

BROADCAST NEWS



In this issue . . .

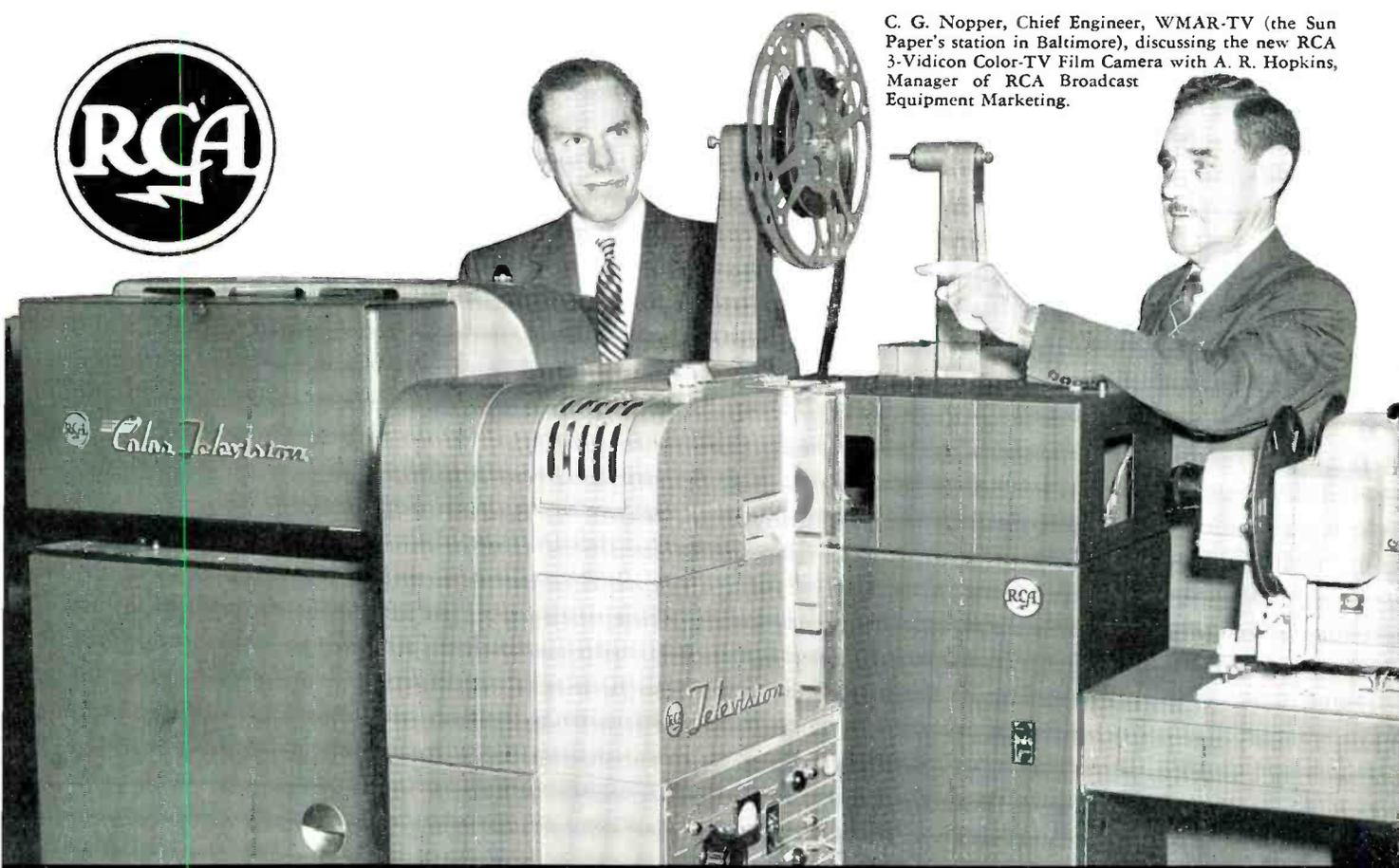
**LIVE COLOR PROGRAMMING AT
WKY-TV, WBAP-TV AND WTMJ-TV**

Vol. No. 31

December, 1954



C. G. Nopper, Chief Engineer, WMAR-TV (the Sun Paper's station in Baltimore), discussing the new RCA 3-Vidicon Color-TV Film Camera with A. R. Hopkins, Manager of RCA Broadcast Equipment Marketing.



Now Delivering

RCA 3-V COLOR FILM AND SLIDE CAMERAS

A. R. Hopkins, RCA, and C. G. Nopper, WMAR-TV, inspecting control panel of the new "3-V" Color Film Camera—first one delivered from units now in production.



This 3-Vidicon Color-TV Film Camera handles 16mm, 35mm color film and slides.

- Multiplexing is automatic—interlocked with projector controls
- High Signal-to-Noise Ratio on color and monochrome—even with unusually dense film
- Excellent resolution and gamma
- Adequate reserve of light for dense film
- Color Fidelity as good as Image Orthicon
- Uses conventional TV projector, the RCA TP-68C

40 TV stations scheduled to receive "3-V" Color Film and Slide Camera equipments within 90 days

Within a few weeks 40 TV stations will be able to meet the demand for color film and slide programs. RCA is now producing and shipping in quantity the finest color TV film-and-slide camera ever designed—the "3-V." Now stations can supplement their color network shows with color motion picture film and slides. And they can do it the easy way—and at relatively low cost! For information on the RCA 3-V—the Color-TV Film and Slide Camera that excels all other approaches to color film reproduction—see your RCA Broadcast Sales Representative. In Canada, write RCA Victor, Ltd., Montreal.

RCA Pioneered and Developed Compatible Color Television



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MONOCHROME AND COLOR SEMINARS COMBINED

AT 20TH TRAINING SESSION 67

"RCA PIONEERED AND DEVELOPED COMPATIBLE COLOR TELEVISION"

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PRINTED
IN
U.S.A.

For the **right** start in **Color-TV**...

*you need this RCA Test and
Measuring Equipment "Package!"*

This indispensable package represents a basic "must" for a satisfactory color operation—network, film or live. You need it to check your station performance, maintain your broadcasting standards, assure the highest quality.

The various components of this vital "package" are pictured below. Charts at the right show how these units are used with relation to other station equipment as a means of providing complete testing facilities to meet various situations.

RCA engineers—the acknowledged pioneers in the development of compatible color television—have spent years developing this test equipment which takes the guesswork out of color broadcasting. Already, RCA color test equipment is proving itself in nearly 100 stations, assuring compliance with FCC standards of quality.

The "package" represents the minimum requirements for your station. For peak station performance each of these items should be included. In many stations the duplication of certain of the items will be desirable.

For experienced assistance in planning the installation of this equipment to meet your individual requirements, call on your RCA Broadcast Sales Representative. Or write RCA Engineering Products Division, Camden, N. J.

The 6 functions
shown here represent
the testing
facilities required
to attain and
maintain the
highest standards
in color operation



RCA PIONEERED AND DEVELOPED COMPATIBLE COLOR TELEVISION
RADIO CORPORATION of AMERICA
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CAMDEN, N. J.

*You will need
all of these
5 instruments
for color test and
measurement...*

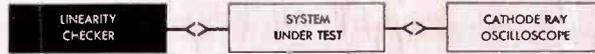


LINEARITY CHECKER
WA-7B

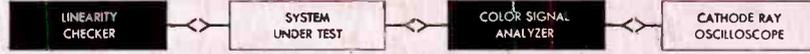


COLOR SIGNAL ANALYZER
WA-6A

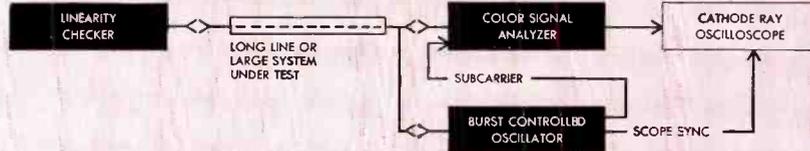
- 1** Linearity Checker and Oscilloscope test for differential gain.



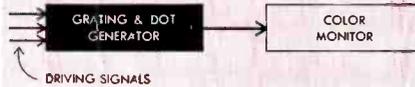
- 2** Addition of Color Signal Analyzer makes it possible to check differential gain and differential phase.



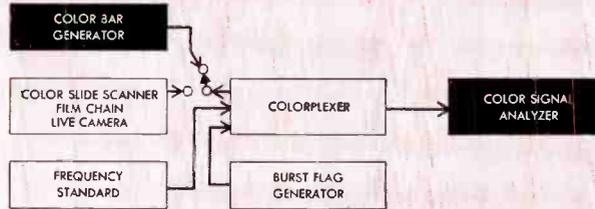
- 3** Burst-Controlled Oscillator must be added to check differential gain and phase at remote locations where studio sub-carrier is not available.



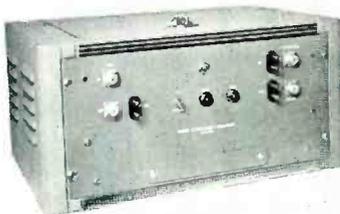
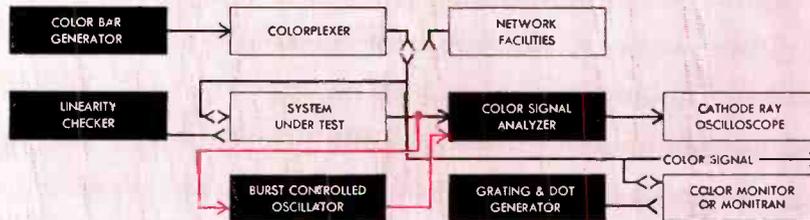
- 4** Grating and Dot Generator checks convergence and deflection linearity of monitors. Its signal can also be used for checking house monitoring systems.



- 5** The Color Bar Generator shown is used with origination equipment for supplying test signal to system. The Color Bar Generator in conjunction with the Color Signal Analyzer is used for precise alignment of the Colorplexer.



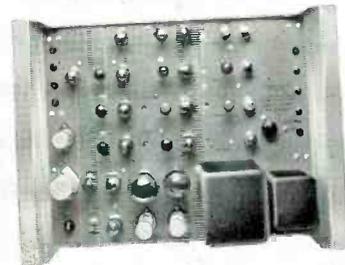
- 6** Integrated Test Equipment System for color broadcasting. This includes all situations depicted above.



**BURST-CONTROLLED
OSCILLATOR
WA-4A**

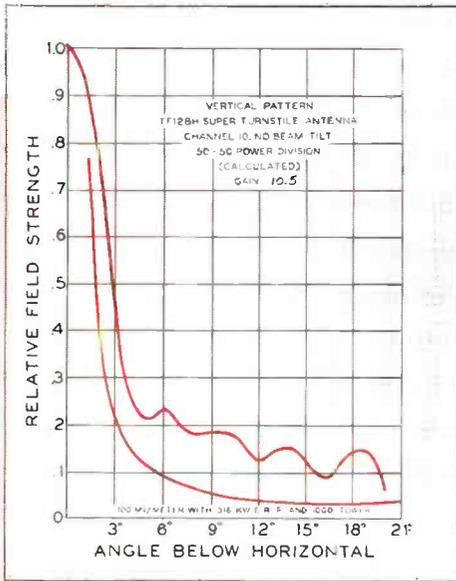


**GRATING AND
DOT GENERATOR
WA-3B**



**COLOR BAR GENERATOR
WA-1D**

How to "Saturate"



Vertical Field Pattern of new RCA TF-12BH 50-kw antenna. Note complete absence of vertical nulls. Operated in conjunction with an RCA 50-kw TT-50AH transmitter, this antenna will "saturate" your service area with strong signals.

RCA 50-kw VHF transmitter, TT-50AH Now in regular production, this transmitter is the ultimate in high power for channels 7 to 13. P.A.'s operate with standard power tetrodes (obtained from any RCA Tube Distributor).



an entire service area

(CHANNELS 7 TO 13)



RCA's new 50-kw VHF transmitter, and an RCA TF-12BH Superturnstile antenna, will "flood" your service area with strong signals — close in AND far out!

Tailored to "consultants' specifications," RCA's 50-kw antenna-transmitter combination is your answer for maximum ERP and "saturation" coverage on channels 7 to 13.

"Rain" your signals in all directions!

