

The opening that evening was one of the largest events the Institute had ever

hosted with over 500 guests showing up for a reception. I was provided with a handful of vouchers for the bar and spent a most enjoyable evening drifting about the museum and giving guided tours of the holograms to a very responsive audience. Twenty five years after my first visit to the States I am charmed to find that young ladies still say “Gee, I really love your accent.” Lou Zona publicly thanked me for my participation and announced that I had agreed to come back with a larger show one day. His enthusiasm for holography seems very real and I came away with the feeling that the Butler Institute, “The Jewel in the Rustbelt” (Ohio was once the centre of the steel industry) may become a focal point for holographic artists from around the world. That an Art & Technology gallery of such high calibre has opened in an area which the locals agree is financially depressed is quite remarkable in itself, so the fact that Lou responded favourably to my suggestion of an Artist in residence program made me feel it was not entirely unlikely it would happen one day.

Talking of which, I passed through New York on the way home and visited the Center for Holographic Art, run by Ana Maria Nicolson and Dan Schweitzer, where British artist Susan Cowles has just been awarded a residency (in addition to her Shearwater prize), and found that holographic art is alive and kicking. They have a good pulse-mastering set up and transfer table, a small exhibition space and apparently a steady stream of students passing through in addition to the established artists visiting. It made me regret the current lack of a British teaching facility for holography but I guess these things go in cycles. Twenty years ago it seemed you had to go to New York to learn holography, then the focus shifted to London, and now perhaps it has shifted back again. Anyone planning on starting a school of holography in the UK?

Jonathan Ross

January 2000

London

[I devoutly wish somebody would. I think mine, at Wolverhampton University, was the last. They let me carry on for three years after my official retirement date (unpaid, of course. But then ‘They needed the space.’) So that was it. Any volunteers? - Ed]

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