The Association of Cinema and Video Laboratories

A Report on the Fall 1978 Meeting in New York

By LYNN BIGBEE

The ACVL held its annual meeting at the Americana Hotel in New York on 28 October 1978 with William H. Smith, President of Allied Film Laboratories, Inc., and ACVL President, presiding over the Laboratory membership meeting.

The meeting began with the treasurer's report given by Burton Stone of DeLuxe General, Inc., who was recently elected to fill the unexpired term of Robert T. Kreiman, who resigned. Mr. Smith expressed his appreciation to Mr. Stone for his willingness to step in and take over the duties of treasurer.

Mr. Smith announced, with sadness, the recent death of Robert B. Pell, President, Wometco Film Laboratories. Ross C. Gwinner, Capital Film Laboratories, was elected by the Board to fill Mr. Pell's position as representative of the Southern Region of ACVL.

Mr. Smith welcomed Image Transform to ACVL membership.

On 27 October 1978, the incumbent officers of the ACVL were re-elected for another year. They are: William H. Smith, ACVL President; Irwin W. Young, Chairman of the Board, Du Art Film Laboratories, Inc., as Vice President; Robert J. Ringer, General Manager, Image Transform, as Second Vice President; Burton Stone, President, DeLuxe General, Inc., as Treasurer; and John Newell, President, Western Cine Services, as Secretary. Dudley Spruill was re-elected to a full term as Executive Secretary of the Association. Mr. Smith expressed his appreciation on behalf of the Association to Mr. Spruill for his contributions to ACVL in his previous term of office.

The Board certified the election of the new board of directors although two elections were still undecided (directors for the Canadian and the Western Regions.) J. Lampert Levy, President, Newsfilm Laboratory, Inc., was installed as a Class A Director; John Corso, Vice President and General Manager, W. A. Palmer Films, Inc., as a Class B Director; and Burton Stone as a Class C Director.

Mr. Smith announced the appointment of Blaine Baker, President, MPL, Inc., as Chairman of the Committee to revise the ACVL Handbook. Mr. Baker will be assisted by Lynn Bigbee, also of MPL, Inc., and by other members who have expressed a willingness to work on this project. "Our Handbook," Mr. Smith stated, "is an important Association project. Over 3000 copies are sold each year, and the book has become a recognized manual in the film industry."

In closing, the President expressed his appreciation to Lampert Levy, Program Chairman, for the program he had arranged; to Irwin Young for making the arrangements at the Americana for the meeting; and to Lynn Bigbee for preparing ACVL Meeting Papers for inclusion in the SMPTE Journal for 1976, 1977 and 1978.

At the end of the program, Mr. Levy pointed out that representatives from 14 different laboratories had participated in this program, "a record number in ACVL's 25 years."

Lab Equipment and Techniques Forum

Following the membership meeting, Mr. Levy presided over the meeting of members, associate members and guests. Present for the 25th Anniversary meeting were 225 members and visitors, including representatives from 16 foreign countries.

Silver Future Market as a Forward Pricing Vehicle

Vincent Conway, Senior Metal Specialist, Merrill Lynch Pierce Fenner and Smith, Inc.

Mr. Conway began his presentation with an explanation of the silver future market, which was originally set up for members of the trade, rather than for the private investors who are interested in this market today. "I like to describe the silver market as a 'simple complexity,'" Mr. Conway stated. "It is simple in principle, but its application is very complex."

The process of the market is to allow members of the trade to form or establish a price for their product as far as two years in advance. For example, motion-picture laboratories, as extractors of silver, could use today's price of over $6 to establish the price of the silver they will sell for the next two years if they want to. But, only if they want to. Buying or selling futures simply means that you agree to buy or sell silver at a set price at a certain date in the future, usually six months or less for most buyers.

The silver produced by laboratories correlates with the silver future market since most labs extract the silver from their processing machines and become sellers in the market. To make participation in the futures market worthwhile, an organization should be able to supply at least 5000 ounces of silver in one or two months, according to Mr. Conway.

How does a lab use the futures market? Each lab determines how much silver they expect to produce over a given period. Then they decide if they like the current prices. Do they want to sell the silver they will produce during the next six months at today's price of $6.25? If the answer is yes, they agree to sell all the silver they produce during the six months period at $6.25 an ounce, regardless of the price at the time of sale. If the price of silver declines, the lab will still get $6.25 (or the agreed upon rate). If the price goes up, the lab will lose since they have agreed on a selling price "for the future." Another advantage of using the futures market is that interest is earned on the worth of the silver involved.

Buying or selling forward is a business decision. Do you want to fix a price now or wait and sell at whatever price is current when you are ready to have your silver refined or sold?

Design Criteria for Process ECP-II

Richard W. Bauer, Supervisor, Eastman Color Products Section, Photographic Technology Division, Eastman Kodak Company

Films and processes should be designed together to keep costs down and quality up. Factors affecting quality are time, temperature, and chemical constituents, and these make impact on either the sensitometric or physical quality of the film-process combination.

The test results reported by Mr. Bauer were based on a throughput of 90,000 ft of 35mm film per day, at machine speeds of 200 ft/min in ECP-II and 115 ft/min on ECP. The tests are computed using a number of industry practices which may or may not apply to any one laboratory. Eastman felt that the test figures were essential so that everyone involved would have common terms for understanding the comparisons involved.

Facts effecting economy can be divided into *indirect costs*, such as the labor required to maintain and control a process, and *direct costs*, such as chemicals. Eastman took both direct and indirect costs into consideration when they designed the ECP-II Process.

Mr. Bauer stated that Eastman feels that the most important indirect cost saving with the ECP-II process came with the improvement of process stability over ECP, resulting in a product that allows the user to get more consistent processing results.

Direct costs can be more easily defined and recognized than indirect costs. The following comparisons between ECP and ECP-II are based on *direct* costs.

Reduction in chemical costs accounts for 95% of the savings, with energy accounting for 5%, and water and effluents considered minor savings. Cost will vary, of course, from laboratory to laboratory.

A contribution submitted on 10 November 1978 by Lynn Bigbee, Assistant to the President and Publications Editor, Motion Picture Laboratories, Inc., 781 S. Main St., Box 1758, Memphis, TN 38101.

The manual supplied by Eastman for ECP-II makes definite recommendations for savings on water consumption. The reduction is primarily obtained by using crossover squeegees and countercurrent washes.