No need to "beam" to reach specific areas. You get saturation everywhere—close in *and* far out. Reason: RCA's TF-12BH high-gain antenna delivers two to three times the required field strength—even in minimum signal areas. And it makes no difference whether you use an extremely high tower—or one of average height. This is the one transmitter-antenna combination that develops 316 KW ERP—with power to spare!

Antenna System takes full 50-kw Input!

RCA's TF-12BH high-gain antenna and antenna components will take the full output of the 50-kw VHF transmitter—with a high factor of safety. Designed for pedestal

or for tower-mounting, RCA antennas withstand windloads of 110 miles, and more. A unique switchable feed system enables you to switch power from one part of the antenna to another QUICKLY—an important advantage that will keep you on-air during an emergency.

A 50-kw VHF System—completely matched!

RCA can supply 50-kw systems matched precisely for peak performance—from antenna, transmitter, transmission line, fittings, tower, r-f loads, wattmeters, and diplexers—to the hundreds of individual components required by the carefully planned station plant.

Qualified planning help is vital!

For experienced assistance in planning a transmitter-antenna system that will literally "blanket" your service area with strong signals, call your RCA Broadcast Sales Representative. *He knows systems-planning from A to Z.*

RCA PIONEERED AND DEVELOPED COMPATIBLE COLOR TELEVISION



RADIO CORPORATION of AMERICA
ENGINEERING PRODUCTS DIVISION. CAMDEN, N. J.

TG-2A STUDIO SYNC GENERATOR

Introduction

An equipment as vital to the operation of the television plant as a synchronizing generator must be built to the highest possible standards of reliability. The RCA TG-1A Studio Synchronizing Generator met these standards, proving itself in the field with many years of successful operation. Yet it was realized that a redesign based on modern miniaturized tubes and components and recent circuit developments could bring about a great improvement in the size and simplicity of existing sync generating equipment. For these reasons, the TG-2A was developed taking full advantage of modern miniaturization techniques and at the same time providing improved reliability and greater ease of operation.

The signal generating and shaping requirements of a synchronizing generator may be satisfied with a number of different circuit techniques. Most designs make use

by

A. C. LUTHER, JR.
TV Terminal Engineering

of one particular type of circuit, which is modified and duplicated to perform each different operation. Selecting circuits having similar individual reliabilities, the best overall reliability will be achieved with the circuit and the configuration which uses the smallest number of tube sections. Thus, if individual circuits are highly reliable, the most reliable sync generator can also be the simplest one.

Basic Circuit Element

Multivibrators are especially adaptable to the circuit functions required of a synchronizing generator. They offer simplicity, flexibility; and with careful design, a multivibrator can be made highly reliable. If

multivibrator-type circuits are to be used in pulse-width determining applications, which is necessary in a sync generator, it further becomes necessary to consider accuracy and stability.

It is well known that the pulse width of a conventional monostable or one-shot multivibrator is a complex function of tube and circuit parameters. Circuit parameters may be controlled quite closely with high quality components if stray and parasitic impedances are made negligible. Tube characteristics, on the other hand, are subject to variation with age, line voltage, and tube replacement. Thus it is necessary to *stabilize* the multivibrator against tube characteristics.

The TG-2A synchronizing generator uses as its basic circuit, a *stabilized* monostable multivibrator which can generate a pulse width depending essentially on component values alone. Tube characteristics are essentially swamped out by a degenerative feedback system. A single multivibrator with feedback stabilization uses two triodes and a germanium diode as shown in Fig. 2. This circuit is used in the TG-2A for generation of the master frequency, counting, and determination of all pulse widths. In many cases it is possible to use fixed components to determine the circuit operation; the number of adjustments thereby being minimized.

Principally because of the simplicity and flexibility of the stabilized multivibrator, all the timing and pulse generation operations for the four standard sync generator output signals (horizontal driving, vertical driving, blanking, and sync) are performed in 27 tube envelopes. Of the total of 40 tubes in the TG-2A, this leaves 13 tubes which provide a regulated power supply, grating generation and Genlock frequency control circuits. The entire unit is packaged in a 21-inch bathtub chassis for rack mounting such that tubes and operating controls are accessible at the front of the rack, and the wiring and *all* controls can be reached from the rear. The layout is pictured in Figs. 1 and 3.

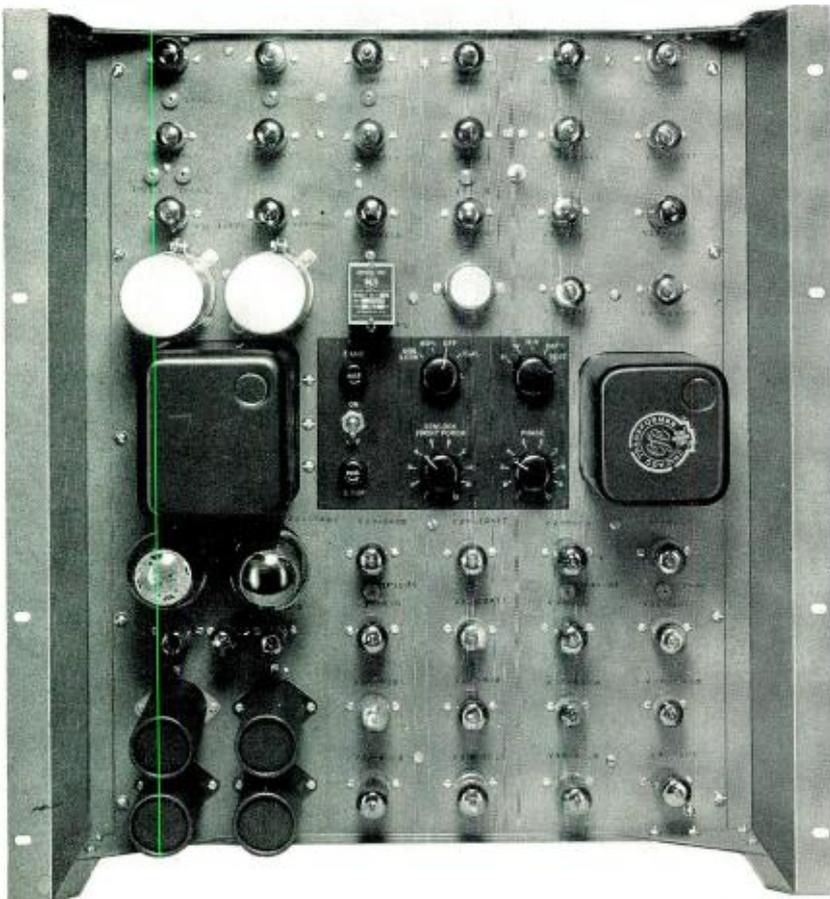


FIG. 1. Front view of the new RCA TG-2A Sync Generator which requires less than one-third the rack space needed by other sync systems.

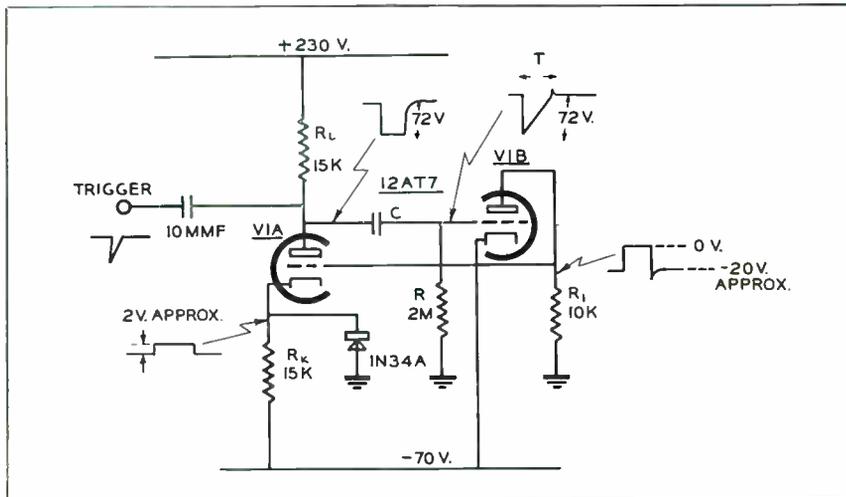


FIG. 2. Schematic diagram of basic stabilized monostable multivibrator.

Timing Circuits

Twelve stabilized multivibrators are used in the basic sync generator portion of the TG-2A; this is shown to the right of the dotted line in the block diagram, Fig. 4. The primary signal for the synchronizing generator occurs at 31,500 cps and is generated by the master oscillator. This circuit is a modified form of stabilized multivibrator which provides free-running at a frequency determined by the circuit components, however the frequency may be readily varied by a d-c voltage to provide control for an afc loop.

Signals from the master oscillator divide in four paths through the sync generator. The first of these is the main counter chain which provides for counting from the master frequency (31,500 cps) down to the field frequency (60 cps)—a count of 525:1. This count down is obtained in four multivibrators counting by 7, 5, 5, and 3 respectively. The counters are stabilized monostable multivibrators operating as in Fig. 5, which shows waveforms for a 5:1 counter. Assuming the multivibrator is triggered by incoming trigger "A", it is seen that the multivibrator timing interval must be more than 4 but less than 5 cycles of the incoming trigger. Then the multivibrator will recover between the fourth and fifth triggers and will retrigger to start a new cycle on the fifth trigger. The multivibrator is designed to be insensitive to the triggers which occur during the timing interval, so that simple differentiation of the timing waveform will provide the output triggers. It can be seen that this type of operation allows a tolerance on the multivibrator operation which is inversely proportional to the count ratio. Thus for 2, 3,

or 5 counting the multivibrator tolerances are sufficiently small that no set-up adjustment is required on the circuits. However, for the 7-counter, it is necessary to provide an adjustment to allow for initial component tolerances. Once this adjustment has been set, it should not require attention again, even for tube replacement.

The output from the main counter chain at 60 cps triggers the vertical blanking multivibrator which determines the width

of vertical blanking. The vertical driving pulse is derived from the vertical blanking pulse by a differentiation process which produces a pulse which is always narrower than the blanking pulse, regardless of adjustments.

Another signal from the master multivibrator triggers the 2:1 counter which provides the 15,750 cps horizontal frequency. The generation of horizontal blanking and horizontal driving from the output of the 2:1 counter is the same as the vertical pulses. Horizontal and vertical blanking are mixed by the blanking mixer, which suppresses the horizontal pulses during the vertical pulse to provide the standard composite blanking waveform.

RETMA Sync Signal Generation

The other two signal paths from the master oscillator are used in the generation of the RETMA synchronizing signal. This signal contains information at three frequencies (31,500, 15,750 and 60 cps) in a series of pulses of three different widths (2.38, 4.76, and 27.3 μ sec). The synchronizing signal from the TG-2A is generated by a single multivibrator which is provided with special circuits to control its pulse width and pulse frequency. Fig. 6 shows the waveforms which accomplish this operation.

For 96.6% of the time, the synchronizing signal is made up of only horizontal

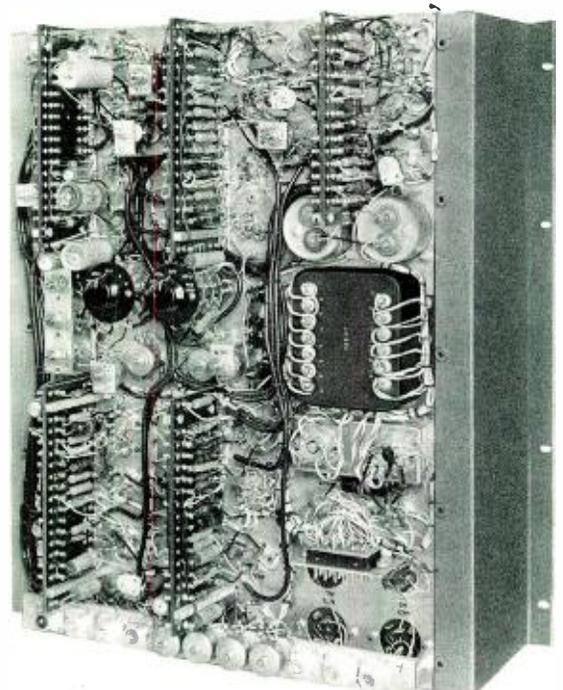


FIG. 3. Rear view of the TG-2A Sync Generator chassis showing components and wiring.

sync pulses at a frequency of 15,750 cps and having a nominal width of 4.76 μ sec. However, for 9 lines out of each field (at a 60 cps rate), the pulse repetition frequency becomes 31,500 pulse per second; and the pulse width is controlled in three groups of six pulses each. This waveform, shown by line (g) of Fig. 6, is necessary to provide the vertical synchronizing information to the receiver consistent with the requirements of interlaced scanning.

