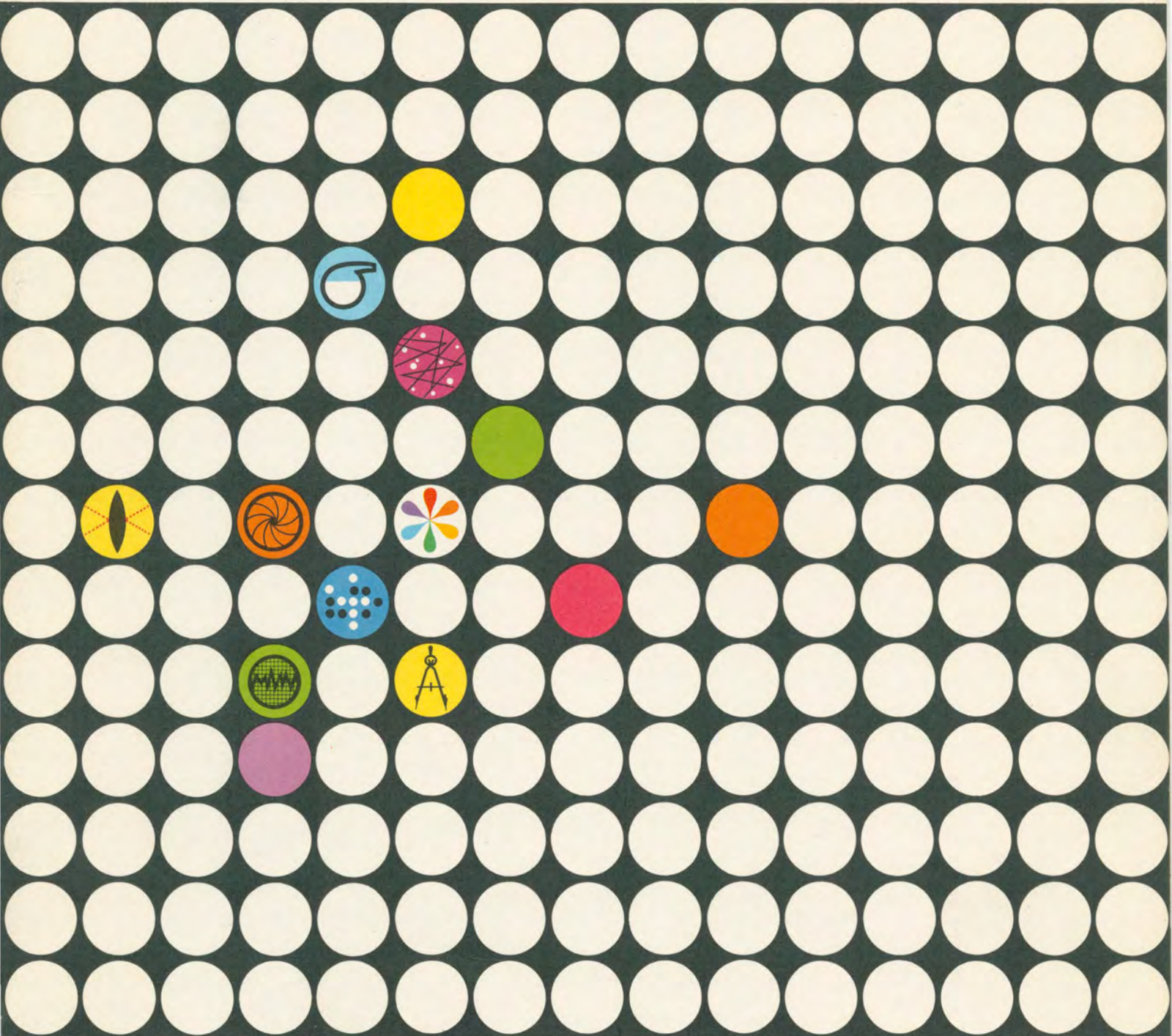


RESEARCH-DEVELOPMENT-ENGINEERING



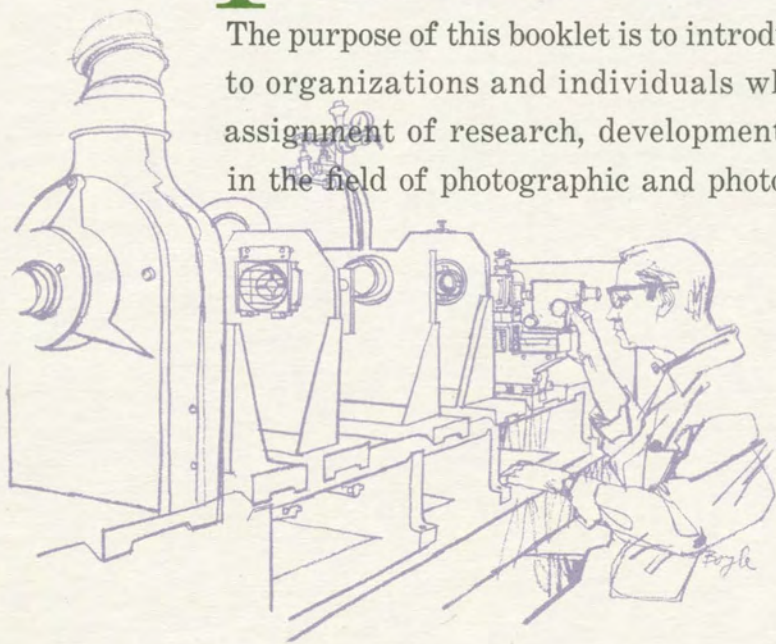
Technicolor
CORPORATION

Direct inquiries to
TECHNICOLOR CORPORATION
Research and Engineering Division
2800 West Olive Avenue
Burbank, California



PURPOSE OF THIS BOOKLET

The purpose of this booklet is to introduce Technicolor Corporation to organizations and individuals who are concerned with the assignment of research, development and engineering projects in the field of photographic and photoelectric communications.