Energy requirements became a concern with the coming of ECP-II and ECN-II, since it was commonly believed that these processes would require more energy to operate. Kodak figures show that energy costs actually account for only 5% of the total ECP-II process cost. This cost can be broken down into three parts: start-up, operation, and standby.

In the ECP-II process, 93% of the energy is used in operating, 3% is standby, and 4% is start-up. With ECP, operating takes 99.15% of the total energy cost, with standby and start-up using the remainder.

According to Eastman calculations, ECP-II is operating 47% of the time; at standby, 47%; with the remaining 6% for start-up. ECP is operating 81.5%; standby, 12.5%; and start-up, 6%. From these figures, one can see that ECP-II requires less operating time.

Although more energy is required for start-up in the ECP-II process, when operating times are compared, the ECP-II process comes out well ahead overall. (More energy is required for start-up in ECP-II process because the developer must be heated to 98° F as compared to 80° F in ECP. The energy savings in ECP-II result from the fact that it takes longer to process the same amount of footage in ECP than it does in ECP-II. Wash water and dryers are on for a longer period of time in ECP. Overall energy requirements are approximately 50% cheaper for ECP-II.

Mr. Bauer broke down processing costs this way: water, three tenths of one percent of processing costs; effluent, five hundredths of one percent; energy, 5%, with chemicals accounting for the remaining 95%.

The ECP-II process, according to Eastman calculations, is 33% cheaper than ECP, with 32% of the savings coming from the reduction in chemical costs. Other factors favoring the ECP-II process are the increased amount of footage that one person can process and an overall reduction in maintenance required to keep the machines in good working order. ECP-II uses less water and therefore produces less effluent than ECP.

The figures given in the paper are based on Kodak's best estimates for chemical and labor costs. Each laboratory must do its own analysis to determine which approach they want to follow.

ECP-II Lab Users Reports, by four different speakers, all introduced by John Keck, Vice President and General Manager, Calvin Communications.

I. *Jim Solomon*,
Laboratory Superintendent,
Motion Picture Laboratories, Inc.

MPL was one of the first laboratories to become involved with ECP-II and they had problems. But, looking back, Solomon feels that many of the problems came from machine design rather than process design. (MPL bought a machine designed for ECP-II.) The increased speed of the machine (from 100 ft/min for ECP to 230 ft/min for ECP-II) caused many of MPL's problems.

Energy and Chemical Costs: (1) ECP uses a bichromate bleach and Solomon stated that he knew of no practical way to recycle this solution for the ECP process. Since MPL still runs both ECP and black-and-white reversal, they take the used bichromate bleach from the black-and-white reversal process, recover the silver, and convert the solution to ECP bleach; (2) MPL rejuvenates ECP-II ferri bleach and recovers approximately 90% by volume by using the persulfate method; (3) ECP-II developer can be reconstituted and MPL recovers approximately 80% by volume; (4) ECP-II has a stop bath, using sulfuric acid. ECP has a clearing bath that ECP-II does not require. The cost savings here comes from the fact that the ECP-II stop bath is cheaper than the clearing bath used in ECP.

Most of MPL's customers do not realize that the lab is still using both processes although some customers will comment on a slight change from a trial print made on Eastman color positive #7381 (ECP) and release prints made on Eastman color positive #7383 (ECP-II).

Early in their use of the ECP-II process, MPL personnel noted a magenta stain in the toe of #7383. They checked the possibility of developer carryover into the stop bath but ruled this out. With emulsion batches now in use, there is no magenta stain in the toe.

According to Solomon, the ECP-II is a stable process, as stable as the black-and-white processes.

Track application was the biggest problem in getting the ECP-II process going. This was primarily because of the increase of the machine speed. They tried various ways to solve the problem and finally solved it by changing the viscosity of the track solution to a much thicker one than used in ECP.

MPL has experienced no drying problems. They have always waxed #7381, but #7383 handles so well in the dry box that waxing is not necessary. "Any time we can eliminate a step like waxing," Solomon stated, "we feel like this is an accomplishment."

In general, MPL's experience with the ECP-II process is very good and Solomon guesses "it is here to stay until Kodak decides to change it."

II. *Edward T. Wicinski*, Administrator,
Calvin Communications, Inc.

Calvin converted two ECP machines to the ECP-II process. The first was done in November 1977 and the second in February 1978. They made no speed change since they were running ECP at 210 ft/min and saw no advantage in increasing it further. The time involved in the process, end to end, was 40 minutes for ECP, and they have dropped the time to about 21 minutes with ECP-II. Adjustments were made in color and film speed differences, but they were relatively minor.

Some of the improvements noted are shorter process time, ECP-II is more stable, and film losses are down. Calvin has had the best control with ECP-II that they have ever had with color positive processing. This represents a significant savings.

It has been necessary to keep an eye on the stop bath. At one time they had problems with developer carryover into the stop bath which caused a magenta stain. Early in the process, they increased the replenishment rate and this helped, but they still have to watch out for carryover.

Calvin has saved 25% on chemicals, 43% on water, with a total overall savings of 43% with ECP-II, compared to ECP. Mr. Wicinski noted that Calvin's savings in chemicals were 25% compared to the Kodak tests which were 45%. Wicinski believes the difference can be traced to the fact that Calvin had previously established chemical recovery systems with ECP which many labs had not yet done and which were not taken into account in the Kodak tests.

Based on their own figures, Calvin expects to amortize the change to ECP-II over a period of about two years, based on water and chemical savings alone.

III. *Frank Reinking*,
Vice President and General Manager,
PSI Film Laboratories

PSI began to process ECN-II and ECP-II in December of 1977. They built their own ECP-II processor, a 16mm-35mm mode, from scratch, inhouse. Since space was a problem, they decided to build a machine that would run at 70 ft/min. The machine began operation in March 1976 and has never presented any real problems. They did have a carryover problem in the stop bath, but this was corrected some time ago.

Mr. Reinking screened a 16mm comparison roll. The original was shot on #7247, and prints were made from the same negative on to #7381 and #7383 color positive and were then intercut into one roll for comparison.

From tests run at PSI, they have determined that they have a slightly higher D Max and a slightly lower D min on ECP-II (#7383). This may not be generally indicative of the product, but it has been the experience at PSI.