Triggers for the synchronizing signal multivibrator come from the master oscillator at 31,500 cps. In order to generate the horizontal synchronizing signal at 15,750 cps, a signal from the horizontal blanking multivibrator is injected such that the sync multivibrator will be triggered only during the horizontal blanking interval. This action is removed during the 9-line vertical synchronizing interval so that the sync multivibrator may fire on every incoming trigger to accomplish the 2:1 change in pulse frequency. The 9-line vertical synchronizing interval is divided into three 3-line intervals during which times the pulse width is either narrow (equalizing pulses) or wide (vertical sync pulses) as shown in line (g) of Fig. 6. Thus it is necessary to generate gating signals to define these intervals where the pulse width must change. These gates are shown in lines (b) and (c) of Fig. 6; they are the equalizing pulse gates and the vertical sync gate respectively. Generation of these signals is accomplished by a pair of stabilized multivibrators arranged to trigger one another in sequence. This action

is initiated by the 60 cps trigger from the 60 cycle output of the counter chain. In order to eliminate critical adjustments in this circuit, the vertical interval gate multivibrators are operated as counters in conjunction with a 3:1 counter operating directly from the master oscillator. This system operates much the same as the main counter chain except that both the starting and stopping points of each multivibrator cycle are precisely located by triggers from the master oscillator.

The two vertical interval gates are applied to the synchronizing signal multivibrator to change the amplitude of the timing waveform and thus control the width of the generated pulse. The amplitude-and-width modulated timing waveform of the sync multivibrator is shown in Fig. 6(f). Clipping of the positive peaks of this waveform yields the sync signal output, line (g).

The leading edges of the synchronizing pulses must be delayed from the leading edges of the horizontal blanking pulses by an amount known as the front porch. The manner in which this is done with a single delay pulse generator is shown by Fig. 7. Horizontal blanking occurs at the trailing edge of the master oscillator pulse, having received its triggers via the 2:1 counter. The same edge starts off the front porch delay generator which provides a pulse whose trailing edge triggers the sync multivibrator. Thus, neglecting circuit delays, the pulse generated in the front porch delay circuit determines the width of the front porch. Provision has been made for manual

adjustment of the front porch over enough range to accommodate all usual system delays. Once this control is adjusted, the front porch will remain stabilized at that value.

Frequency Control

In most complete systems, the master multivibrator is not used as the primary standard to determine the frequency of the television system. Instead, it is "locked-in" to some other frequency standard. In the TG-2A, there are four types of frequency control available with a front panel selector switch. These are listed below with their purposes and description.

1. 60-CYCLE AFC. The normal operation in a monochrome television system is to lock the sync generator frequencies to the 60-cycle power line such that the vertical-frequency pulses stay in the same relative phase with respect to the power line sinusoidal voltage. Then it is possible to operate film projectors with synchronous motors directly from the a-c power lines and maintain synchronization with the TV system.
2. CRYSTAL CONTROL. In some cases the local power line frequency may not be the correct value, or it may be so unstable that satisfactory 60 cycle AFC operation is impossible. Under these conditions the next best operation is to put the sync generator exactly on frequency and let it control itself. A crystal oscillator is built in to the TG-2A to facilitate this type of operation. The crystal runs at 94,500 cps, which is fed to the master multivibrator operating as a 3:1 frequency divider at exactly 31,500 cps.

3. EXTERNAL FREQUENCY CONTROL.

In the RCA Color TV system it is necessary that the sync generator be exactly synchronized with the 3.58-megacycle color subcarrier frequency. For this reason, provision is made for receiving an external synchronizing signal from a color television frequency standard and counter unit which will lock the 31,500 cycle master oscillator at the proper fraction of the subcarrier frequency.

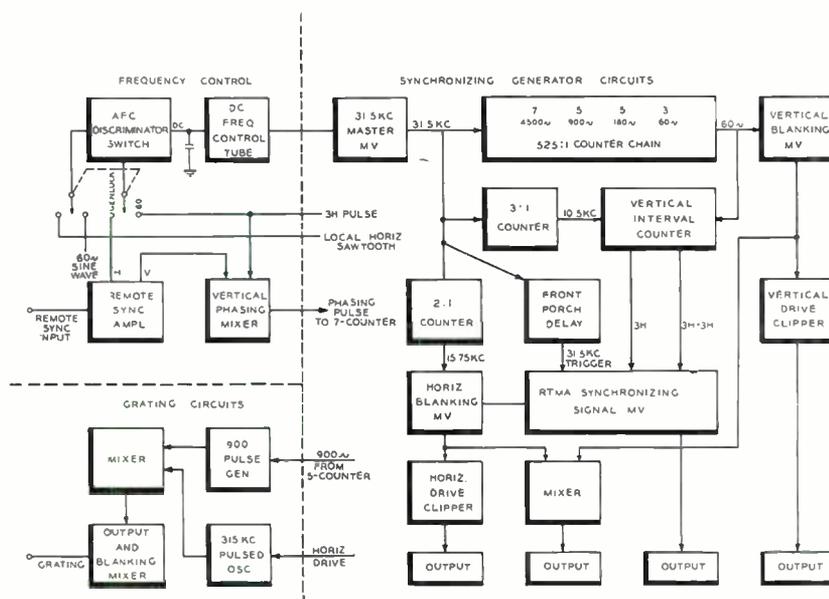


FIG. 4. Block diagram of the TG-2A sync generator.

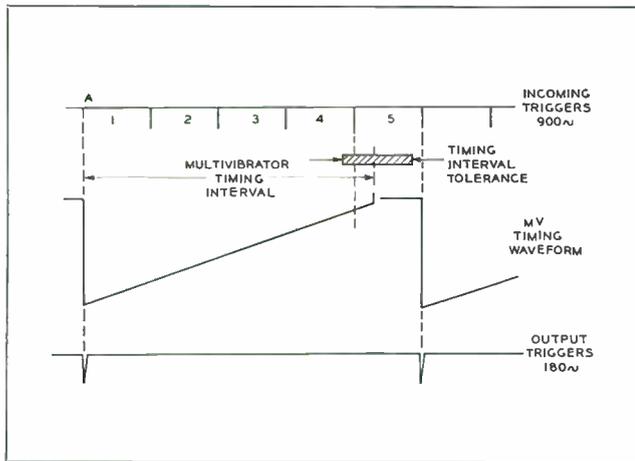


FIG. 5. 5:1 monostable multivibrator counter waveforms.

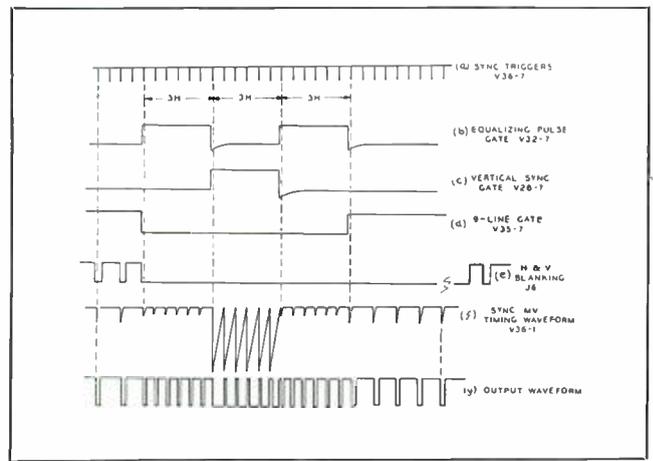


FIG. 6. Synthesis of RETMA sync (waveforms).

4. GENLOCK.

In modern television programming, it often becomes necessary to perform lap dissolves or special effects between two signals which would not normally be synchronous. Since synchronism is an essential requirement of such operation, some provision must be made to lock two synchronizing generators together. This feature is called Genlock; the TG-2A contains complete circuitry for accepting a synchronizing signal stripped from a remote video signal (by an RCA Type TA-5D Stabilizing Amplifier), and locking the local sync generator both horizontally and vertically to the remote signal.

Horizontal lock is provided by an afc system which provides good noise immunity consistent with non-critical operation. This afc circuit controls the frequency of the master oscillator so that it operates exactly in step with the remote signal. Under such conditions, the vertical output from the sync generator may have any phase with respect to the vertical components of the remote sync signal. To correct this condition, a pulse is introduced to the main counter chain to cause a controlled miscounting until the two vertical signals "slip" into exact coincidence. The length of time required for this operation, which represents the total lock-in time of the system since horizontal locking occurs almost instantaneously, varies with the starting conditions; it may be anything between zero and four seconds.

The horizontal afc of the Genlock includes a phasing control so that the remote and local blanking signals may be brought into exact coincidence with each

other regardless of front porch widths or system delays.

Grating Pattern

An additional feature of the TG-2A is a built-in grating generator circuit. This circuit operates entirely independent of the rest of the sync generator and provides a choice of five test patterns on a separate output jack. These patterns are: horizontal bars, vertical bars, both horizontal and vertical, dots, or large dots. The large dots are particularly useful for convergence testing of color monitors and receivers, while the other patterns may be used with the RETMA linearity test chart for adjusting scanning linearity of cameras and monitors. All patterns are produced as white lines or dots on a black background, with blanking and without sync.

Overall Stability Testing

Circuits for counting and pulse generation in the TG-2A fall in the general class of go-no-go devices. In other words, there is an abrupt point beyond which a failure has unquestionably occurred. Such circuits have the property that slow deterioration caused by tube aging does not show up in the output, but it does increase the probability of a failure.

In order to detect the internal aging of the circuits so that deterioration may be caught before it causes a sudden failure, the TG-2A contains a special checking means which indicates the amount of "margin" in the circuits. A control has been provided on the master oscillator frequency which has a predetermined range of $\pm 5\%$. All the counting circuits are designed to operate satisfactorily over this entire range. However, as tubes age the range of the circuit with respect to master frequency will decrease. Clearly, a routine procedure

of checking the frequency range for satisfactory operation will indicate when the circuits are getting on the "ragged edge".

Such a test is extremely simple to perform; with the generator on 60-cycle lock, the master frequency control is rotated either side of its center position while observing the operation of the generator on some convenient monitor or oscilloscope. Over the entire range of the control, no change in frequency, number of pulses, or pulse width should be observed. This condition should be obtained by the initial adjustment of the generator, and can be maintained thereafter by preventative maintenance whenever the test shows erratic or improper operation at the ends of the frequency range. Normal operation, of course is with the frequency control in its center position, and complete failure of the generator will not occur until the region of instability as shown by the test approaches this center position of the control.

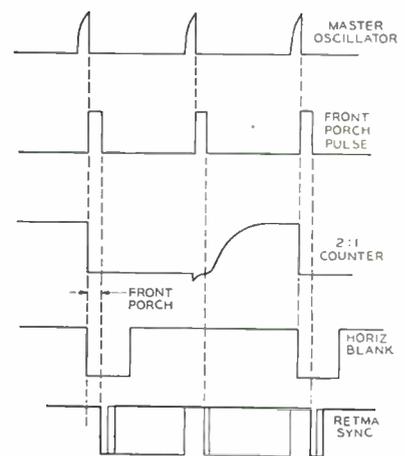


FIG. 7. Horizontal timing diagram.

an ink, it dries immediately and can be handled without smearing. Also, there is no necessity of cleaning the type since it comes in contact only with the non-emulsion side of the leaf paper. Cell overlays are readily "flapped" or mounted over a card by the use of cellophane tape.

LETTERING METHODS

Where cards did not involve the use of Cell overlays the lettering was done either by hand brush lettering, or by hot-pressing type directly to the card or by a combination of both. In the example of the Circus Clown (Fig. 1) the lettering was done show-card style or brush lettering. In the card with the Floral Arrangement (Fig. 1) the lettering was hot-pressed to a "pannelled" card which was pasted down to the background board. Here the RCA credit line was hot-pressed directly on the background board. In the Life Saver commercial, (Fig. 1) lettering was done by brush except for the words "Five Flavors" which was hot-press lettering. While hand or brush lettering may be necessary in some cases, hot-press lettering can save time and money and an extremely wide selection of type designs are available to set different "moods."