Technicolor Corporation, founded in 1915 as a pioneering manufacturer of theatrical motion picture prints in color, is today a world-wide organization with almost a half-century of experience in this and other forms of visual communication. During its history, Technicolor has manufactured over six billion feet of the highest quality color films available. As a long-established member of the communications industry, the Company is also engaged in a wide variety of scientific and engineering projects, both government and commercial. The Technicolor name is associated not only with professional motion pictures, new photographic products and services, but also with important scientific contributions to photography, optics, and electronics.

Technicolor's largest manufacturing plant is in Hollywood where theatrical motion picture films are processed and release prints are manufactured in black-and-white and color, in 16, 35 and 70mm widths, and in all the wide variety of formats and anamorphic ratios required by current film production techniques. The present capacity of this plant alone is over half a billion feet of film a year. Technicolor also operates similar plants overseas, in London and Rome.

For the amateur and the professional photographer, Technicolor plants in New York City and Burbank, California, process Anscochrome, Ektachrome, Kodachrome, Ektacolor and Kodacolor photographs, as well as 8 and 16mm home movies. Other new products and services for photographers everywhere are on the drawing boards and currently entering the market. Presently being introduced is the revolutionary new Technicolor 8mm Instant Home Movie Projector. This new concept in showing home movies completely eliminates complications faced by many amateur home movie enthusiasts. The projector has no reels or sprockets and requires no threading or rewinding.

Scientific thoroughness and precision which guide the Company's research, development and engineering staff have contributed greatly to these achievements. This tradition goes back to the earliest days, when the first Technicolor process was born in the offices of a small group of consulting engineers in Boston. Today, the Company's chemists, physicists, engineers and other highly-trained experts continue the same quest for improvement. In order to meet the high standards of its reputation for quality, Technicolor designs and builds most of its own facilities, from large factory buildings to delicate optical interference filters, exercising a wide variety of technical skills.

TECHNICOLOR CORPORATION

In 1956, the Company consolidated its research activities in Burbank, California, in a building acquired and modified for the purpose. Recently, the Engineering Department has also moved to this location. The Research Laboratories presently occupy 25,000 sq. ft. of this space, with ample room for expansion. The Company's research staff and facilities provide capabilities in the following fields:



PHOTOGRAPHY AND OPTICS

Information storage and retrieval by color photographic means
Photographic processes, techniques and equipment
Rapid processing skills
Optical spatial filtering techniques
Optical interference filters – design and manufacture
Measurements of sine-wave response and granularity of photographic emulsions
Edge-sharpening photographic development processes
Image processing techniques



CHEMISTRY

Organic chemistry of dyes, photographic chemicals and inks
Polymer and colloid chemistry
Physical and analytical chemistry
Chemical engineering



ELECTRONICS

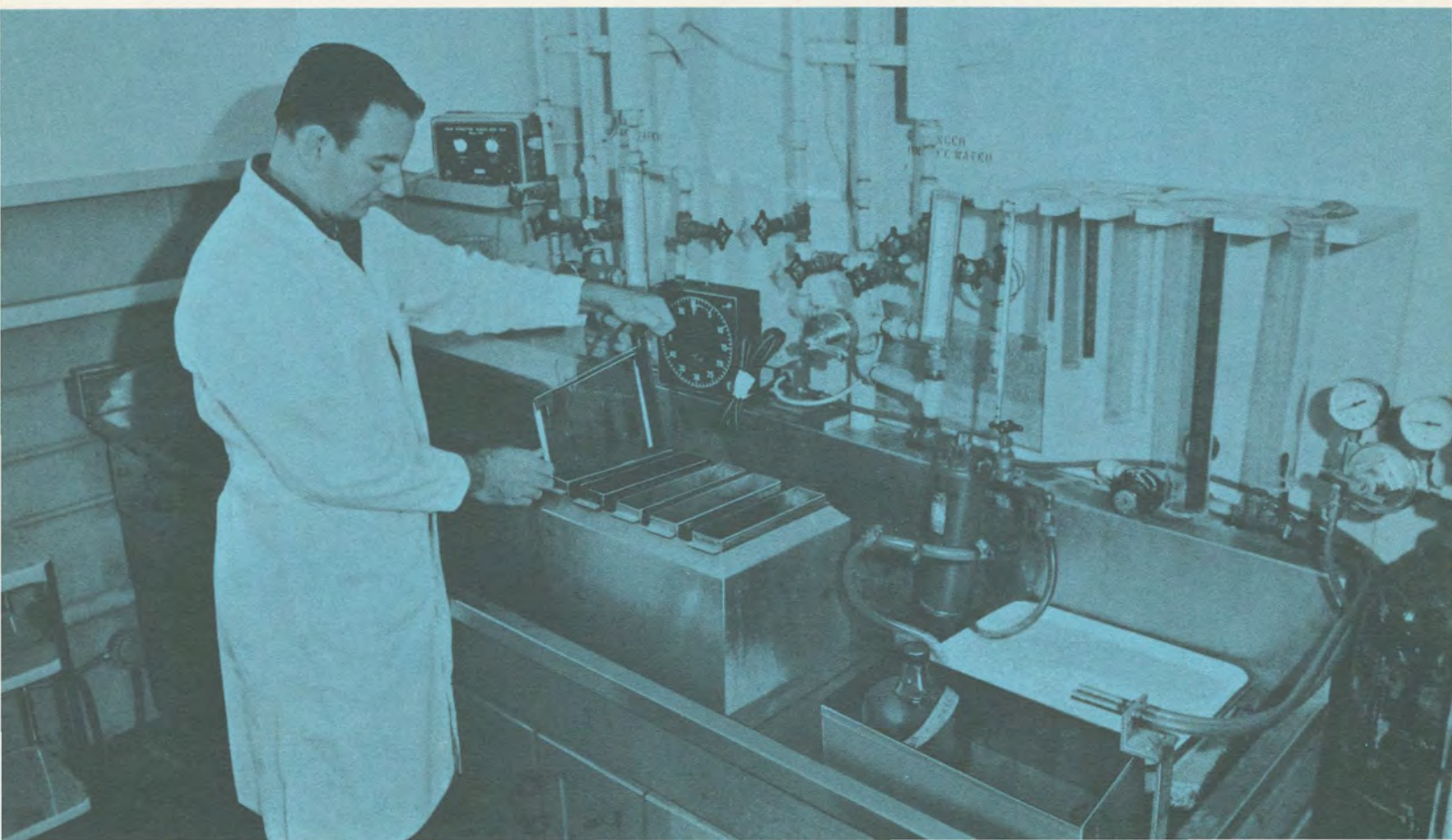
Analog and digital data handling
Special purpose cathode-ray tubes
Storage tubes • Flying-spot techniques
Color generation systems • Signal statistics
Special purpose data storage and retrieval
Displays – electronic, photographic, optical
Applied magnetics