IV. *Douglas Kluge*, General Manager,
Kluge Motion Picture Laboratories, Inc.

Kluge Laboratories, according to Mr. Kluge, "is a small, custom lab in a small area, in Milwaukee, so we decided on a 75 ft/min, 16mm only, machine." In setting

up the process, they used Eastman's specifications completely and began to process both ECN-II and ECP-II in December 1977.

Although it took about a month to pin down the replenishment rates, they have adjusted their formulas slightly, and the process has been extremely stable. It has adjustable recirculation, a number of heating positions and other improvements which have resulted in savings in energy costs. They are drying at around 85° with about 45% relative humidity. They have built an extra large dry box in case of future energy problems.

Pitch checks show the film to be very steady. All prints are lubricated, and they get an almost zero return rate if the prints are waxed before they are shipped.

By careful use of squeegees, rotary buffers, and some heating in the loop tree, Kluge says they are now getting excellent application results. They use Natrasol for track application and have held the soundtrack developer as long as a month with no loss of quality, even when it is a single mix.

Backing removal turned out to be one of the biggest problems since they run a lot of super 8 Estar. Be exercising great care, they now successfully intermix acetate and estar. Everything must be fine-tuned to keep the operator from having to make a lot of changes. Maintaining the mixed process requires plenty of scrubbing and careful adjustment of back removal temperature, time and composition.

Kluge Laboratories have found that they can mix #7381 (ECP) prints with #7383 (ECP-II) prints in the same order, and they do this since they still have ECP-I available in the laboratory.

Mr. Kluge summarized by saying: "We are very pleased with ECP-II, and we feel that it is the way to go."

Status Report After Eight Months Commercial Use of Persulfate Bleach

Bengt O. Orhall, Managing Director, AB Film-Teknik, Solona, Sweden

Prior to 1977, the people at AB Film-Teknik had been investigating new methods of bleach chemistry to conform to codes demanded by their local sewer plant. They had tried various mixtures, but as soon as Eastman Kodak announced the persulfate bleach at the 1977 SMPTE conference, they convinced Kodak of their great need for change and were allowed to be the first commercial laboratory to test the new bleach in the ECP-II process. They have been using the new bleach since February 1978.

The addition of the persulfate bleach involved machine redesign. Since persulfate is quite corrosive, materials for tanks, racks, etc., must be carefully selected, with titanium or Hastalloy C preferred. The persulfate bleach also required the addition of a new processing step — an accelerator bath — before the bleach.

Another important part of the process is the wash between the first fix and the accelerator. This wash must be very efficient since small amounts of fix in the accelerator can stop its function.

After listing the chemical formulas used at AB Film-Teknik, Orhall offered some precautions to laboratories expecting to use the persulfate bleach:

1. The accelerator has a distinct odor which gets stronger as the pH increases. It is essential to cover the tank well and to allow extra ventilation in the room. It may also be necessary to change filters in the circulation line every day.

2. When collecting the overflow for reuse, it is important to make sure that the pipe ends below the surface of the tank to prevent the solution from oxidizing. A tank cover should be used and this area should also be well ventilated.

3. When mixing the bleach, it is important to add the stated amount of gelatine to prevent chlorine gas from forming. One way to detect chlorine gas is to dip a piece of green leader into the bleach tank. If chlorine gas is present, the leader will change from green to yellow.

After eight months of use, the laboratory has found no significant sensitometric effects on the prints, regardless of the brand of rawstock used. The soundtrack has not shown any difference, but the D min has decreased about 20%. There is some increase in quality control time since they must analyze the accelerator, the bleach, and the potassium iodide in the first fix. They have found mixing and regeneration of the bleach much easier than with other processes. Some of the people involved with the film have developed minor allergic reactions, but this can be avoided by taking extra precautions when handling Thiol.

In conclusion, Mr. Orhall stated that his company was fully satisfied with the new persulfate bleach. Its advantages override the few difficulties mentioned above.

Commercial Systems Available For Videotape to Film Transfer, moderated by Edward Watton, Forde Motion Picture Laboratories. Six different speakers and six different transfer systems were involved in this portion of the program. All the examples shown on the screen were made from the same videotape, supplied by CBS.

I. *John Corso*,
Vice President and General Manager,
W. A. Palmer Films, Inc.

Mr. Corso presented a brief history of the production of kinescopes before videotape was available.

When Standard Oil saw the necessity for pre-recorded programming in 1952, Palmer Films had a camera that gave better quality kinescopes than earlier systems, and they were asked by Standard Oil to prepare 13 half-hour programs on the San Francisco Symphony and the San Francisco Ballet.

The film used for normal projection was transferred onto black-and-white reversal. For airing, Palmer made a negative picture with an electro-printed, positive, optical soundtrack. Mr. Corso screened two prints from the Standard Oil series. The first was a positive print made from original reversal via a dupe negative. The second was the air print made on negative with the electro track. The camera used to record the 1952 series was the forerunner of the Palmer-built cameras used today. Both monochrome and color systems from Palmer are now available for portable (field) use. The bulk of their business is transferring closed-circuit ¾-in color tapes to film. Some of these transfers are also released in super 8. Since the camera has no servo drive to lock or phase the camera movement to the incoming television signal and is powered directly from the power main, it is ideal for the services Palmer provides. Mr. Corso screened sample transfers made from both 2-in and ¾-in videotapes, using Eastman color negative #7247 as the printing negative.

II. *Robert J. Ringer*, General Manager, Image Transform

Image Transform has been in the commercial transfer business since 1972. "We have the reputation of being the most expensive and the slowest, but we also think we are pretty good," Mr. Ringer stated. Most of their technology is in the signal handling of transfers. They have an especially effective noise-reduction system which allows reduction up to 3-dB of noise in the signal from the customers' tapes.

Image Transform uses a sequential master separation system with an electron beam recorder to make separation intermediates in black and white. The separations then go to the optical department where the necessary filters are added and a color internegative is made. Prints are on color positive. Enhancement and noise-reduction are standard in all their products.

They can handle ¾-in, 1-in and 2-in videotapes and can transfer to super 8, 16mm or 35mm.

"Our system is no longer a big secret," Mr. Ringer said, "and we would be happy to have any of you visit our facility if you are in Los Angeles."

III. *Michael T. D'Ambra*,
Executive Vice President,
Byron Motion Pictures, Inc.

The samples shown by Mr. D'Ambra were produced on Byron's Chromoscan system which was developed by that organization. Rather than to discuss the system, Mr. D'Ambra said: "We will let our film speak for itself."