WHERE CELL OVERLAYS CAN BE USED AND THEIR ADVANTAGES

Cell overlays can be used only where the work beneath them is flat. Also, when a Cell

overlay is mounted to the card it should cover the entire card. There may be an inclination to use a partial Cell overlay where an actual object is mounted to a card with lettering to one side of it. A partial overlay would photograph with a noticeable edge; so this practice should be avoided. Where real objects are mounted to the card for illustration purpose the lettering should be done either by hand or by hot-pressing directly to the card or a combination of both as shown in the Life Saver commercial (Fig. 1). An alternate method is to hot-press lettering to a thin sheet of cardboard or paper and cement it to the background card as shown in the Floral Arrangement example of Fig. 1. Here, the artificial flowers mounted directly to the background card prevent the use of a Cell overlay.

Cell Overlays Permit "Re-Use" of Artwork

Fig. 3 points out an advantage of using Cell overlays. The artwork beneath the overlay can be retained and used with revised copy or filed and picked up for future use. As illustrated by Fig. 3, new copy can be printed on a new Cell overlay, permitting a new message to be posted on the card mounted on the "Artists" easel. This message can be changed any number of times without limiting use of the artwork. While an artist is rendering the illustration the Cell overlay can be under

FIG. 5. Layout of a standard title card showing recommended copy area. The copy area (7" x 9 1/2") is a small portion of the overall 11" x 14" card. This area is the safe area for copy, assuring that no useful information will be "clipped" by the masks of home receivers.

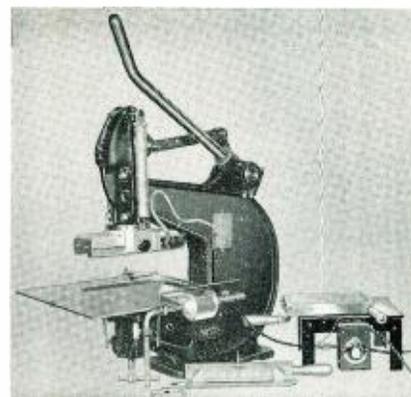
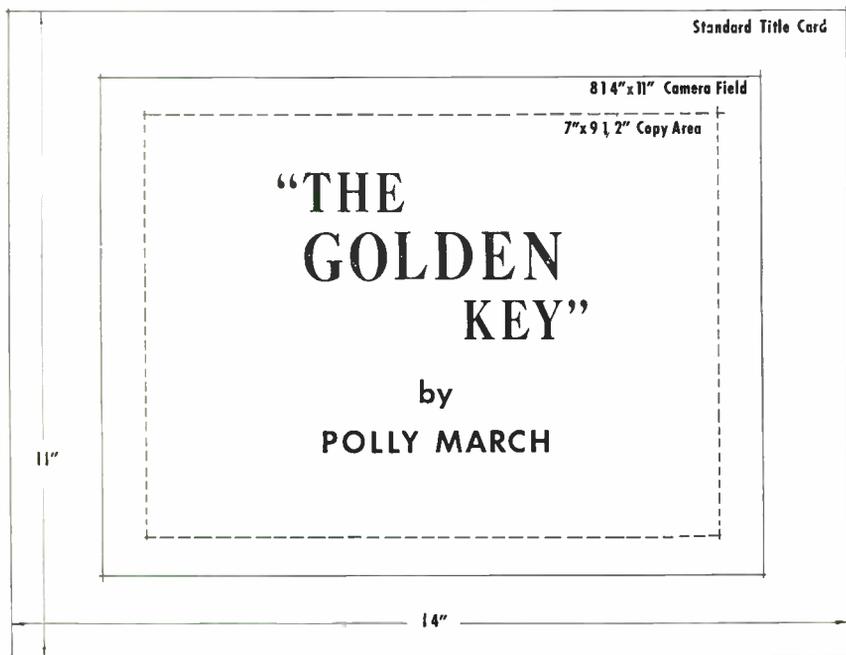


FIG. 6. The hot press shown above is a convenient tool in preparing color TV slides as well as black-and-white. This device saves time and offers wide flexibility.

production in the hot-press room, permitting two phases of preparation to be handled at one time. Cell overlays are quick to produce and inexpensive when prepared by the hot-press method. While the Cell overlay technique of producing artwork for slides has many advantages, the Cell overlay card cannot be used successfully on "live" studio camera due to glare of the acetate. Direct-lettered cards, however, can be used on "live" studio camera.

TECHNIQUES OF PRODUCING THE ILLUSTRATION

In Fig. 2, the artist, the floor and easel frame were rendered in water colors by brush. The card mounted on the easel was cut from a piece of off-white paper and pasted down, and the artistic border on the top and right side touched in with water color. The Cell overlay, of course, provided the message. In Fig. 1, the carousel was made by cutting strips of colored paper to form the pennants, the scalloped roof, the base and the diamond-shaped decorations on the base. These were pasted down to the background board. The hobby horses and frills were whited in, partially on the pasted-down paper and partially on the actual background board. Since the message was on a Cell overlay, the undisturbed artwork beneath provided an excellent subject to file for future use.

The Independence Hall scene shown in Fig. 1 was rendered in brick-red and white water colors directly to the background board, except for the roofs of the building, the windows and trees. The roofs, the windows and trees were cut from rough green paper, pasted in and touched with white. In the circus card of Fig. 1, ex-

cept for the clown which was a paper cut-out painted and pasted down, the general treatment including the lettering was executed in poster style. The Floral illustration of Fig. 1 was handled simply by scotch-taping a bunch of artificial flowers to the background card. Notice the three-dimensional shadow effect produced when the work is lighted. Another note of interest is the "panelled card" which is made to look like a panel card by painting a gray line on the left side and top, while the right side and bottom is painted with stark white lines. The panelled card is made of off-white paper to minimize "burning in" on the TV system and to reduce the possibility of an ugly aura of black which often surrounds a brilliant white. This also makes it possible to draw in a stark white line. Another point here is that the letters WFIL-TV and the numeral 6 are not pure black. This is a carry-over from techniques of lettering for black-and-white slides where contrast limitations prevailed.

USING REAL-LIFE OBJECTS AND PACKAGES FOR ILLUSTRATION

The work involved and expense of painting or fabricating a facsimile of a product or device is quickly reduced by using the actual product or product package. In this way the true natural color of the package or product can be presented at no additional cost. Also when the finished artwork is lighted in the photographic process, an interesting shadow can be produced which provides a 3-dimensional effect in the finished slide. Note the shadows beneath and to the right of the package and Life Savers in Fig. 1.

Since most slides are prepared by using 11" x 14" cards, small packaged items lend themselves readily to convenience. However, larger packages (contents removed when possible) can be mounted on a background card chosen to scale, with lettering to scale. The Life Saver commercial of Fig. 1 illustrates a small packaged item mounted directly to an 11" x 14" card. A background, with a color complementary to the real package of Five Flavor Life Savers was chosen. A highlight background or application of blue and white paint in a semi-swirl on an orchid background card provided an area on which to place the real package and real Life Savers which had been removed from another package. Two narrow strips of thick cardboard cut somewhat shorter than the package were pasted parallel to each other and close enough to prevent the round package from rolling. These strips offered a point of anchor for the package which was se-

cured by clear cement. The candy Life Savers were likewise mounted after a suitable color progression was selected. Note the tie-in between the lettering of the words Life Savers and the lettering on the package . . . and the poetic tie-in between "Life Savers" and "Five Flavors." In addition, this slide serves as a 10-second "shared ident"—used during station breaks. The required positioning of the station call for a 10-second shared identification is in the upper right hand quarter of the picture area.

COPY AREA SPECIFICATIONS

The working area for placement of copy should be planned so that useful information is not clipped or cropped when viewed on home receivers. A valuable guide is shown in Fig. 5. Most work is done on 11" x 14" cards; however, larger cards may be used when kept on this scale. Photostatic enlargement of the measurement guide in Fig. 5 may prove useful as a guide for larger work. Actually, the copy area is a small part of an 11" x 14" card. As shown by Fig. 5, this area is 7" x 9½".

MAKING THE SLIDE FROM FINISHED ARTWORK

The finished artwork is photographed either as a single direct exposure on 35-mm. color film, or as many as nine individual exposures may be made on 4 x 5 color film with properly designed copy camera equipment. A reliable local photographer can usually supply this service or readily acquire such facilities. In larger cities there may be photographers who specialize in this work.

Once the film has been processed, it can be cut and mounted. A suitable method of mounting film to produce a 2 x 2 slide is to frame it with a mask having an opening of 29/32" x 1 11/32" and scotch-tape the edges to bind the components together. (See Fig. 7). The glass enclosure (6 to 8 ounce glass in glazier's terminology) protects the film and facilitates cleaning. When producing slides, at least two of each should be made and the spare filed for emergency use in case a glass is broken or the slide is lost or otherwise damaged.

Best production will result from slides of good color saturation. Over-exposure, even slight, will not yield good color saturation . . . slight under-exposure has been found preferable in some cases.

Since the color obtained from film differs somewhat from the original, a guide may be made by pasting up a card with hues of the most commonly used Color-aid papers cut in 2-inch squares. These are then photographed and the transparency colors compared to the original colors to determine what color value will be produced from the original. This provides a key to select colors which will ultimately produce the desired result.

Much of the information for this article was supplied by the NBC Graphics Department, New York, where the slides described were produced. This department has pioneered in developing proved techniques in all types of staging services. A capable staff headed by Mr. Edward J. Bennett is on hand to offer information to broadcasters or render complete staging services to the broadcast industry.

FIG. 7. A set of finished 2" x 2" slides with film mounted between glass. The one to the left has had the two glass enclosure plates removed. The film is shown fastened with scotch tape between a mask which folds over the film. The mask opening is 29/32" x 1 11/32". Two glass plates which "sandwich" the film and mask are held together by scotch-taping the four sides.

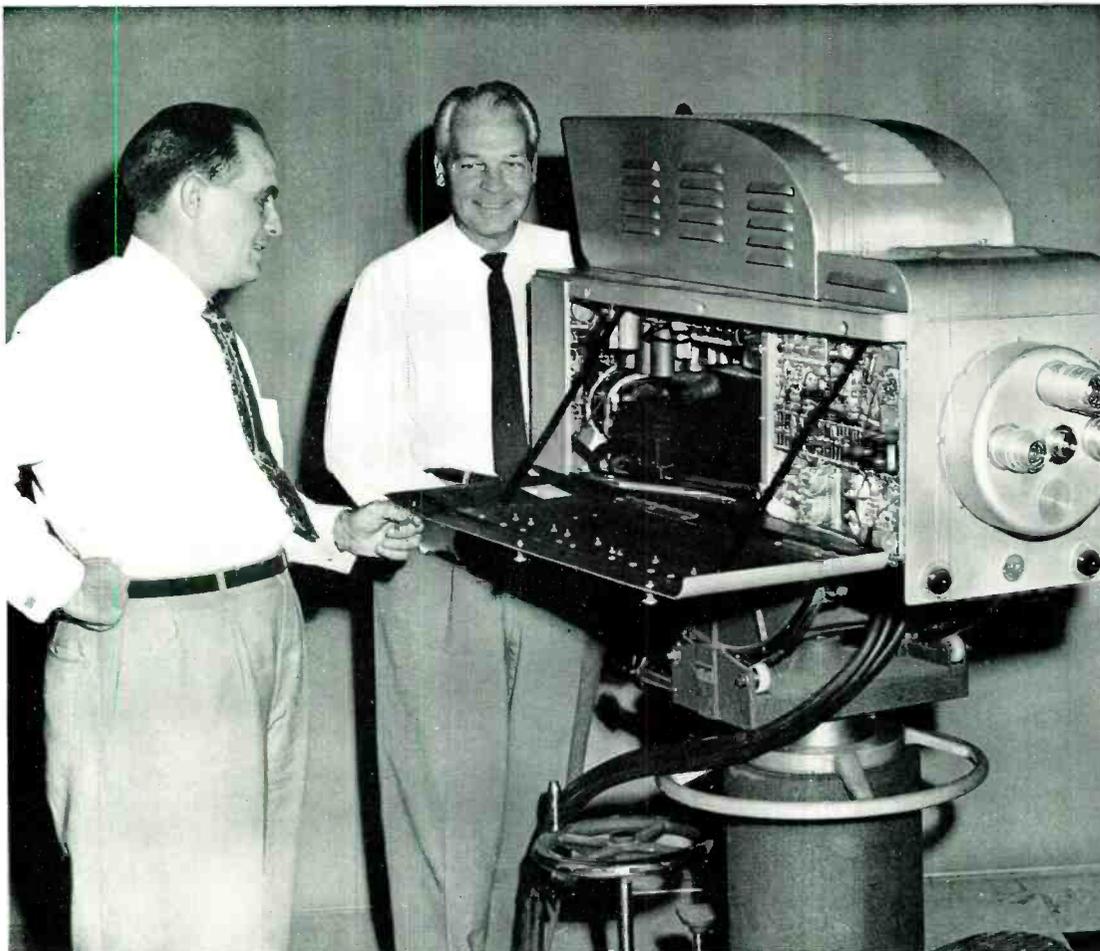




WKY-TV's experience with live color

FIG. 1. WKY-TV's color ID is particularly good because even viewed in monochrome it has obvious color motif.

