

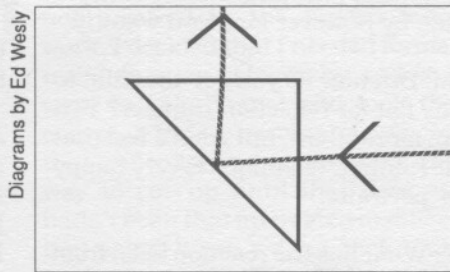
LAKE FOREST— HOLOGRAPHY WORKSHOP II

Ed Wesly

The Holography Workshop II, held at Lake Forest College this summer, was a minisymposium of topics for the advanced student. Professional holographers spoke on their fields of expertise, and a couple of them even made holograms right on stage. First up to bat was Dr. Tung Jeong, director of the workshop, who gave an update on the use of fiber optics in holography. Dr. Jeong is quite bullish on the topic and believes that it is only a matter of time before we will be using fibers for beam-splitting, spatial-filtering, compensation in interferometry and the replay of many holograms by one large laser using a tree-like arrangement of fibers.

A student from a previous year's workshop, Bill Durrell, demonstrated his thesis project—a combination beam splitter/fiber-optic launcher. The launcher is similar to the usual commercially available ones, but the beam-splitting arrangement is quite novel. When two fiber cores without claddings are placed in close proximity to each other, light will jump from one to the other thanks to the evanescent wave effect. The distance between the fiber cores determines the beam-splitting ratio. Although this theory is beautiful and simple, mechanically fabricating such a device for variable beam-splitting is quite a chore because of the distances and tolerances involved, and so they are not too reliable or long-lived.

Durrell's device is bigger and more rugged, using another clever concept. His beam splitter for the raw laser beam is a right isosceles prism. When light is incident internally on the hypotenuse at the criti-



Diagrams by Ed Wesly

Fig. 1: Light incident at the critical angle is totally internally reflected.

cal angle or greater (rounded to the nearest whole angle for this glass wavelength combination it is 41°), all of it is reflected, going into one of the fibers (see Fig. 1). At the other extreme, if light from a polarized laser is incident on the hypotenuse at Brewster's angle (in this case about 33° , since it is going from glass to air), all of it exits, putting all of the light into the other fiber (see Fig. 2). By rotating the prism through the 8° between these two angles, any ratio is possible. Since the prism is a wedge shape, rotating it will move the exiting beams and destroy their alignment traveling into the fibers. A tricky arrangement of prisms at the beam-splitter exits will ensure that the beams stay in the fibers by having the sum of all the reflections inside the prisms add up to 0° —a good homework problem! Durrell Laboratories (41310 North West-lake Avenue, Antioch, Illinois 60002) will market this patented piece of equipment.

Hans Bjelkhagen and Nils Abramson gave presentations of their "greatest hits" in experimentation. Even though this writer has read their papers and Abramson's book, *The Making and Evaluation of Holograms* (and has participated in some

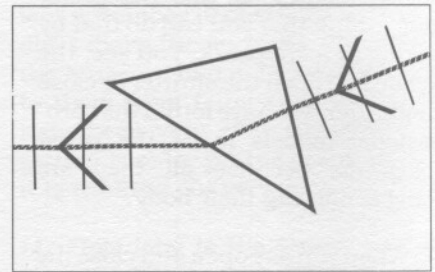


Fig. 2: Light incident at Brewster's angle passes to the other fiber.

of the experiments), it is always interesting to hear the stories firsthand. Topics discussed were sandwich holograms, moiré, contouring, light in fibers, light in flight and relativity, bubble-chamber holography and pulsed laser holography, including portraiture.

Two topics of great interest to artists are color control in reflection holograms and large-format displays, which were covered by Melissa Crenshaw and John Perry, respectively. Ms. Crenshaw's talk was an overview of Jeff Blythe's idea of preswelling the emulsion with triethanolamine before exposure, as perfected by John Kaufman and Lon Moore. She showed that this tedious process, which sometimes takes as long as ten hours ("It's like giving birth," she says) is capable of high technical quality results. But the question must be raised, is the end result worth all that effort? Of course, having a battery of different color lasers to do the same thing is not so easy to manage either.