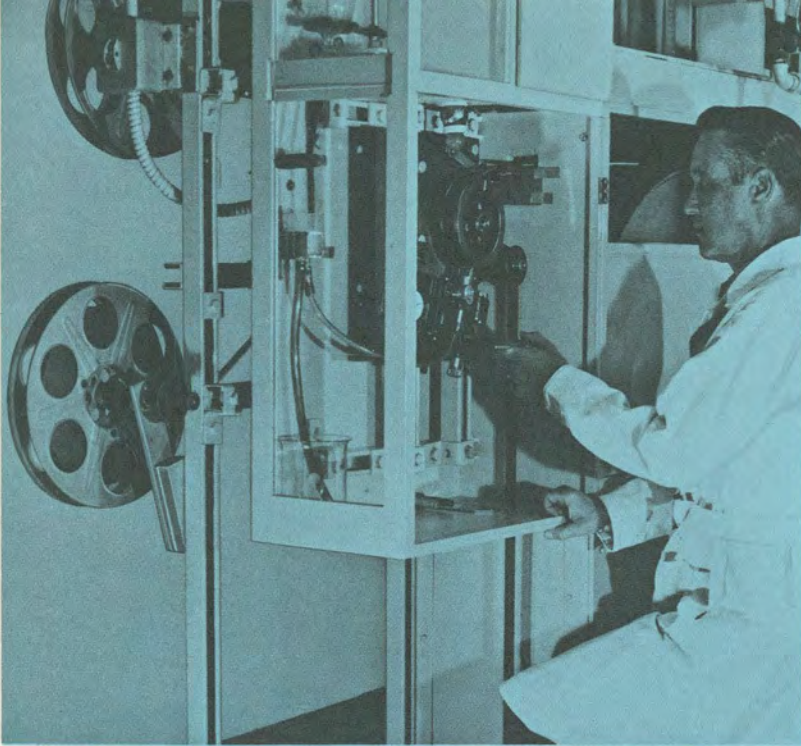
RESEARCH AND DEVELOPMENT



TYPICAL CHEMISTRY LABORATORY. This laboratory unit is typical of several which are suitably equipped for organic synthesis, physical and analytical chemical problems, or photographic chemical investigations. Many hundreds of dyes have been synthesized and tested.

TYPICAL PHOTOGRAPHIC DARKROOM. This is one of several darkrooms equipped for photographic process investigations. Typical darkroom investigations include optimization of black and white and color film processes for speed, grain, tone rendition and color rendition; development of low cost color duplicate slide processes; preliminary evaluation of new photographic materials and chemicals for production use.

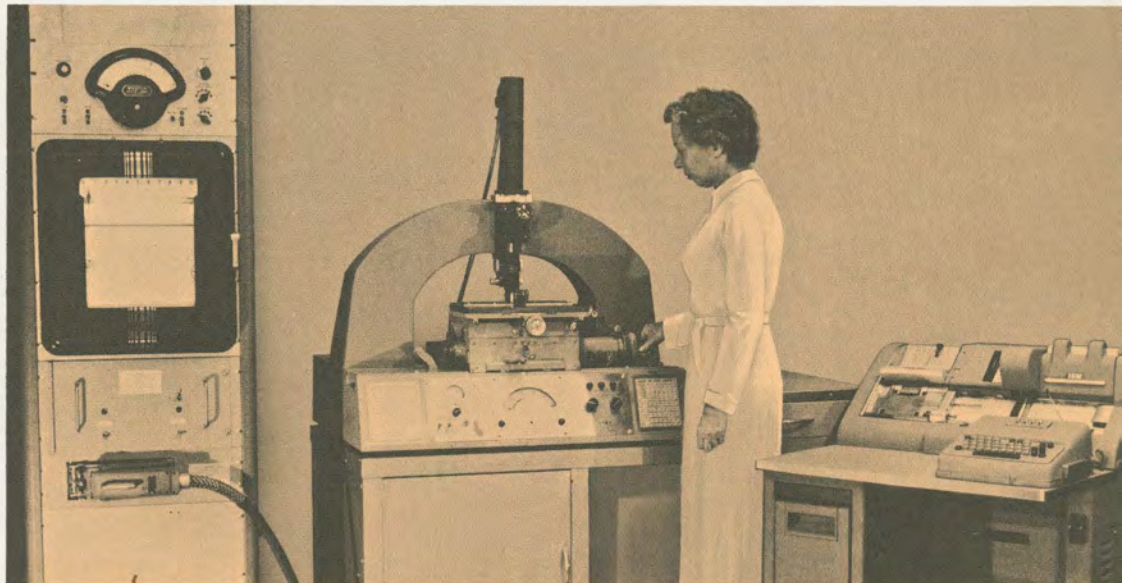




EMULSION COATING MACHINE.