IV. *Stan Nalski*, President,
Film Craft Lab, Inc.

Film Craft Uses the Teledyne CTR-III and transfers to #7247 color negative.

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They can handle 2-in and ¾-in tape. Since they had been in operation for only three or four weeks, they had not had time to setup in 1-in or ½-in. After showing his samples, Mr. Nalski commented: "As film people, we have discovered that we have a lot to learn about tape. It is an interesting, growing field and we plan to participate actively."

V. *Blain Baker*, President,
Motion Picture Laboratories, Inc.

MPL has been transferring videotape to film for a little over 20 years, and during that time they have used a number of systems. Now they have two Teledyne units — a CTR-I for black and white and a CTR-II for color. The system includes various means of enhancement and filtering. MPL also uses #7247 for their MPLchroma47 transfers.

Although MPL people have always seen a wide variety of quality in the films they receive through the years, the variations in videotape quality are even more extreme. All too often, the customer is inclined to believe, in spite of the written tape evaluations which they all receive, that most or even all defects in his finished product can be traced to the transfer to film. They expect the lab to "fix" any electronic problems that occur in the tape.

Mr. Baker's sample reel included transfers from 2-in and ¾-in and he commented: "We used to feel that the wider the tape, the better the quality. Now, many ¾-in tapes are beginning to look much better than previous ones because the cameras in this mode are getting better."

MPL can transfer from 2-in, ¾-in, and have made some attempts at ½-in, although the electronic signal on ½-in is marginal.

VI. *Ronald B. Balousek*, Vice President,
Producer's Color Service, Inc.

Producer's Color Service uses a transfer system that is different from all the previous ones described. It is a laser system, developed by CBS Laboratories and first demonstrated in 1970. Since then, improvements have been made, and Mr. Balousek indicated that he felt that the system now in use in his laboratory gives good results, provided that the tape is marginal or better. The system they use allows them to generate either an "A" or "B" wind negative, and it involves separating the red, green and blue and going to lasers. Their system can resolve a frequency as high as 8 MHz but, at this point, they cannot record it on film. The films Balousek demonstrated were transferred to #7247 color negative.

Photo Guard Technology

Ashwani Mehta, Laboratory Manager,
Photo Products Division, 3M Company

The Photo Guard system can be used on negatives, positives, transparencies, and motion-picture film. The coating is one tenth of one mil. Photo Guard provides the following services:

1. Abrasion resistance. Photo Guard tested their system using 60 prints of *Jaws II* and 200 prints of *Candle Shoes*. Some prints were Photo Guard protected and some were not. Mr. Mehta screened examples in slide form to show that Photo Guard prints had fewer scratches, cinches and abrasions than the control prints which were not protected with Photo Guard.

2. The ability to rejuvenate. Although Photo Guard has the ability to rejuvenate, it cannot correct materials where the emulsion has been removed completely. It can help prevent scratches on both base and emulsion if the film is pre-treated with Photo Guard.

3. It is anti-static.

4. It is resistent to a large number of chemicals, including nail polish, nail polish remover, and various types of marking pens. The coated test slides also resisted acetone.

5. It has easy cleanability. Marking pen inks were easily removed from Photo Guard protected prints.

6. It is anti-bacterial. Mr. Mehta reported that they had actually grown cultures in the lab which ate up the gelatin on the uncoated samples. After 34 hours, all the gelatin was completely destroyed on the uncoated slides. Coated slides showed no change.

7. It maintains its stability.

8. Tests indicate that the Photo Guard process offers some protection from ultraviolet rays.

9. Photo Guard can also help eliminate Newton rings on pre-print materials.

Photo Guard offers a flexible coating and its abrasion resistance is similar to that of glass. It can be applied to release prints or to intermediates, including CRI's (color reversal internegatives), master positives, dupe negatives and internegatives.

Basically, Photo Guard is a polymerized silene. It is not a silicone, it is not a resin, it is not urethane, and it is not an epoxy. They refer to the chemistry as 100% solid, but it is not a wax or a powder. It is a liquid, one-part system, but the liquid is not diluted in any water or chemicals.

Presently, Photo Guard has a nationwide program in Canada for coating motion-picture film. Field tests on color prints are being run in four U.S. locations, and 3M is still running in-house tests in their own laboratory. They expect to open a commercial facility in New York in January 1979. At this time, prices have not yet been determined.

Wet Printing Systems Currently Available

Moderated by George Golden,
President and General Manager,
Film Lab Service, Inc.

I. *Morris Bleckman*
Cinema Processors, Inc.

To test the validity of his wet-gate system, Mr. Bleckman selected #7247 color negative and deliberately scratched the test film on the edge of a metal reel. He showed sample prints made from the damaged negative, composed of three sections: (1) printed dry on the Model C printer; (2) printed on the Model C with slight diffusion filtration; and (3) using the Carter Full Immersion Wet Printer. Sample #2 lost some resolution but the scratches were less noticeable. Sample #3 showed better resolving power, was more brilliant, the D max was improved, and many of the scratches visible in the negative were not seen in the print.

II. *Mr. John Newell*, President,
Western Cine Services

Mr. Newell began by saying that his experience with wet-gate printing has been similar to Mr. Bleckman's, and that he had noticed improvements in negatives not only on the base side but also, in many incidents, on the emulsion side too.

Although much progress has been made in correcting scratches, there is still much work to be done in the area of getting better grain dispersal in the wet-gate processes. A good system gives effective grain dispersal. "By effective," Mr. Newell said, "I do not mean loss of resolution. I mean the acuity on the screen that gives the impression to the eye that the grain is minimized. We should all be concerned with acuity or how the picture looks on the screen.

"We call our wet printer our 'grain shrinker' because it throws the modules of grain slightly out of register. This does not interfere with the inherent resolution. Under a microscope, wet printed film, like many optical techniques, is not as sharp as contact prints. But resolution is not what we are selling in wet-gate printing. We are selling acuity."

Wet gate is often used as a generic term. Customers come in and they ask for a wet-gate print although there are actually three systems rather than just one way to wet-gate film; wet application, wet gate itself, and total immersion.

One of the major problems that Western Cine has faced with their wet printing system is the lack of correlation between the standard contact Model C printers, setup with timing tapes, and the valves, as operated in any wet printing system. This problem will probably have to be solved by engineering at the manufacturers' level by using new types of light valves.