FIG. 2. Hoyt Andres (left), Assistant Manager, and P. A. "Buddy" Sugg, Station Manager of WKY-TV, happily examine the first color camera to be received by an independent station . . . anywhere.



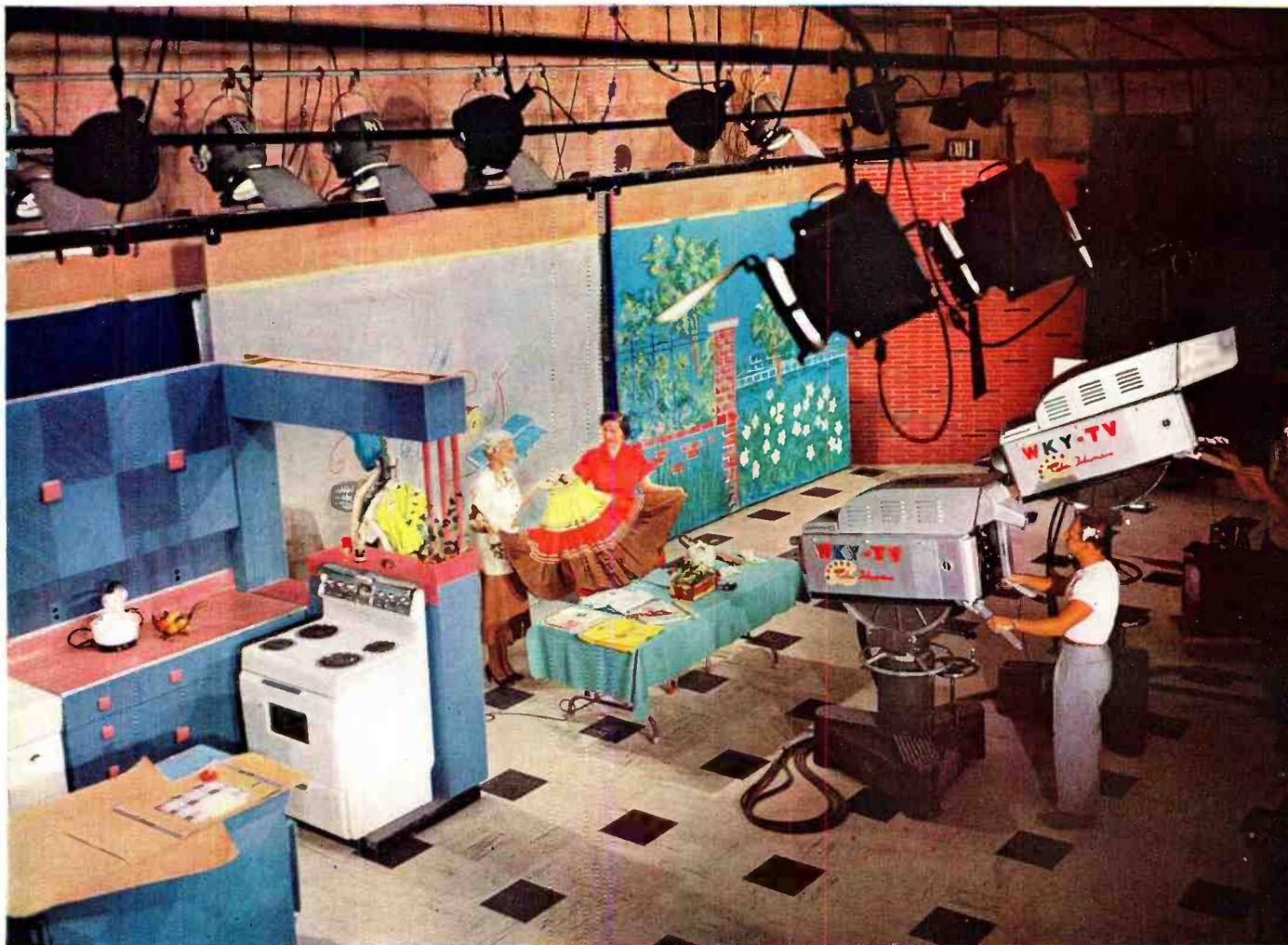


FIG. 3. Scene on WKY-TV's "Cook's-Book" show, first program in the world to be aired in color every day.

Introduction

"Being first in service to the public is a habit that began more than 33 years ago at WKY" says Mr. E. K. Gaylord, President of the Oklahoman Publishing Company and of WKY and WKY-TV, its radio and television stations.

The record backs him up. WKY was the first radio station west of the Mississippi with regular daily programming (April 1921), the first to bring network radio to the southwest, the first television station in Oklahoma, and the first with network TV in Oklahoma. But it's WKY-TV's newest record that they are proudest of—first independent station, *anywhere*, with regular live color program origination.

Live Color Since April

WKY-TV aired its first live color program from its own studios on April 8, 1954. The camera used was the first RCA color camera to be shipped to an independent station. This camera, along with most of WKY-TV's other color equipment, had been received only three weeks before. On

April 21, WKY-TV presented a half-hour variety show in color, and the following day telecast its regular weekly western variety show "Sooner Shindig" in color.

On April 26, WKY-TV began its most ambitious color stint, the regular daily airing of its Cook's-Book program in color. As this is written, Cook's-Book has been on every weekday for over five months—probably the most consistent color programming to date—anywhere!

Importance of WKY-TV's Color Experience

WKY-TV measures the results of its color pioneering in station prestige, in audience building, in advertiser interest and in color programming experience. It particularly expects the latter to pay off as the industry moves into a period when color will mean added revenue. As of today WKY-TV is not charging its advertisers anything extra for color. However, it feels that the color programming it is doing now is educating its advertisers to the extra value of color,—and that these advertisers

will have no hesitancy in paying extra for color just as soon as the set circulation justifies it.

To the rest of the industry WKY-TV's color operation is of particular interest because it has brought color out of the laboratory and network stages into the down-to-earth realm of everyday station operation. Many in the broadcast industry have felt that only when this happened could the practicality of color be fully measured. Now that it has happened what are the results? What did WKY-TV do? How did it work out?

To find out we spent several days at WKY-TV—literally living with its operating staff, talking to engineers, production people, artists, everyone who has a part in creating WKY-TV's color programs. On the following pages are described at length all phases of the station's color operation—set down in detail because it is felt that other stations about to start in color will want to know as much as possible about "how WKY-TV did it."

WKY-TV's Planning For Color

Being first is usually not an accident. WKY-TV was the first station with live color cameras because its manager P. A. (Buddy) Sugg placed an order for color equipment with RCA way back in September 1949. Thus, when production finally began, WKY-TV was first in line.

WKY-TV prepared for color in other ways, too. Engineering-wise it prepared by sending Aaron Britton to New York in June 1953 to work with NBC color engineers at the Colonial Theatre. On his return, Mr. Britton, who has since been designated Color Coordinator, conducted seminars for the benefit of other WKY-TV technicians. As a result of this early prepping, the WKY-TV engineers, under the direction of Jack Lovell, Chief Engineer, were able to install the complete color equipment (without factory assistance) in less than three weeks. Only in final adjustments did RCA engineers lend a hand.

On the production front WKY-TV also did some early preparing. During the winter of 1953 WKY-TV production, program and art personnel participated in an organized seminar series on color processes, color design and harmony, and the psychology of color, conducted by staff members and guest speakers.

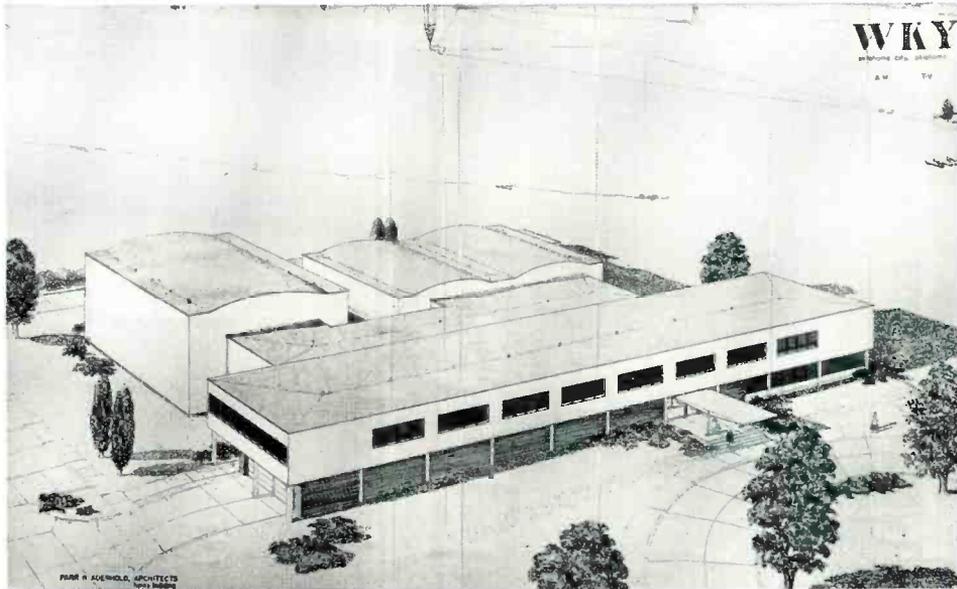
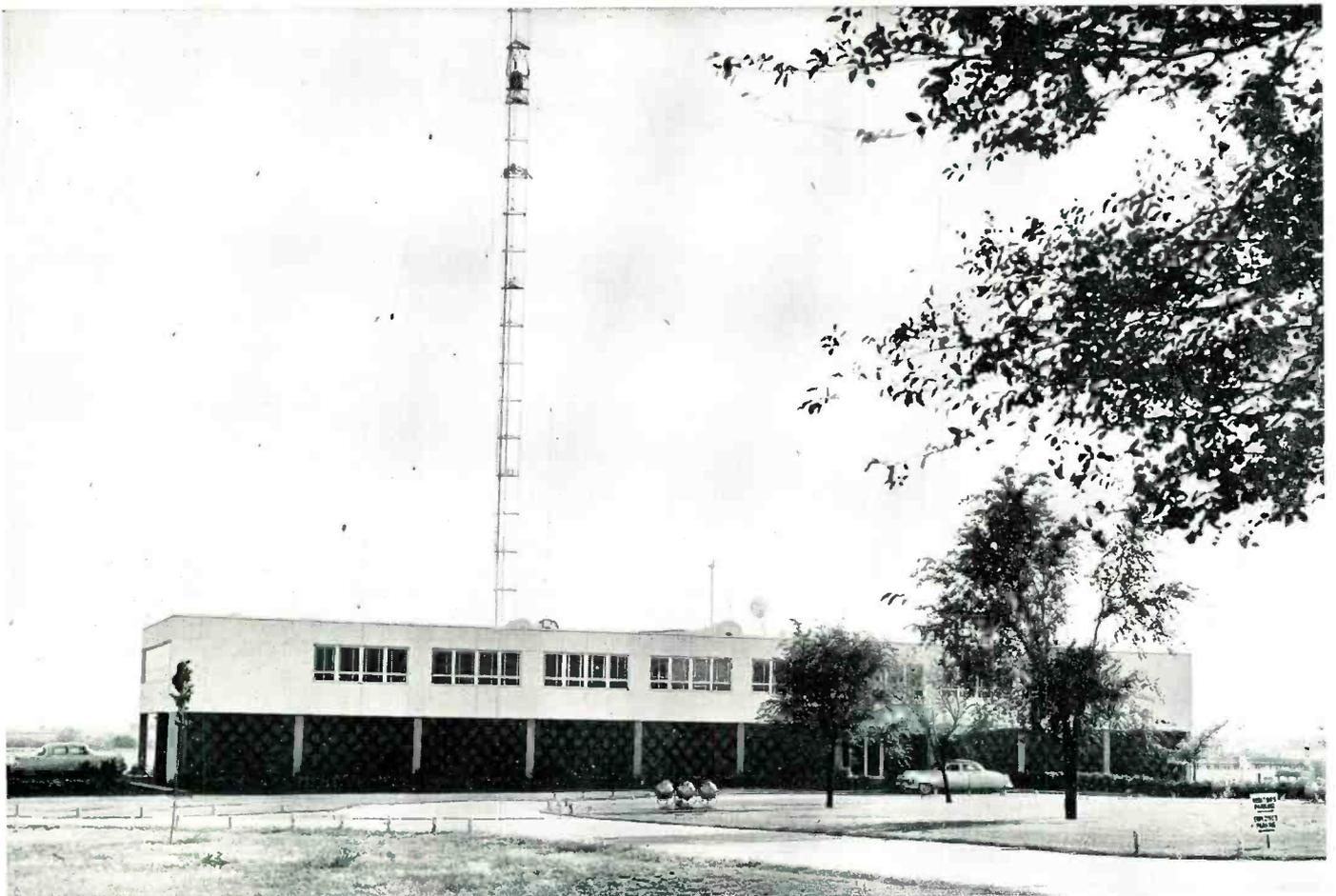


FIG. 4. This architect's drawing of WKY's studio building shows the general type of construction employed. Note raised roof section over TV studios. The large unit at the left rear, which is not yet constructed, will be a new large-sized studio "A".