In a photographic research laboratory, it is frequently necessary to prepare experimental coatings for test and evaluation. This laboratory is equipped with a machine capable of coating a continuous run of emulsion onto various types of support material of 35mm width.

AN AUTOMATIC RECORDING MICRODENSITOMETER is as important to the photographic scientist as the oscilloscope is to the electronic scientist; it provides a graphic picture of grain, sharpness and other microscopic properties of photographic images. This particular instrument was designed and built by Technicolor; it can scan an image with a spot of light as small as 2 microns in diameter. Sometimes, as in the case of sharp edges or sine waves, an analog trace across the image with a long, narrow slit is sufficient. In other cases, such as the analysis of photographic grain, these measurements can be converted to numerical form and stored in punched cards for automatic data reduction.



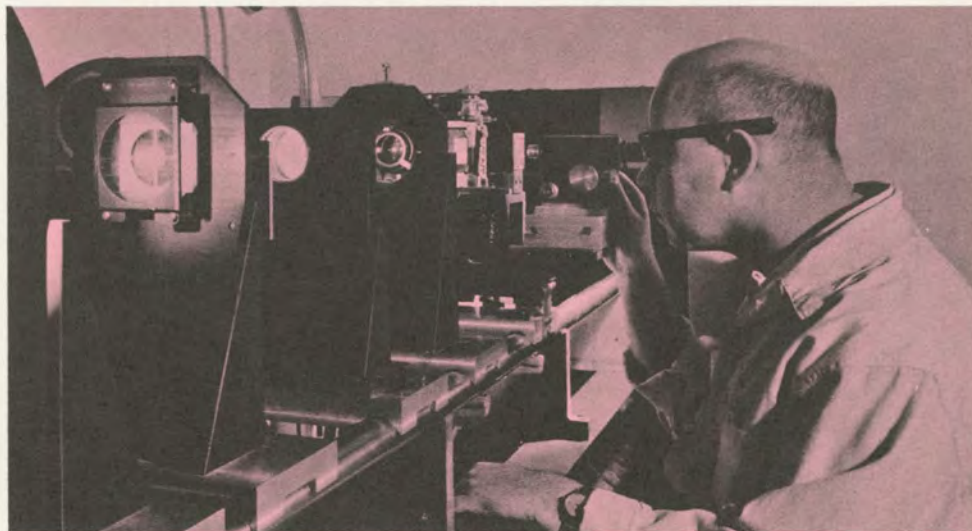


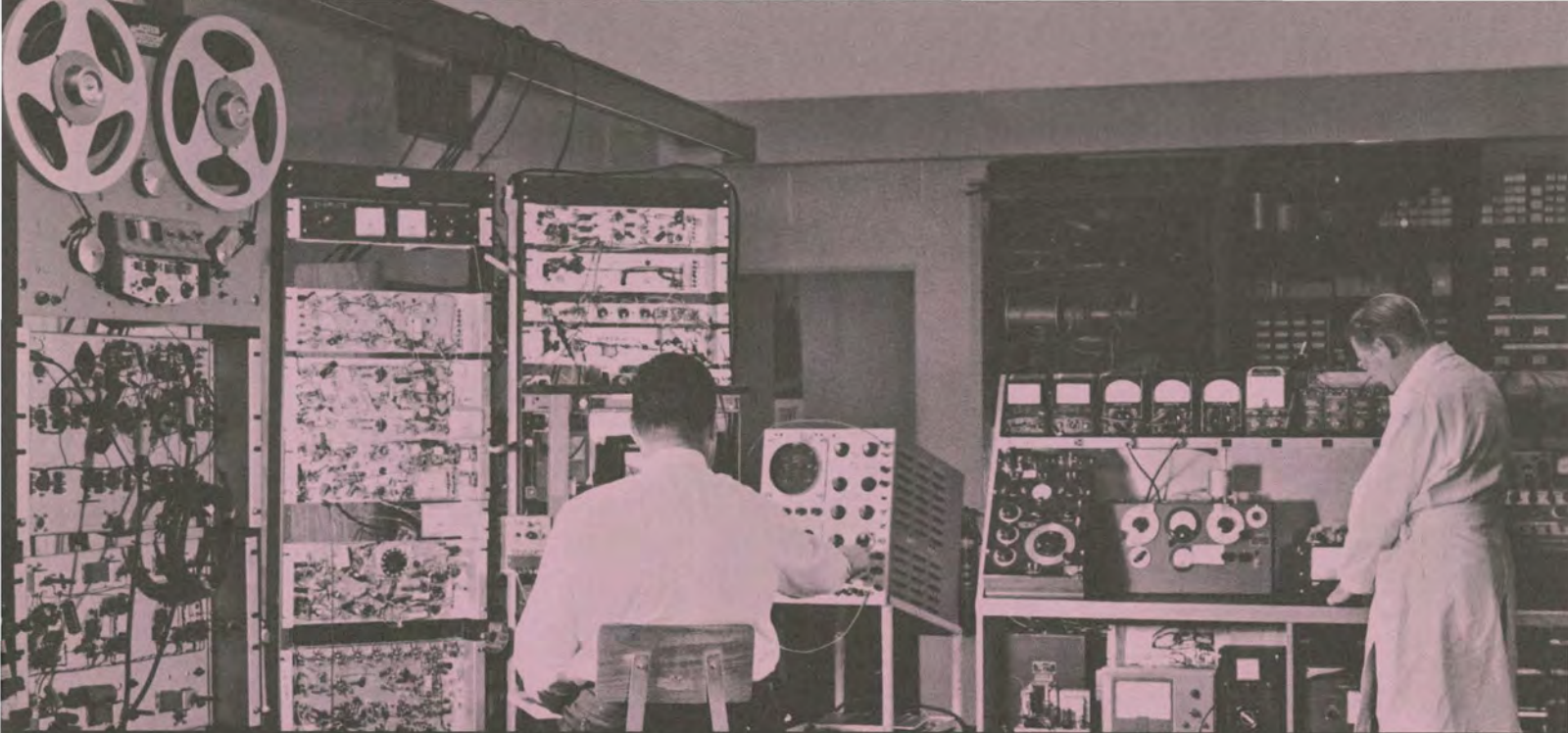
VACUUM EQUIPMENT FOR DEPOSITION OF THIN FILMS. This laboratory contains complete high-vacuum evaporation systems for the controlled deposition of thin coatings of both metallic and dielectric films.