The lack of correlation between dry printing and wet printing is most apparent in low-light scenes. At Western Cine, the difference seems to be about three points. If the timer looks at a scene on the analyzer and decides to print it at light #7 on the Model C, he will need to change the light to #10 for wet printing. The printers match well in the mid-range lights, but are off a bit again at the high end.

Mr. Newell's experience with the Carter print is that the screen acuity is remark-

ably good, particularly as compared to almost any other system.

Sometimes, laboratories are guilty of selling wet negatives for the wrong reason. Many customers come to Western Cine and look at a price list, see that wet printing is more expensive than dry printing and go for the wet printing, thinking that a higher price tag will make the negative better automatically. Newell believes that this is the wrong reason for buying wet printing. "The real reason for making wet negatives or prints is to repair damage," he stated. "If we can explore the avenues of grain reduction and acuity on the screen, I think we can get into a whole new ball game regarding ideas to improve our printing systems."

III. *George Golden*,
Film Lab Services, Inc.

Film Lab Services has the first, Carter 16mm motion-picture continuous-contact, full-immersion, liquid-gate print. They selected the Carter printer because they wanted a printer to restore a #7247 negative after it had been mishandled, a common problem in the industry, and because they felt that it would give them the best possible image in printing intermediates. It was the only one of its kind with the concepts they wanted and it is compatible with their Bell and Howell printing equipment. The Carter printer comes with Bell and Howell light valves and fader; the RF cueing works at the same speed as the Model C; there is an interchangeability and availability of parts and similar servicing; and the printers operate at pretty much the same speed — 90 and 180 ft/min.

Film Lab prefers to make a dry answer print first and then goes to the wet printer for the intermediate. (They will, of course, make wet answer prints if the customers request them.) This system works out pretty well although there are some problems in timing between dry and wet printing although this has not been a big problem at Film Lab Service.

Advantages of the Carter system as related by Mr. Golden: (1) elimination of base scratches, minor emulsion scratches and even some deep emulsion scratches; (2) elimination of cinches and other problems caused by poor handling techniques; (3) no Newton rings from original to intermediates; (4) runs faster than wet optical printing; (5) does not accentuate grain; (6) contrast about the same as dry printing; (7) has specular light as does the Model C and produces crisp intermediates that are as sharp if not sharper than prints from the Model C; (8) produces sharper prints than diffusion printing, particularly when there is intermixed original and wind differences. The wet printing system can handle these and keep the images crisp.

The Carter printer will not eliminate imbedded dirt and will not erase all of the deep emulsion scratches although it may help emulsion scratches in some cases.

Problems have been amazingly few, considering that Film Lab received the first 16mm printer made outside Carter's laboratory. They had some basic printer problems that are common to most new equipment including a defective sprocket with a bad tooth on it, some light valve failure, take up adjustment problems, and some uneven fields. As far as liquid gate is concerned, they wondered at first if it was "a bubble machine or a printer." They also had some problems with start-up procedures and some ventilation and lint build-up problems. All these problems have been corrected.

In recent weeks, they have experienced some problems with the perchlorethylene with backings on intermediates. The problems have differed with each type base and emulsion, but are under control at this time.

Film Lab Service had the following comments to make on the improvement of the system: (1) they would like to have footage frame count cueing and a soundhead (the new printers have soundheads); (2) they have had occasional problems with the RF cue sensitivity — sometimes the problems are caused by the printer and sometimes it is defective metallic tape. (3) they would like to have a quicker start-up time — it now takes about 180 s from the time the button is pushed until the printer starts printing.

New Products and Systems

I. Wet Printing System

Dan Carter, President,
Carter Equipment Co.

In describing the Carter wet printing system, Mr. Carter asked, and then answered the question: "What should you look for in a wet printer?"

1. A good printer head, which is the heart of the machine.

2. The tank containing the liquid should have a door for easy access and a good drain system. It should be black to help keep it clean.

3. It should have two compartments because, no matter how efficiently one cleans the film, the wet printer is *not* a cleaning machine. The use of two tanks helps to isolate perforation dust as a source of contamination.

4. The tank should be equipped with entrance wipers to eliminate bubbles that are brought in with the film.

5. There should be wipers and other aids to recover as much of the solvent in a liquid form as possible.

6. In order to take full advantage of quality increases obtained by full immersion wet printing, the printer should have parallel light. To do this, a window is needed to allow the optics to operate in air or they will lose their effective power.

7. The free loop after exposure is particularly important if one is printing from a 16mm original in A & B rolls with numerous splices. Straight cuts in 16mm that may be unacceptable in dry printing due to splicing problems, are vastly improved when printed wet with specular light.

Mr. Carter concluded his presentation by showing slides made of his printers.

II. New Continuous Contact Printer and Accessories for Model C Printers

John M. Ehrenberg, General Manager, Professional Equipment,
Bell and Howell Co.

Mr. Ehrenberg spoke about the Bell and Howell Model #6123 continuous contact printer. Standard features on this printer include:

1. These film formats — 16mm, 35/32 or 35mm — with other formats available on request.

2. Four-speed bi-directional, dc servo-drive system — 120/240/480/960 ft/min.

3. 3000 ft negative and raw stock film capacity.

4. Simplified film path for faster thread-up and shorter stock leaders. (Raw stock leaders can be 20% less than on the Model C and 40% less than on the B & H panel printer.)

5. Bell and Howell automatic additive color light source with proven B & H light valves and tungsten halogen printing lamp.

6. The microprocessor-controlled printer tape reader stores printer light and frame count cue control tape data for printer operation. The program tape is used only once, to insert tape data into the memory.

7. Light valve memory device to inhibit reactivation of a light valve if a printer light setting is repeated.

8. Modern electronic design with five electronic modules.

9. Film pull-back system to minimize short end losses.

10. Section printing system permits fast, efficient method for automatically locating and printing any desired portion of a negative.

11. Inboard and outboard edge printing lights at the picture aperture on both 35mm and 16-35/32 models. The 16-35/32 soundhead also features both inboard and outboard edge printing.