FIG. 5. WKY's beautiful modernistic studio building shown here is located at the transmitter site some nine miles north of the center of Oklahoma City. The first floor plan of this building, which houses WKY's radio studios and business offices as well as TV facilities, is shown on opposite page.



Studio Space For Color

WKY-TV's existing studio layout was very advantageously arranged for the switch to color. There were two medium-large studios (B and C) located back-to-back (see Floor Plan, Fig. 6) and provided with identical equipment. Each had its own separate complete-in-itself control room so that full-dress on-camera rehearsals could be held in one studio while the other was on the air. Master control and switching facilities were temporarily located in Studio B Control Room. (Plans call for a separate master control room to be installed when a new large "Studio A" is added to the present building.)

The availability of the two studios, and the fact that they could operate as separate entities made the switch to color relatively easy. Studio C, appropriately enough was designated as the color studio and all live color operations are carried on in this studio. Studio B remains all black-and-white, and is capable of carrying nearly all of WKY-TV's local monochrome originations. Studio C it still set up for black-and-white, and still carries one or more monochrome programs a day. However, it is available at least fifty per cent of the time for color experimenting and color rehearsals (in addition to actual color programming).

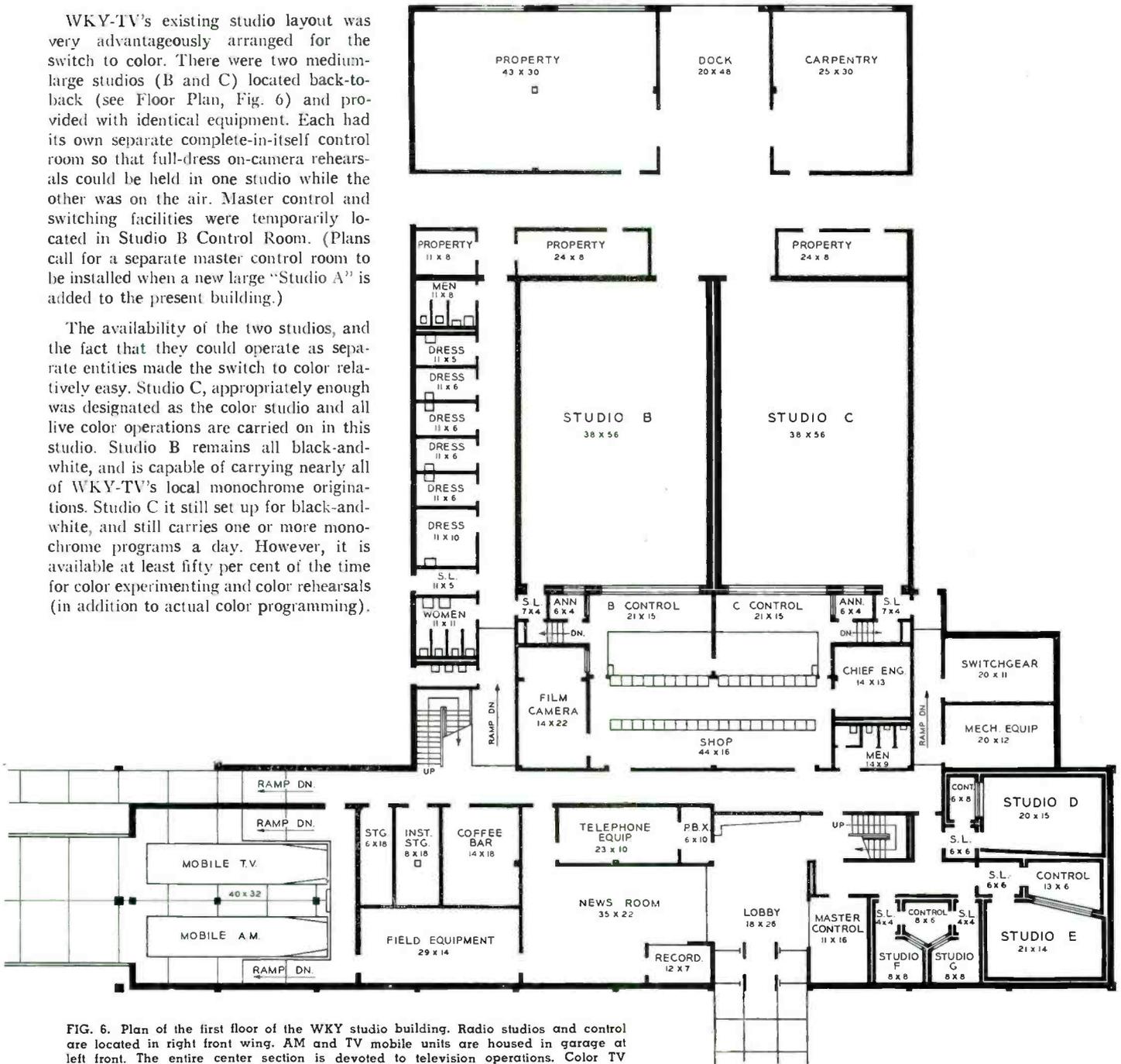


FIG. 6. Plan of the first floor of the WKY studio building. Radio studios and control are located in right front wing. AM and TV mobile units are housed in garage at left front. The entire center section is devoted to television operations. Color TV operations are centered in Studio C, and Control Room C houses most of the color television equipment. To make room for this equipment, monochrome camera controls for C Studio were moved to B control from which point they are operated blind when monochrome programs are aired from Studio C. A detailed drawing showing location of color equipment is shown on the following page.

WKY-TV's Color Equipment

The WKY management has gone all-out to make sure it would have everything necessary for full-scale local origination. Its original color equipment order called for:

- (a) RCA Color Network Equipment
- (b) RCA Color Test Equipment
- (c) RCA Color Sync Generator Equipment
- (d) RCA Color Slide Camera Chain, Type TK-4A
- (e) RCA "3-V" Color Film Camera Chain, Type TK-26
- (f) Three RCA Live Color Studio Camera Chains, Type TK-40A

This constitutes a complete set of the RCA deluxe color equipment packages described in *BROADCAST NEWS* No. 77 (January-February 1954).

At the time of the editor's visit to WKY-TV the color slide scanner and two of the

live color cameras had been in operation for a little over three months. The third live color camera had just been received and was not yet in operation. The color film camera was expected in the fall. Originally WKY-TV had ordered RCA's fast-pull-down-projector-flying-spot-scanner combination for its color film setup. In early spring, however, it became apparent that the new RCA 3-V (Vidicon) Equipment would be greatly superior to the flying spot scanner. WKY-TV, therefore, cancelled its order for the latter and asked RCA to ship instead one of the first of the new 3-V equipments.

When the new color film equipment is received WKY-TV will be fully equipped to handle every type of color program—whether it comes from the network, from film, from slides, or is originated live in the WKY-TV studios.

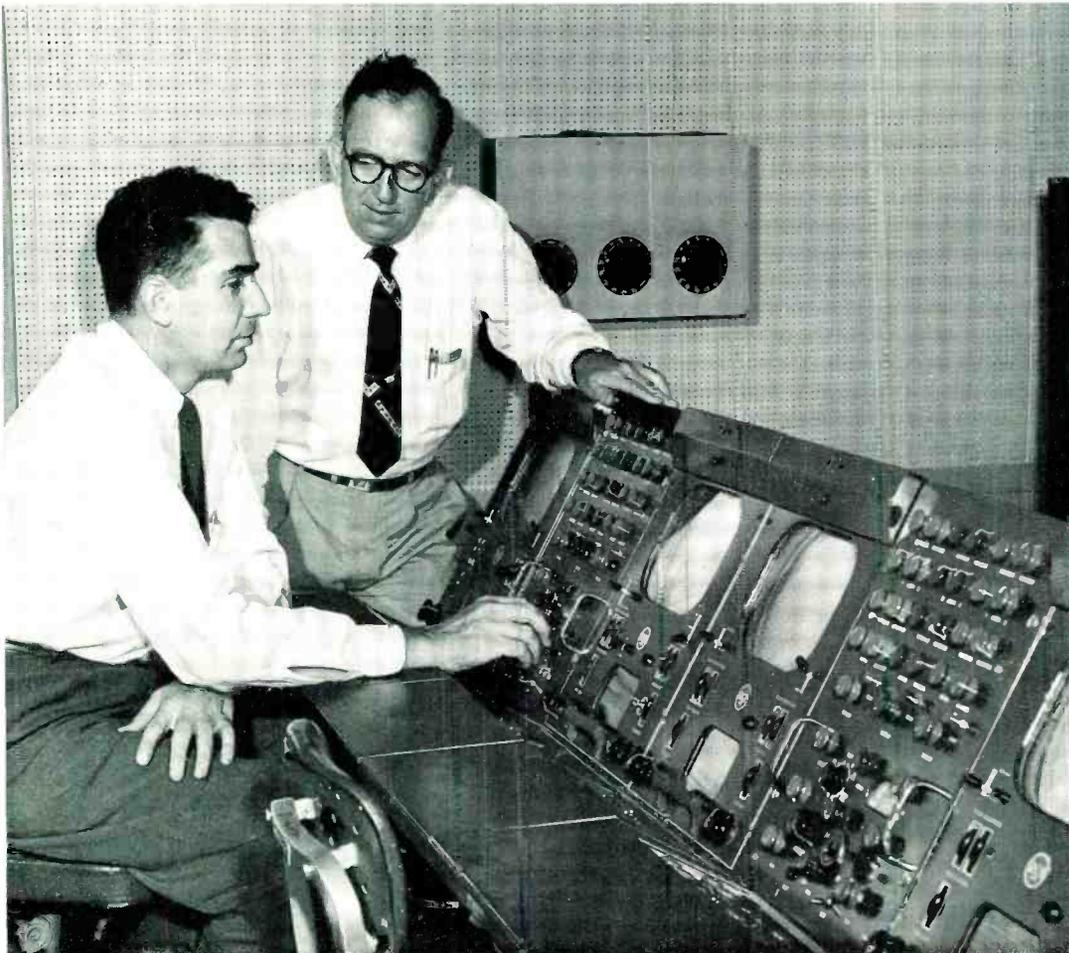
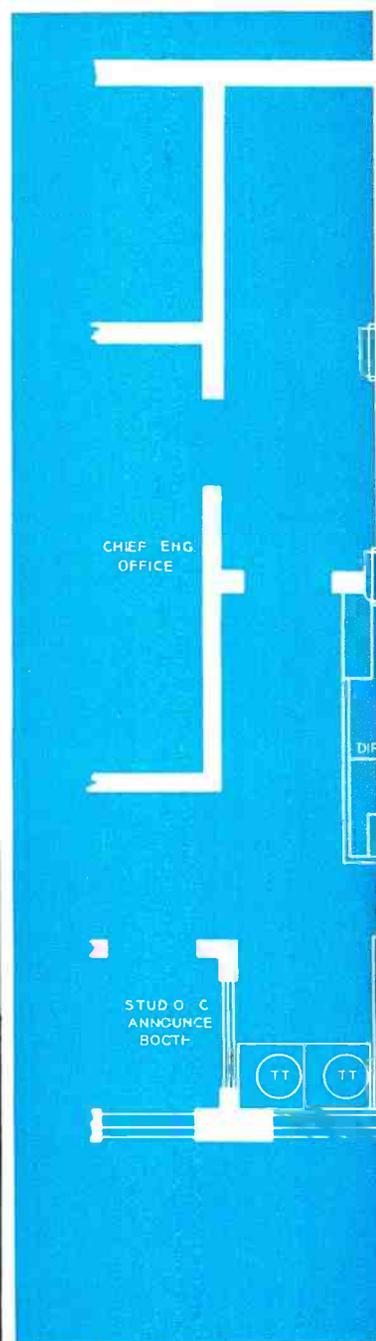


FIG. 7 (left). WKY-TV's extensive color facilities were planned, and the technical operation is supervised by Aaron Britton (left), Color Coordinator, and H. J. ("Jack") Lovell, Chief Engineer of WKY and WKY-TV.