These units are equipped with optical control systems of novel design, which permit regulating the thickness of each layer to very close tolerances.

Technicolor also has computing facilities for calculating the theoretical performance of multilayer coatings. These have been used in the design of many unique filters and beamsplitters.

OPTICAL BENCH. This bench and equipment were specially designed for experimental work in image analysis, spatial filtering, and edge-sharpening. This device and the microdensitometer provide an integrated system for analyzing the microstructure of photographic images. Sine-wave camera charts were constructed to serve as the input image. Sine-wave analysis of photographic images thus parallels electronic analysis techniques and exemplifies the merging of optical and electronic skills at Technicolor.





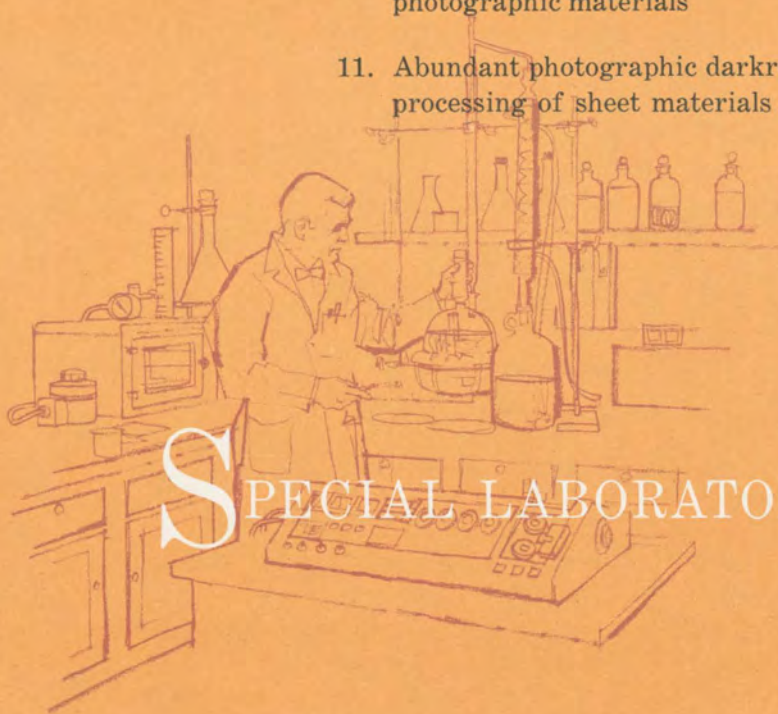
ELECTRONICS LABORATORIES. Technicolor has broad experience in the application of electronic techniques to the general problem of visual image analysis, processing and storage. The Company's special requirements have called for the construction of electronic equipment for such purposes as color negative evaluation, electronic printing of color film, monitoring of thin film transmission, microdensitometric measurement, and light-beam control. Work in the broader field of image processing has required the construction of electrostatic and magnetic storage devices, and cathode-ray tubes for coding, processing and displaying video signals.



TECHNICAL LIBRARY. This library contains a collection of approximately 2500 volumes on science and engineering. In addition, there are 1850 bound volumes of technical journals and references; and 134 subscriptions to the current literature of technology. Requests to use this library are often received from other corporations, government, and private institutions.

Not included in the preceding photographs are many items of research equipment of which the following are typical:

1. Cary Recording Spectrophotometer
2. Spinco Ultracentrifuge producing forces to 200,000 G's
3. American Optical Rapid Scanning Spectrophotometer
4. Beckman Spectrophotometer modified to handle samples of large dimension
5. Brice-Phoenix Light Scattering Photometer
6. Leitz Aristophot Photomicrography and Microtome equipment
7. Ample electronic test equipment including Tektronix oscilloscopes, sweep and signal generators and standard measuring instruments
8. Sheet metal shop for fabrication of electronic chassis, consoles and cabinets
9. Machine shop equipped to handle all research requirements for instrument and apparatus manufacture
10. Complete equipment for the sensitometric and spectrographic evaluation of photographic materials
11. Abundant photographic darkroom facilities for the printing, enlarging and processing of sheet materials and for continuous processing of 35mm film