12. Air vacuum squeegees for all negative and raw stock film paths with internal pump.

13. Safelight threading lamps are provided at each printing head.

14. Three bay cabinet — 72 in high, 74 in wide and 30 in deep.

15. Wet printing optional accessory will be available later.

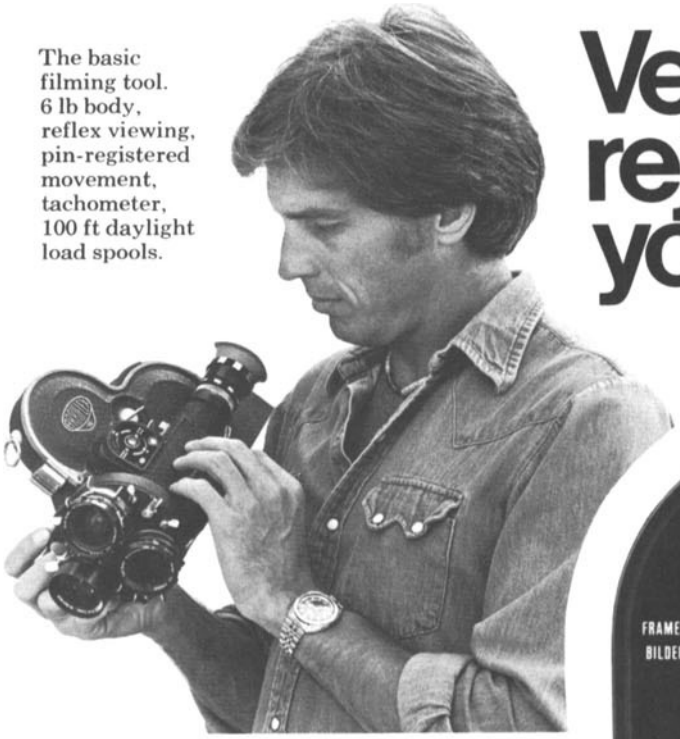
III. A New Processing Machine

Ronald Bailer,
Allen Products Co.

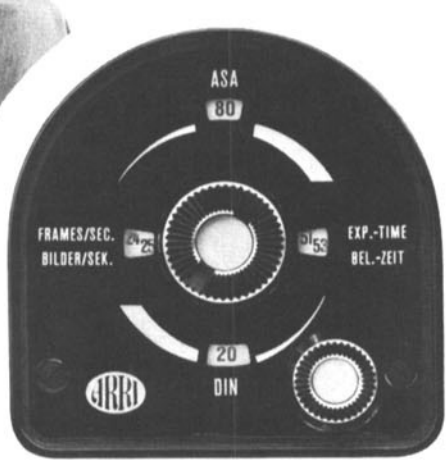
Mr. Bailer described a processing machine built by Allen to run Eastman Kodak's VNF, (video news film.)

The machine is only 13 ft long and is

Veteran workhorse rejuvenated: Now you can add APEC to your 16S/B



The basic filming tool. 6 lb body, reflex viewing, pin-registered movement, tachometer, 100 ft daylight load spools.



Plus fiber optics, crystal control, and the many other components of the 16S/B system.

If your 16S/B is S/N 12001 or higher, you can buy a door with APEC built in.

The 16S/B is continually being updated. APEC is one example. Here are some others:

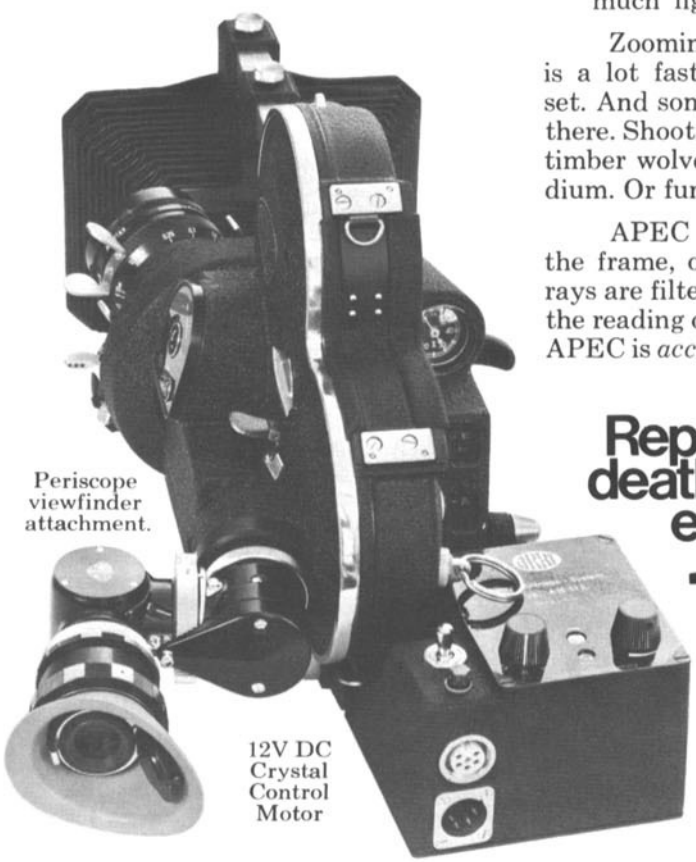
Fiber Optic Screens (with aperture markings) to replace your groundglass: Better light transmission, easier focusing. A Bridge Plate for balancing long lenses and mounting matte boxes. A crystal control Universal Motor (with Pilotone) that also runs at speeds from 0 to 50 fps and single frame.

APEC does *not* mean automatic exposure. It's a built-in meter with its needle visible in the finder.

With your eye at the eyepiece, you can frame, focus *and* set the f stop. The through-the-lens APEC system tells you precisely how much light is getting to the film.

Zooming in for an APEC reading is a lot faster than walking onto the set. And sometimes it's not easy to *get* there. Shooting surgery, for example; or timber wolves. Or a speaker at the podium. Or fungus through a microscope.

APEC reads the central third of the frame, off the mirror shutter. UV rays are filtered out. ND wedges center the reading on the cell's response curve. APEC is *accurate*.