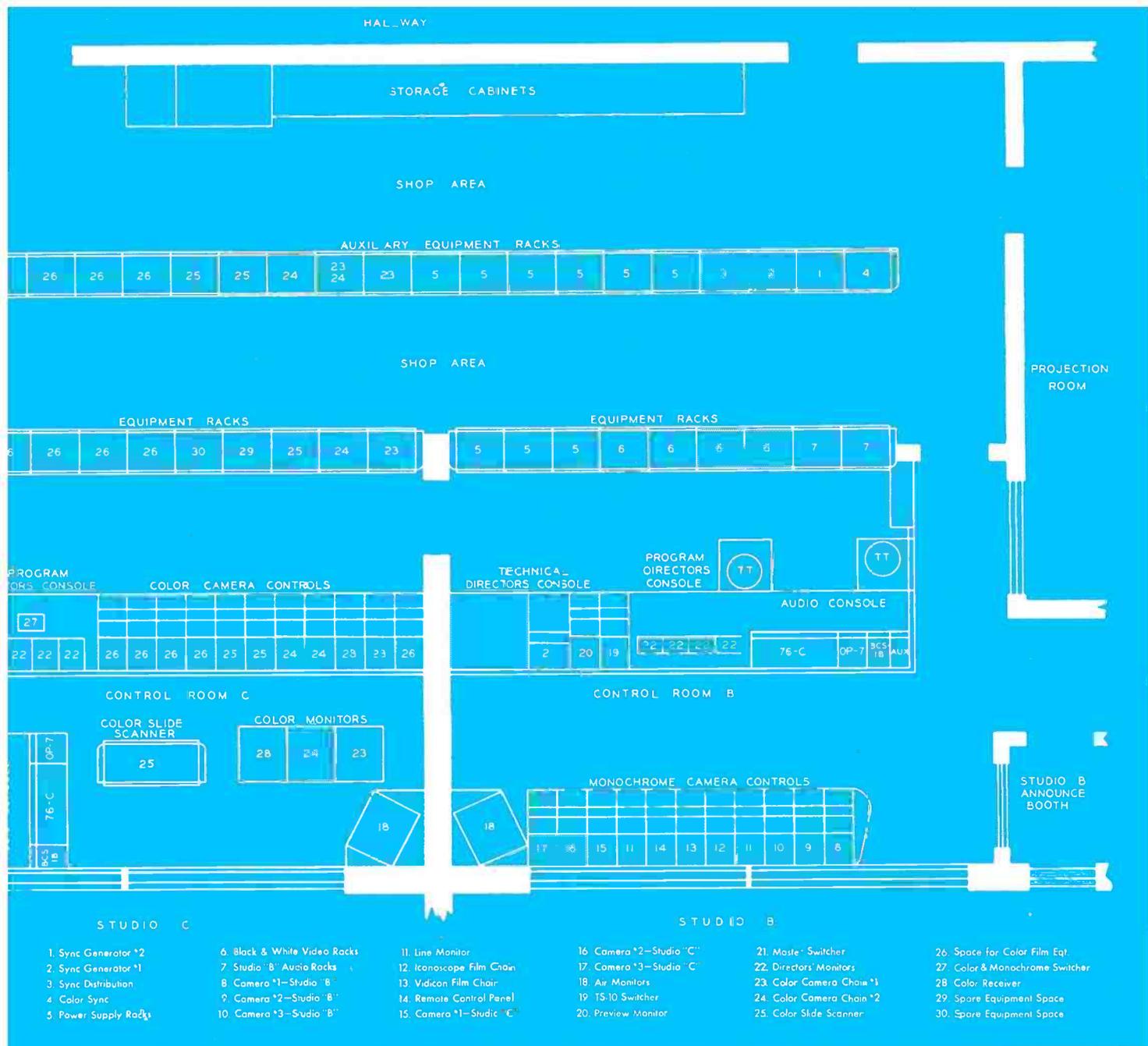


FIG. 8. Plan drawing of the control room area of WKY-TV showing location of various color equipment units.

Location of Color Equipment

Television is growing so fast that every TV station, even the newest, has a space problem. Color aggravates the problem. Partly this is because it takes more setup time (and hence more total studio time). Partly it is because the equipment takes somewhat more space. But primarily it is because (for the time being) monochrome has to be continued along with color. Eventually monochrome will disappear and the problem will be alleviated, but for the time being we have to live with it.

The necessity of providing for both monochrome and color is particularly difficult in the control room. Almost without exception control rooms have literally been built around the present monochrome equipment. On first thought the problem of "shoehorning" in the color control equipment seems almost impossible.

WKY-TV's engineers struggled a long time with this problem—finally came up with a fairly simple and quite satisfactory arrangement. Although it involved consid-

erable moving, they decided to put all the color equipment in "C" Control Room. This has the great advantage of making the color operation an integral unit which can be operated independently of the regular monochrome operation.

Originally the monochrome camera controls in "C" Control Room were on the lower level in front of the window looking into the studio. The audio console and director's console were on the elevated platform. In order to make space for the color



FIG. 9. WKY-TV's Control Room C as rearranged for color operation. Video engineers sit at camera control units at further end of raised platform: color monitors are on table in front of them. Program director sits at console in foreground. Audio position is at lower right corner. Slide camera is just in front of studio window. Color receiver in far corner functions as "on air" monitor.

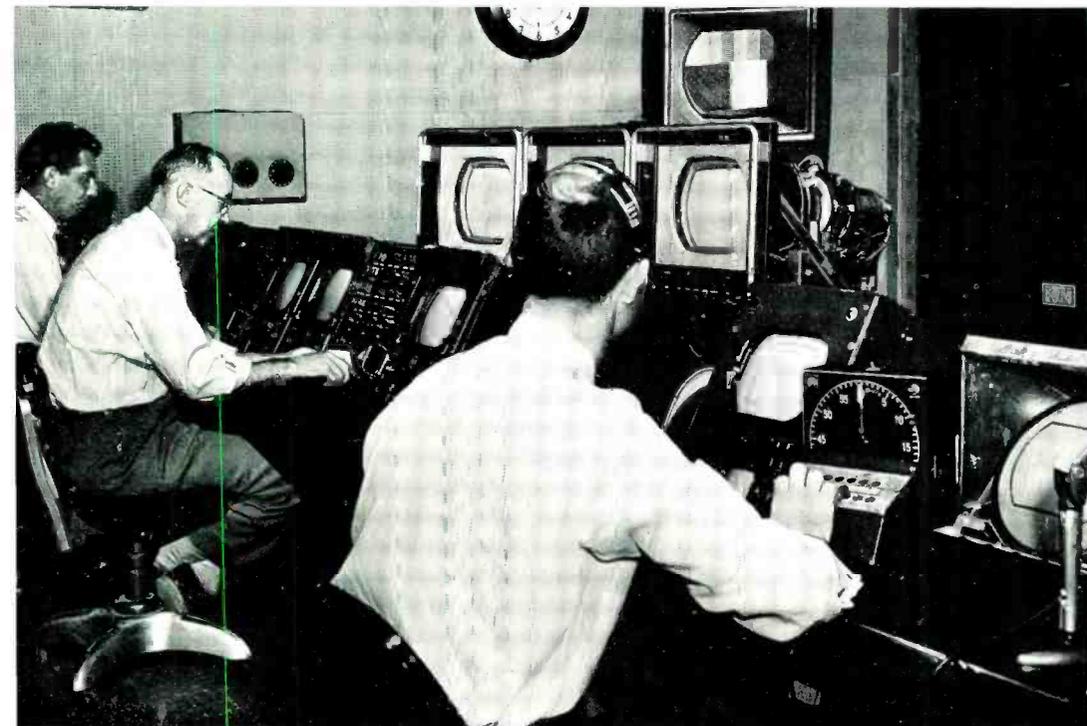


FIG. 10. This is a view of the color control room from a position just behind the program director. Note that the program director (center foreground), as well as the video engineers at left, can see the three color monitors (one for each camera) and the "on-air" color receiver. The program director's console, a corner of which is visible at the lower right, contains four monochrome monitors which can be patched across either color or monochrome camera outputs, network, or "cue". Thus the program director can operate from this position for either color or monochrome.

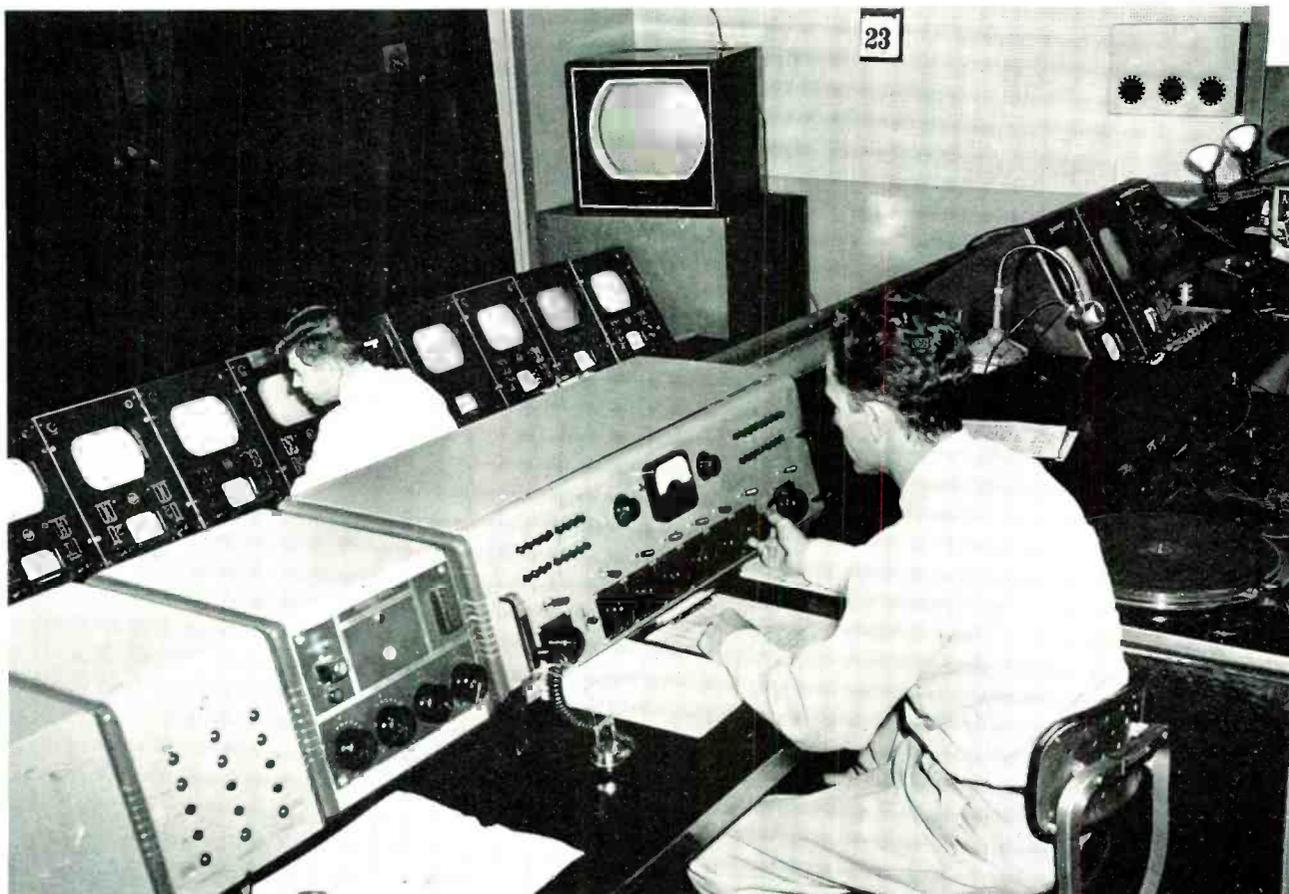


FIG. 11. WKY-TV's Control Room B. On lower level are camera control units for monochrome cameras in both B and C studios. On upper level is the audio console (foreground), the program director's position (center) and the master control position (upper right).

equipment in Control Room "C" the monochrome camera control units (for the Studio "C" monochrome cameras) were moved into Control Room "B," where there was just room for them beside the Studio "B" camera control units. Next the audio console was moved, from its former place on the elevated platform, down to a position in front of the studio window. The new color camera control units were then placed on the elevated platform (where the audio console originally was) alongside of the program director's console. The latter was left "as is" except that the inputs to the four monochrome extension monitors built into the console were brought out to a video patch panel. For color operation three of these are patched across the outputs of the three color cameras and the fourth used as a line monitor. When desired one can be used as a "cue" or "preview" monitor.