SPECIAL LABORATORY EQUIPMENT

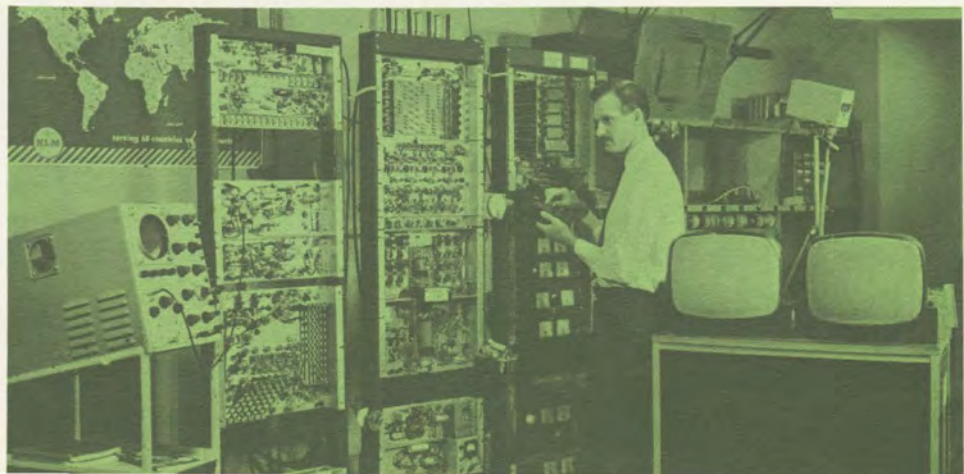
RESEARCH PROJECTS

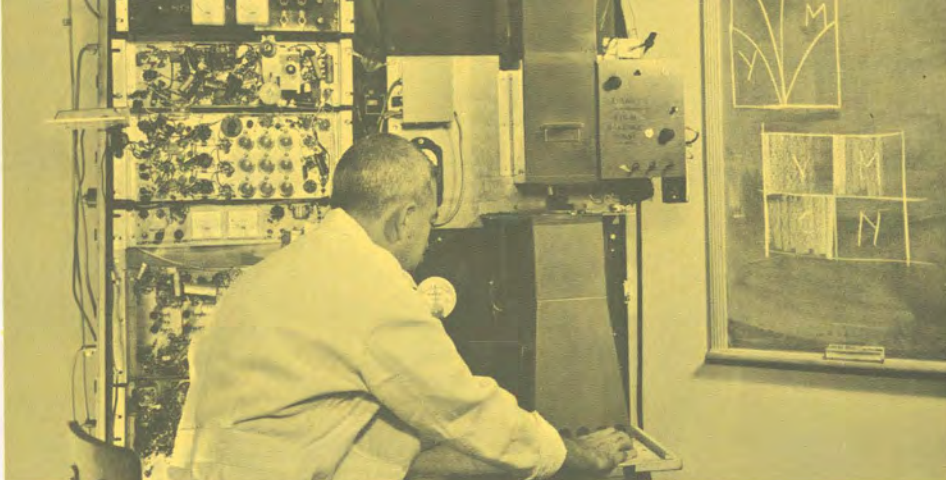
The following recent projects exemplify areas of Technicolor's research capability:

1. Development of methods for preparing high information density, color coded terrain elevation and radar reflectivity maps
2. Design and construction of high efficiency photographic and optical systems
3. Development of means for minimizing degradation in multi-generation, high resolution photographic images
4. Synthesis of special dyes for photographic work
5. Development of special mordants for dyes used in photography
6. Studies of the physical-chemical properties of gelatin as they apply to the dye transfer process
7. Studies on the stability of photographic film under unusual environmental conditions
8. Formulation of special matrix developers for use in the dye transfer process
9. Formulation and testing of viscous photographic developers
10. Chemical modification of photographic developer formulae for special purposes
11. Evaluation of cathode ray tube printing techniques for color printing
12. Evaluation of cathode ray tube timing methods for color printing.

Shown in the series of photographs which follows are recent projects which have involved the construction of equipment.

THIS TELEVISION BANDWIDTH REDUCTION SYSTEM uses digital, storage and waveform-synthesis techniques to compress the normal television bandwidth requirements by a factor of four.





CRT COLOR PRINTER. This equipment was developed for exposing color prints from color transparencies by using a cathode-ray tube light source. By means of feedback masking, it is possible to correct for the unwanted absorptions in the dyes of the transparency.



PICTURE STATISTICS ANALYZER. This complex instrument uses digital television techniques to extract and record the first-, second-, and third-order probability distributions of pictures on magnetic tape. This kind of statistical information is used in designing more efficient visual communication systems.

ELECTRONIC NEGATIVE TIMER. The electronic negative timer uses color television techniques for displaying a positive color image directly from a color negative. This permits the displayed image to be varied instantaneously in color balance, contrast, and color masking. With this facility, the red, green and blue printing exposures required by the negative may readily be determined.



The Engineering Department comprises a staff which includes electrical, mechanical and chemical engineers, designers, estimators, erectors, machinists, and supporting personnel. This force occupies a floor area of 6,000 sq. feet.

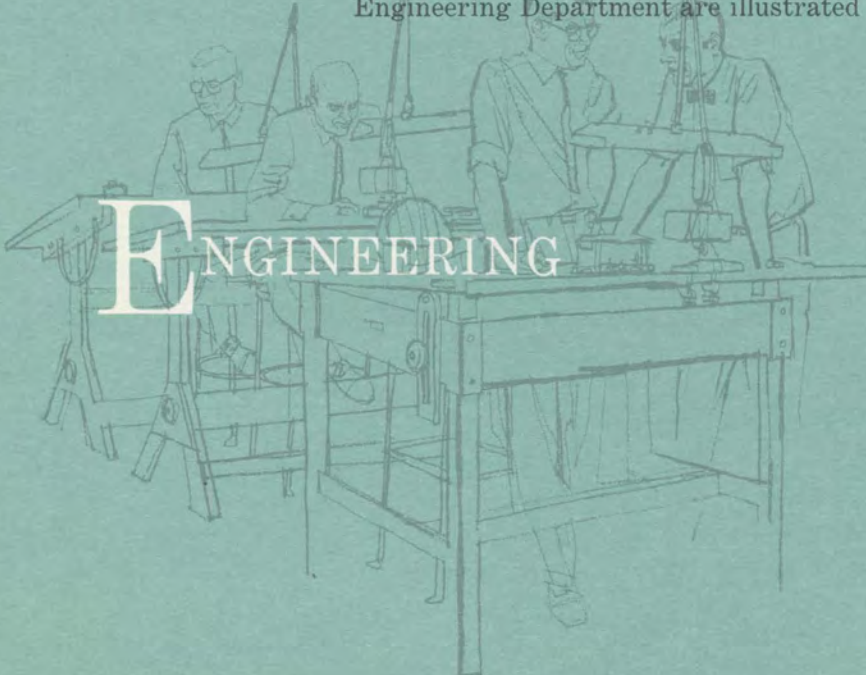
This staff and its facilities are especially qualified in the design and construction of all the various facilities which are required by film processing laboratories. Included in these capabilities are:

1. Plant layout
2. Structural design and fabrication
3. Film processing machines
4. Chemical plant equipment
5. Electrolytic silver recovery systems
6. Electrical construction
7. Hydraulic systems
8. Large area cameras, printers and projection systems
9. Printer light control systems
10. Systems of instrumentation and control
11. Training program for photographic laboratory operation

All of Technicolor's professional and amateur processing facilities, both in the United States (except in the New York plant) and abroad, have been designed by the Engineering Department. The equipment in these plants has likewise been designed by Engineering and much of it has been constructed in Technicolor's own shops. Recently, design and construction projects of similar nature have been undertaken for government agencies.

Recent Engineering Projects

Typical projects which have been completed in the past few months by the Engineering Department are illustrated on the following pages.



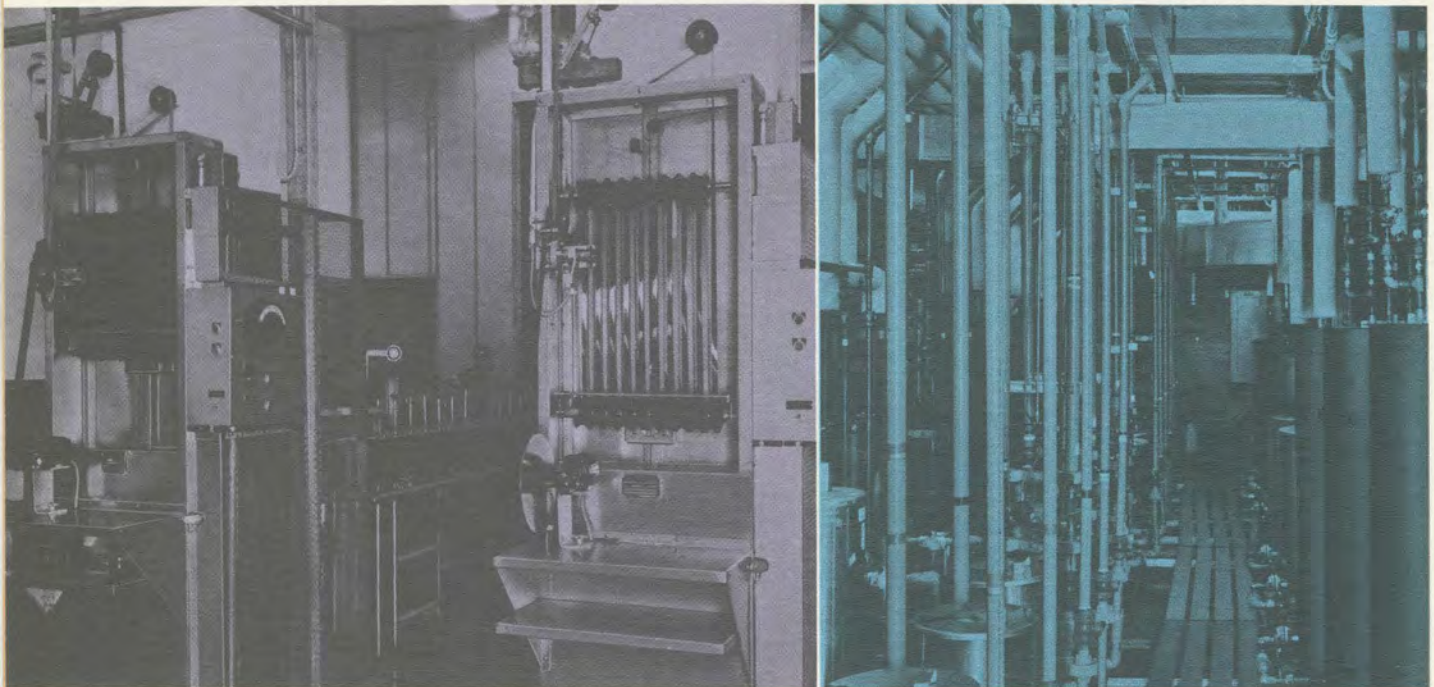
ENGINEERING



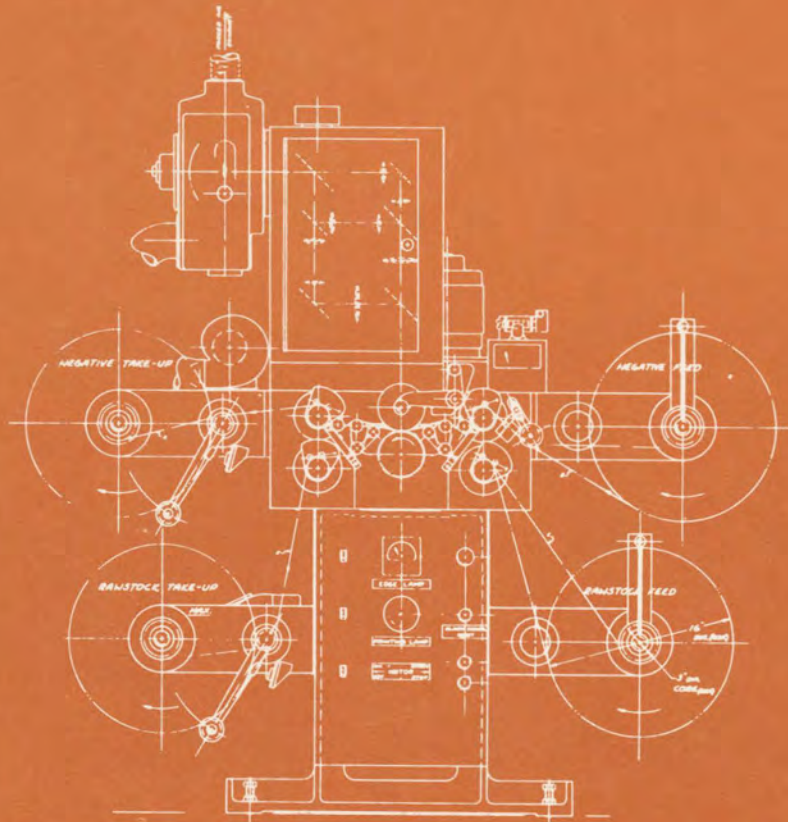
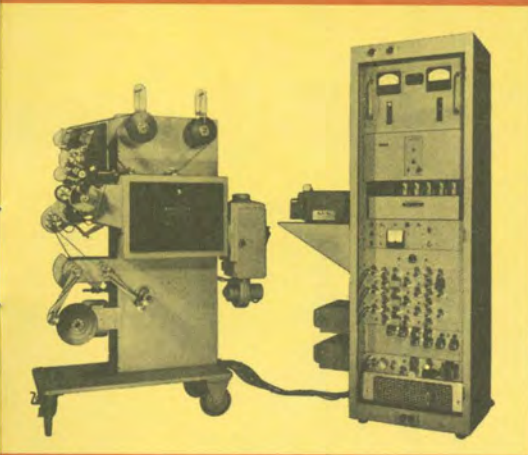
COLOR FILM PROCESSING PLANT, ROME, ITALY, is located on the outskirts of Rome, covers a floor area of 49,000 sq. ft. and has complete facilities for the manufacture of 72 million feet of release prints per year by the dye transfer process. All aspects of layout and construction of the buildings were under the control of the Engineering Department, and all items of processing equipment were both designed and constructed by that group.

PROCESSING FACILITIES FOR VANDENBERG AIR FORCE BASE.

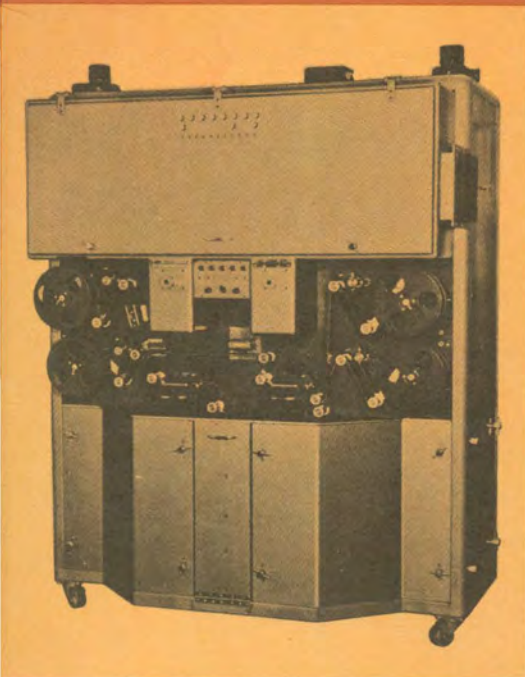
(Below, left) This new Air Force laboratory is equipped with machines for processing color and black and white films, complete with chemical systems, all designed and constructed by Technicolor. To combat the corrosion problem this equipment is constructed of Type 316 stainless steel, heliarc welded. The after treatment of passivation is important for removing all foreign matter and thoroughly cleansing the welded areas.