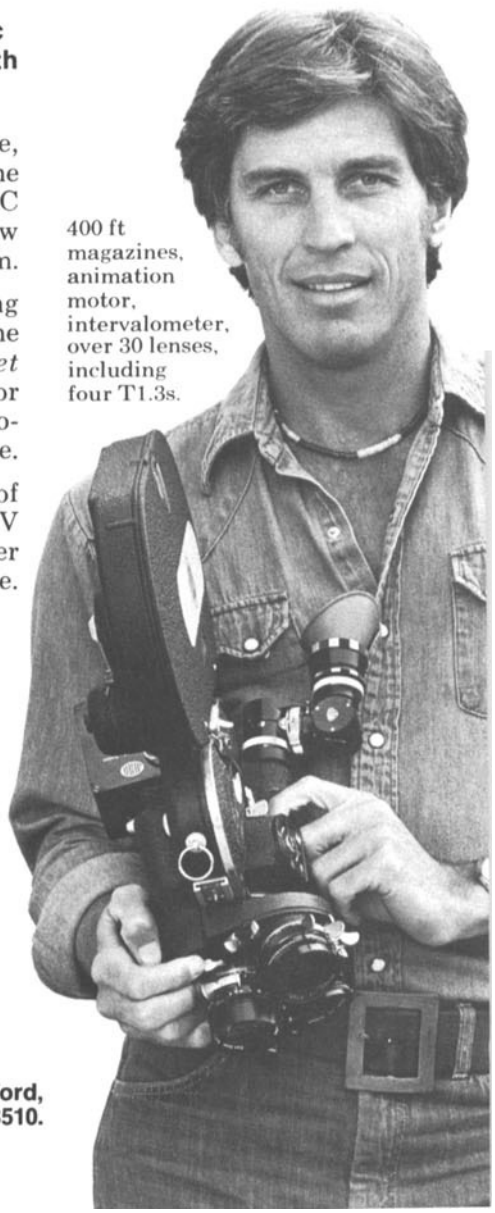
Periscope viewfinder attachment.

12V DC Crystal Control Motor

Reports of its death have been exaggerated: 16S/B

ARRI

1 Westchester Plaza, Elmsford, New York 10523. (914) 592-8510.



400 ft magazines, animation motor, intervalometer, over 30 lenses, including four T1.3s.

constructed completely of stainless steel or titanium. The drive system is Allen's standard automatic tension adjusting system which uses the "permanent magnet motors" discussed at SMPTE two years ago. The machine is designed to run VNF at 45 ft/min and the new RVNP (rapid video new process) at 77 ft/min; Allen has run tests as high as 150 ft/min with adequate film quality. It has digital temperature readouts as well as digital speed readouts, a system which Allen developed. The temperature of any solution can be checked by pushing one of the labelled buttons on the left side panel.

Allen is now using polypropylene as their bearing material as well as for their rollers. The squeegee blades in the tanks are the Winthane urethane type which Allen began to use three years ago and now seem to be standard in the industry. Their machine has a magnetic coupled pump marketed by Fluid Controls, standard on all Allen machines. They use EPR rubber O rings wherever O rings are needed.

Allen has switched to 2000-ft plastic magazines where daylight load is needed. Besides the advantage of light weight, blue comets and other defects are eliminated by the use of plastic. The squeegee before the drybox is the rotary buffer type. Because of OSHA standards for noise and the problem of fumes using vacuum squeegees, the rotary buffer system seems to be the best alternative and has proven itself to be a quiet and reliable system. Allen has also used this system successfully on ECN-II and ECP-II machines.

IV. Accessories for Model C Printers

Charles J. Thomas, Jr.,
Marketing Manager,
Bell and Howell Co.

Although Bell and Howell has developed the new Model 6123 printer, they continue progressing with the Model C, which is "still alive and operating all over the world," according to Mr. Thomas. Part of the program for the Model C has been the development of a completely new, electronic control system, which Mr. Thomas explained by using slides.

The first product developed was a frame count cuer, built to be compatible with the existing reader systems. The B & H reader system, now called The Printer Control Unit, has several new features: (1) a photoelectric reader head; (2) frame count cueing internal to the reader system; (3) new integrated circuit designs; (4) new controls for the light valve system. The most recent development is the microprocessor card itself.

Bell and Howell is also adding a new electronic fader system, with five programmable feeds, that should be available sometime in mid 1979.

The new printer control unit, designed for the new Model C, is available for conversion on existing Model C printers.

V. A New Total Immersion Contact Printer

Harry Teitelbaum, Secretary-Treasurer,
Hollywood Film Company

After a number of years of experimentation, Mr. Teitelbaum stated that, in his opinion, the total immersion of both negative and positive of the main printing sprocket is one of the most effective and trouble free wet printing methods in existence. At Hollywood Film Company, they worked on the premise that the wet printer should be as close in design as possible to already existing machines. This way, it would take less time for printer operators to learn to run the new printers properly.

A second "must" in the HFC design was the requirement that there be no exposure of the operating personnel to fumes from the immersion liquid. "This is not only good common sense," Mr. Teitelbaum commented, "but it is also in line with OSHA standards."

HFC uses perchlorethylene in its immersion printers because it has an index of refraction of 1.504 which is quite close to 1.478 (the refractive index of the base of the film). Perchlorethylene has been found to be more than adequate for the great majority of base scratches.

Threading of the machine, particularly of the main sprocket, follows the normal procedures and practices. The print apertures are at the top of the main sprocket so there is full visual or manual accessibility. The entire film-handling front area of the printer, is enclosed and all fumes are vacuum exhausted. The liquid system is composed of a sump pump, air bubble removal means, a sealess pump, filter, and solenoid valves as well as appropriate controls and high visibility.

HFC printers are available in a number of configurations and with a number of accessories, including quartz halogen lamps, high-speed tape readers which use the Bell and Howell code, and separate dc power supplies for both picture and track lamps. Cueing may be either notch or RF cue frame count.

Electrical and electronic systems, the major components, are in attached black frames with pull-out drawers for maximum serviceability. Most electronic elements are modular and readily changeable. There is a speed selector switch on the control panel for speeds from 60 to 240 ft/min and a simple top adjustment for varying any settings.

The machine drive is highly stable and includes an eddy current brake for controlled deceleration. The construction is all metal with a heavy duty frame. All of the film handling movements — sprockets, take-ups and optics — are mounted on ½-in or ⅝-in aluminum jig plates. The fader is optional.

The printer was designed in its entirety by Harry Whitmore, Hollywood Film Company's technical director.

VI. A Film Rejuvenation System

Harry Whitmore,
Hollywood Film Company

Hollywood Film Company is now manufacturing a complete system for scratch removal, cleaning, and lubricating for negative or positive in one-pass through the machine. The HFC Rejuvenation Machines System I is designed for the continuous treatment of scratched acetate or nitrate base films and their emulsions.