John Perry showed what Yankee ingenuity can do with just a laser, concrete and hot glue. Large display holograms are becoming a big market, and his lab is busy all the time.

No wonder, with the excellent product he keeps producing.

Walter Clarke spoke about the business aspect of embossed holography and the actual holographic "coining" machine, while Steve Smith addressed the nuts and bolts of the equipment necessary to shoot photoresist. But most impressive of all was Tom Cvetkovich's demonstration—he made a single-beam transmission grating in photoresist on a table (and not one of the isolation type either) right up on stage! A fourteen-minute exposure gave him time to field questions before developing the plate. Although not perfect, the finished hologram illustrated the principle.

Rich Rallison also made holograms

of the dichromated gelatin variety on stage, then turned the setup over to the audience. Most everyone who tried to make a hologram walked away with one. This is the essence of the spirit of sharing technology in which this type of workshop is held.

This spirit was maintained in the plenary sessions held at night, during which artists and entrepreneurs spoke. Paula Dawson, from Australia, showed great slides of her impressive large-scale pieces. This may be as close to her work as we in the States will get, since she requires more laser light to show her giant holograms than the Bureau of Radiological Health allows. Larry Lieberman gave his important paper on fire and insurance, which was published in the summer issue of

Holosphere (vol. 15, no. 2). The "Images in Time and Space" show came to us from Montreal thanks to a video production by Mark Diamond.

Other attractions were visits to two local labs—Lasersmith Inc. for embossing and Holicon for portraiture. All the participants got to take home a volume of papers by the lecturers. And, of course, there are always the postplenary sessions where anything and everything is discussed until the wee hours. With all these hours of shoptalk, the holographers certainly got their money's worth and virtually unanimously vowed to come back for next year's International Symposium on Display Holography.

SCHOOL OF HOLOGRAPHY IN L.A.

Andrew Pepper

For a metropolis the size of Los Angeles it is surprising that a school of holography has been so long coming, particularly considering L.A.'s connection with film, TV and special effects. Until last year anyone wishing to learn holography without enrolling in a formal education program had to make the trip to San Francisco to the School of Holography, run by Sharon McCormack. Or perhaps try Chicago or New York. The L.A. School of Holography, like all the other facilities set up for this purpose, is not a formal educational establishment but offers private instruction to those who have heard about holograms and would like to make them.

The school has been devised by Jerry Fox and David Schmidt, names familiar to those associated with holography, to offer hands-on experience in the L.A. area. Fox studied holography in the mid 1970's and has been involved with the production and marketing of holography through the firm he set

up called White Light Works. Schmidt was cofounder of the original San Francisco School of Holography in 1972 and was a co-owner of the Multiplex company, which introduced many people to holography through the first commercially produced synthetic holograms.

The school offers a three-day intensive session which begins on Friday evenings (7 to 9 P.M.) with an introduction to holography covering the history of the medium, types of hologram and application of the process, with specific overviews of industrial and commercial applications. This is followed by details of art preparation for holograms, both 2D and 3D, and ends with an overview of the materials and equipment to be used. Saturday (10 A.M. to 5 P.M.) concentrates on making a laser-transmission master hologram and looks at interferometry. Sunday (10 A.M. to 5 P.M.) shows how to make a white-light-viewable reflection copy from the master hologram and introduces some advanced tech-

niques, which include integral holography—storyboards, filming and editing—as well as Benton, achromatic and colour holograms.

Already, as reported in the *L.A. Daily News*, some of the first students have been interested enough to become assistant instructors, a situation which will be familiar to some of the other schools in existence. The school offers two pricing levels, one for students and a slightly higher price for professionals, who receive more materials during the session. The price includes all materials, hologram samples and textbook. To date about half the people on the course have been involved in advertising or graphics, with students as well as artists, engineers and accountants getting practical experience.

For more information on prices and availability of classes contact the Los Angeles School of Holography, P.O. Box 851, Woodland Hills, California 91365.