CHEMICAL SYSTEMS FOR VANDENBERG AIR FORCE BASE. (Above, right) These chemical facilities are typical of the requirements for processing color and black and white motion picture film. Many of the chemical systems present special problems of their corrosive nature. Technicolor is experienced in providing the complete engineering service, starting with plant layout and following through with fabrication, installation and testing of equipment, including the training of personnel in its operation.



CONTINUOUS COLOR PRINTER FOR PATRICK AIR FORCE BASE. (Drawing, above) This printer handles 70mm film running continuously at a speed of 105 ft. per minute. It is equipped with a beam splitting type illuminating system in which light from a single source is split into separate red, green, and blue beams. Each beam is independently modulated to secure close control of color quality and intensity after recombination at the printing aperture. High efficiency dichroic filters and reflectors are used throughout. It has a control rack similar to the one illustrated above, left.



CONTINUOUS ADDITIVE COLOR PRINTER. (Photo, above, left) This printer handles 35mm film and is one of two supplied to Orlando Air Force Base. The second machine (not shown) handles 16mm film and combines track and picture printing in one machine. Both are for color printing and both run at 150 ft. per minute.

AUTOMATIC PRINTER FOR STILL NEGATIVES. (Left) Color negatives are printed by this machine with entirely automatic adjustment for color balance and density distribution, at a rate of about 5000 prints per hour. Printing information is encoded along the edge of each negative and serves to program the automatic operation of the printer for optimum performance.

Additional information with respect to services outlined in the foregoing pages may be obtained by contacting: Research and Engineering Division, Technicolor Corporation, 2800 West Olive Avenue, Burbank, California.

Technicolor Corporation is a wholly owned subsidiary of Technicolor Inc., 30 Rockefeller Plaza, New York, N. Y.