The machine is available in both sprocket and tension drive and incorporates elements for cleaning, base and/or emulsion treatment, and final lubrication at speeds up to 100 ft/min. It is completely enclosed and fully vented and features variable speed dc drive, 35/16 combination sprockets as required, dual take-up torque motors and is caster-mounted for ease of installation. Both feed and take-up torque motors are self-compensating.

Cleaning is accomplished by circulating filtered solvent forced through spray nozzles above one set of dacron rotary buffers. The solution keeps the buffer sets saturated and wet scrubbing of the film takes place, followed by drying with two sets of rotary squeegees. The film then enters a second cleaning tank where the process is repeated. The film then enters the base treatment chamber where it passes over an applicator. There is no pressure on the image area of the film since the center of the applicator is relieved. The chemistry of the solvent used for base treatment was developed by HFC and is available in concentrated or solution form.

The System #2 Rejuvenation Machine is similar in design to System #1, but is smaller and treats base or emulsion. It requires two passes where System #1 does both in one pass.

The base and emulsion solutions are not compatible and the machine will not accept film with flipped sequences. HFC reminds users that "scratches which penetrate and remove the color layers cannot be corrected by any known means, not even prayer."

VII. A New Edge Numbering System

Harry Whitmore,
Hollywood Film Company

Hollywood Film Company, working in cooperation with 3M, has modified their edge numbering machines to use a new 3M ink, known as Uvox. Inks used in the past did not adhere to either side of polyester film or to the oxide side of sound recording materials. The new ink can be applied to both polyester and acetate based film.

HFC will soon have units available to customers who want to modify their own machines for the new type ink. Mr. Whitmore cautioned: "When changing from ordinary ink to Uvox ink, all parts of the machine must be thoroughly cleaned before you make the adaption, to avoid contamination."

VIII. The Peterson Full Wet Immersion Printer

Cornelius Zichterman, Vice President and Director of Marketing,
Peterson Enterprises, Inc.

Peterson is licensed under the Carter patents, however, they have adhered to the standard Peterson Panel Printer Format. They have built a single direction, full wet immersion printer, which operates right to left only, and conforms to the Model C direction of printing.

The Peterson format is at twelve o'clock for two reasons: (1) it is a straight-through printer path which is standard in the industry; (2) staying with the standard has made it possible for Peterson to offer wet printing conversions for Peterson printers already in service.

The Peterson printer is wet only in the picture head, but they do offer a sound conversion for those who want it. The new printer contains the standard Peterson automatic light valve system. It will fill with liquid and printing can start after 60 seconds.

The PMPEA/Kodak Seminar:

A Close Encounter with Doug Trumbull

The great magicians of the world are never supposed to reveal the secrets of their tricks. An exception to this rule occurred this year on the night before Halloween, when Douglas Trumbull addressed 2000 people and told how he had achieved the fantastic illusions in *Close Encounters of the Third Kind*. The occasion was the annual Professional Motion Picture Equipment Association (PMPEA) seminar held in conjunction with the annual SMPTE Conference.

This year the entire PMPEA seminar was devoted to Mr. Trumbull and his special effects. To make this truly a special event and to do justice to the spectacular visuals, the PMPEA (with assistance from Eastman Kodak Co.) rented the Ziegfeld Theatre for the entire evening of 30 October. The theater, a block north of the SMPTE Conference site, is considered by some to be one of the finest 70mm projection facilities on the East Coast. Coincidentally, it was the theater originally selected for the New York premier of *Close Encounters of the Third Kind*.

Two Shows Required

Because the first show, at 6:15 p.m., was sold out more than a month in advance, a second show was scheduled for 9:00 p.m. — and that one too was sold out by seminar time. Both shows were huge successes. Mr. Chadwell O'Connor, President of the PMPEA, opened the evening and welcomed the audience to the seminar. Anton Wilson then gave a brief account of Mr. Trumbull's filmography and showed a five-minute excerpt from the film *Silent Running* which Mr. Trumbull both wrote and directed. Then, the house lights dimmed and Mr. Trumbull began a slide presentation of production stills taken during the *Close Encounters* filming. The audience saw the planning and execution of miniature landscapes, the creation and mechanization of spaceships and flying saucers, and the sophisticated computerized cameras that actually photographed the effects. (Who would have believed that in the scene where the woman and her child were "buzzed" by saucers the road ended only 30 feet behind the actors? or that the village in the background was only a 3-ft by 5-ft tabletop model? or that the lights of the saucers were photographed on the same film only after the other action had already been shot?)

Mr. Trumbull went into great detail both verbally and visually, about the motion recording system that stores camera motion data in a computer during live action filming. This data is then retrieved during special effects filming and used to control servomotors that cause the camera to pan, tilt, dolly, etc., in exact duplication of the movements that were executed during live filming. Unlike early special-effects efforts, which were usually restricted to static shots, using this system allows complex camera movements while retaining perfect correlation with live action and later created effect.

No secret was sacred, and Mr. Trumbull covered every aspect of his creations including some "inside" ancedotes. His slide presentation was then followed by a 70mm reel of test footage Doug had shot while developing the effects for *Close Encounters*. This was indeed a unique experience, to see how the final effects developed from an idea to a practical and dazzling visual. Included in this reel were the marvelous moving cloud sequences, the mothership sequences, various spaceship tests as well as matte tests. Throughout the reel, Mr. Trumbull explained the technical elements involved.

A lively question and answer session followed, and then came the piece de resistance of the evening: a special demonstration reel that Mr. Trumbull had prepared of all the actual special effects from *Close Encounters* in 70mm and six-channel stereo sound.

Mr. Trumbull, the PMPEA, and the Eastern Kodak Co. are to be thanked for providing an experience that had — if anything — more impact than the *Close Encounters* film itself. "A Close Encounter with Doug Trumbull" was most effective and most appreciated.

Acknowledgments

Truly, too many people gave great efforts to this program for them all to be named. Some names with their special contributions really must be acknowledged however. Thus, thanks are extended to: Cindi Becker who as PMPEA Vice President handled all practical details; Chadwell O'Connor (PMPEA President); Kenneth Mason of Eastman Kodak who assumed half of the financial expenses of the seminar; Lee Duncan, Secretary-Treasurer of the PMPEA, who took care of publicity, posters, printing tickets, and sales; the Walter Reade organization (owners of the Ziegfeld); and Anton Wilson (program chairman) and Herbert Lightman (*American Cinematographer* Editor) both of whom proposed the idea of the seminar to Mr. Trumbull.