With this arrangement the program director has a close-up view of each camera picture (in monochrome). He can also see the three camera pictures in color on the color monitors.

The color monitors (associated with each color camera) are mounted on elevated platforms (see photo, Fig. 10) in such a position that both the video engineers and the program director can see them. At the present time the color slide scanner is also located in the control room. This is a temporary arrangement. In the near future both this scanner and the new 3-V Color Film Equipment will be located in a color film room which will occupy the space which is now the chief engineer's office.

Originally all of WKY-TV's rack-mounted equipment was mounted in eighteen cabinet racks which formed the wall between the control rooms and the "shop" (maintenance area). To accommodate the new rack-mounted color units sixteen additional cabinet racks were installed in a second row as shown in the floor plan, Fig. 8). Some of the monochrome rack units originally at the rear of "C" Control were moved into the new racks so that the colorplexers and processing amplifiers associated with the color cameras could be mounted in the racks directly behind the video engi-

neers' position (see Fig. 9). This makes them convenient for adjustments needed to balance the cameras.

This overall arrangement of color facilities in Control Room "C" is straightforward and has worked out very well. Moreover, it is equally convenient for handling monochrome programs originating in Studio "C." The "director's console" in "C" Control contains four black-and-white extension monitors. For monochrome operation they are patched into the outputs of the Studio "C" monochrome camera controls. Thus the director of a monochrome program going on in Studio "C" sits in the "C" Control Room and carries on as usual. The fact that the monochrome camera control engineer sitting in "B" control cannot see into the studio is found to be of no consequence. (In fact, there is a definite trend, in new studio design, toward purposely locating the camera control men in remote or "blind" locations. Because their only job is to keep the picture *on the monitor* good, they have no real need to see the studio action.)

WKY-TV's Live Color Programming



FIG. 12. Sybil Johnson shows examples of needlework on the "Cook's-Book" program which she conducts daily.

WKY-TV's color programming experience falls in three categories: (a) a number of "one time" airings of regular WKY-TV shows such as "Sooner Shindig," a western variety show; (b) the "Cook's Book" program, a one-hour Monday through Friday home economy program which since its first showing on April 26, has been aired every weekday; (c) a closed-circuit show called "Food, Fashion and Furnishing Forum" which has been produced from time to time for small groups of WKY-TV's advertisers.

Of these three types of shows the "Cook's Book" program is the most interesting from the viewpoint of confirmed experience. Having been repeated with nearly the same format for some 100 shows, it has gradually shaken down to the point where most of the problems it poses can be answered with considerable certainty.

"Cook's-Book" Program

"Cook's-Book," conducted by WKY-TV's home economist Sybil Johnson, is a typical home-making program, complete with discussions and demonstrations of sewing, cooking, decorating,—even gardening. A WKY-TV success-story in black and white, it is a smash hit in color. That this has happened should be no surprise. The most important contribution of color is to make the picture more real. And reality is most important in those things we are most familiar with. Thus, fried chicken in monochrome usually has to be verbally identified as such; in color it positively makes the viewer drool. Similarly with the familiar can of beans, the soap package, the demonstrator breaking an egg into a dish. It is in the very commonplace things that mono-

chrome has short-changed us the most—and it is in these things that color will have its greatest impact.

"Cook's-Book" usually opens with Sybil Johnson seated at the breakfast table with one or two guests who are experts on some particular aspect of home-making. The backdrop for the "breakfast table" set is a drawing having some tie-in with the principal program. (See notes on "Sets," below.) Reading questions from listeners' letters Mrs. Johnson draws her "guests" into animated discussion of the day's subject, which can be anything from "how to keep peach pies from sagging" to "how to get the crab-grass out of the front yard." In order to provide pictorial interest as many props as possible are used. These may be the sagging pie itself, a colorful dress, a plant in bloom, or almost anything vaguely related to the subject of the discussion.

The interview part of the program takes up half to three-quarters of the hour program. It is broken at roughly five-minute intervals by commercials which are mostly "live" (described in detail below). These are tied into the program as much as possible and usually are made by Mrs. Johnson herself.

Following the interviews Mrs. Johnson rises, says goodbye to her guests, and walks "into the kitchen," which is an immediately adjacent set (see Floor plan, Fig. 14). In the kitchen she rapidly demonstrates some aspect of cooking, canning, etc., in pretty much the standard fashion.

This program format is one that is used with minor variations in almost every TV

station in operation today. Its importance to the *color now* story lies in the fact that (a) it is a standard program, (b) it has not been changed in any important respect for color, (c) it is being done in color without difficulty by WKY-TV's regular staff, and (d) it obviously benefits enormously from the added impact of color.

Color Rehearsals

Not too much can be learned about rehearsal requirements from the experience to date. On the Cook's-Book program only a small amount of rehearsing is done. For the most part this is informal and consists of quickly running through the commercials and such parts of the program as involve action other than that at the breakfast or kitchen tables.

The commercials are checked for color (as noted above) and in addition the dresses of Mrs. Johnson and her guests are checked for color suitability. (Usually she tells her guests about what colors to wear and asks them to bring an alternate costume.) Props to be used are similarly checked. If guests are to participate in the action, this is quickly run through. And that's about it. Programs of this type thrive on informality and the ad-libbing naturalness of the commentator.

How much rehearsing is needed for more formal color programs is a moot point. However, from putting various bits of evidence together one might arrive at the conclusion that, except for a little more work with the lights and costumes, there is no reason to assume it will be any greater than for black and white.

Sets and Backgrounds for Color

Two types of sets are used on the "Cook's-Book" program. One is a semi-permanent "kitchen" setup consisting of range, sink, refrigerator, and wall cabinets in the background, with a cabinet-type table (on rollers) in the foreground. Most demonstrations of recipes are done on this table. The cabinets of the set are striated plywood finished in a dull slate-blue, with handles and trim a dull salmon-pink. All of the appliances (originally white) have been painted over in light coffee-gray. As seen on the TV receiver this background is pleasing although a little on the dull side. This is probably as it should be—because a bright background would draw interest away from the demonstration. At the right side of this set a wall partition (with a window cutout) gives "depth" to the setting, provides a room effect and serves to divide the set from the adjacent set.

The second type of set used on the "Cook's-Book" show is a "breakfast table" setting which consists of a large plain table positioned about six feet in front of a flat backdrop. The backdrop is one of the novel and interesting things about the WKY-TV color operation. Approximately 8 ft. high by 12 ft. wide, it consists of a large seam-

less sheet of colored paper mounted (with masking tape) on a light wood frame. The frame has hooked rollers at the top so that it can be easily moved laterally along the rails which run around three sides of the studio.

The scenic effect desired for the particular show is sketched on the colored paper background with bright colored chalks. Nick Panos, WKY-TV Art Director, and his assistants have developed a quick and simple procedure for turning out these backdrops. Ordinarily the main topic of a particular day's show (viz., cakes, pies, sewing, gardening, etc.) is determined by Mrs. Johnson and her staff about a week in advance. In most cases she gives the Art Department a rough pencil sketch of the kind of "topical" background she wants. Starting from this point, Nick and his assistants select an appropriately colored paper for the background and work up a small-sized "rough" sketch of how the background is to look.

This is all they do in advance. On the day of the show they start at about 8 A.M. to prepare for the 11 A.M. show. They mount the colored paper on the frame,

sketch with light lines the outlines of the scene and fill in the details with colored chalks. The whole process is done right in the studio and takes only an hour to an hour and a half.

This very simple and relatively inexpensive method for producing backdrops achieves really startling results. The chalks can be used to produce either sharp "line" drawings or scenes with a more "diffused" effect. The latter are often of advantage in giving the effect of depth to the scene.

As viewed on the receiver it is impossible to distinguish these chalk drawn backdrops from more expensive and much more time-consuming painted backdrops. Because they are done so quickly and inexpensively WKY-TV can afford to use a new backdrop every day. This, plus the topical nature of the backgrounds, is important in keeping the interview parts of the "Cook's-Book" program from becoming monotonous.

A typical backdrop is shown in Fig. 12. It consists of a large rendition of scissors, spools of thread, etc., on a very light gray background. This was used on a day when the program featured sewing. Another typi-

FIG. 13. Very effective color backgrounds for "Cook's-Book" and other WKY-TV color shows are drawings made with color chalk on colored paper stock (see text). Easily and quickly done they make it possible to have a new background for every show.



cal backdrop, used on a day when pie-making was the main theme, depicted in humorous cartoon style some eight or nine pie characters (such as the pie that was too stuffed, the pie that sagged in the middle, etc.). On this program Mrs. Johnson used the background characters in summarizing the things to avoid in pie-making.

So far (October 1st) the Cook's-Book program has run for 100 consecutive week days and has used a new backdrop every single day. Most of these backdrops were discarded immediately after use. However, a few of generalized nature have been used for the occasional other color shows WKY-TV has aired, or for its closed-circuit "Food, Fashion and Furnishing Forum" shows put on for WKY-TV clients. The garden and desert scenes shown in Fig. 13 are typical of backdrops usable for various types of shows. The triple-rail hangar running around the studio allows the scenes to be shifted about as desired and allows a number of them to be kept handy for instant use. As WKY-TV goes into pro-

gramming of additional color shows this feature should be of considerable help. It will, for example, enable the Art Department to make up ahead of time all the backdrops needed for a day's production. By sliding these along the hangar rails it will be possible to make very quick set changes.

In the course of making up and using some 125 backdrops the WKY-TV staff has learned a number of things about the choice of colors, shades, etc. They find, for example, that the best backgrounds are those in the cooler colors such as blues and greens. Reds, they find, are the most unsatisfactory because they tend to kill the delicate flesh tones. The latter is very important because it is in the flesh tones that variations from true color are most quickly spotted by the viewer.

In general WKY-TV has not found it difficult to use color in backgrounds. Very bright colors (whites and yellows, particularly), and very excessive contrasts, have to be avoided—just as they must be

avoided in monochrome. Some producers seem to think these requirements more critical in color than in monochrome; others feel that the problem is very little different. In talking to artists and art directors one finds that they almost all feel that a color scene which is in good taste (as seen by the artist's eye) will be good on the color receiver.

There is one extra complication, of course, and that is the fact that the picture must also look good on monochrome receivers. Where a set (such as the Cook's-Book kitchen set) is used over and over again, the best background colors can be found by trial and error. However, for one-time backdrops (such as the chalk drawings mentioned above) there is not time to do this. In order to have some idea of the effect before he makes the backdrop, Nick Panos has recorded the grey scale values of all the colored papers he keeps in stock. In this way, for example, he can avoid using as background a color which has the same grey scale as flesh tones.

FIG. 14. Sketch showing approximate arrangement of lights for WKY-TV's program, "Cook's-Book", aired daily in color.



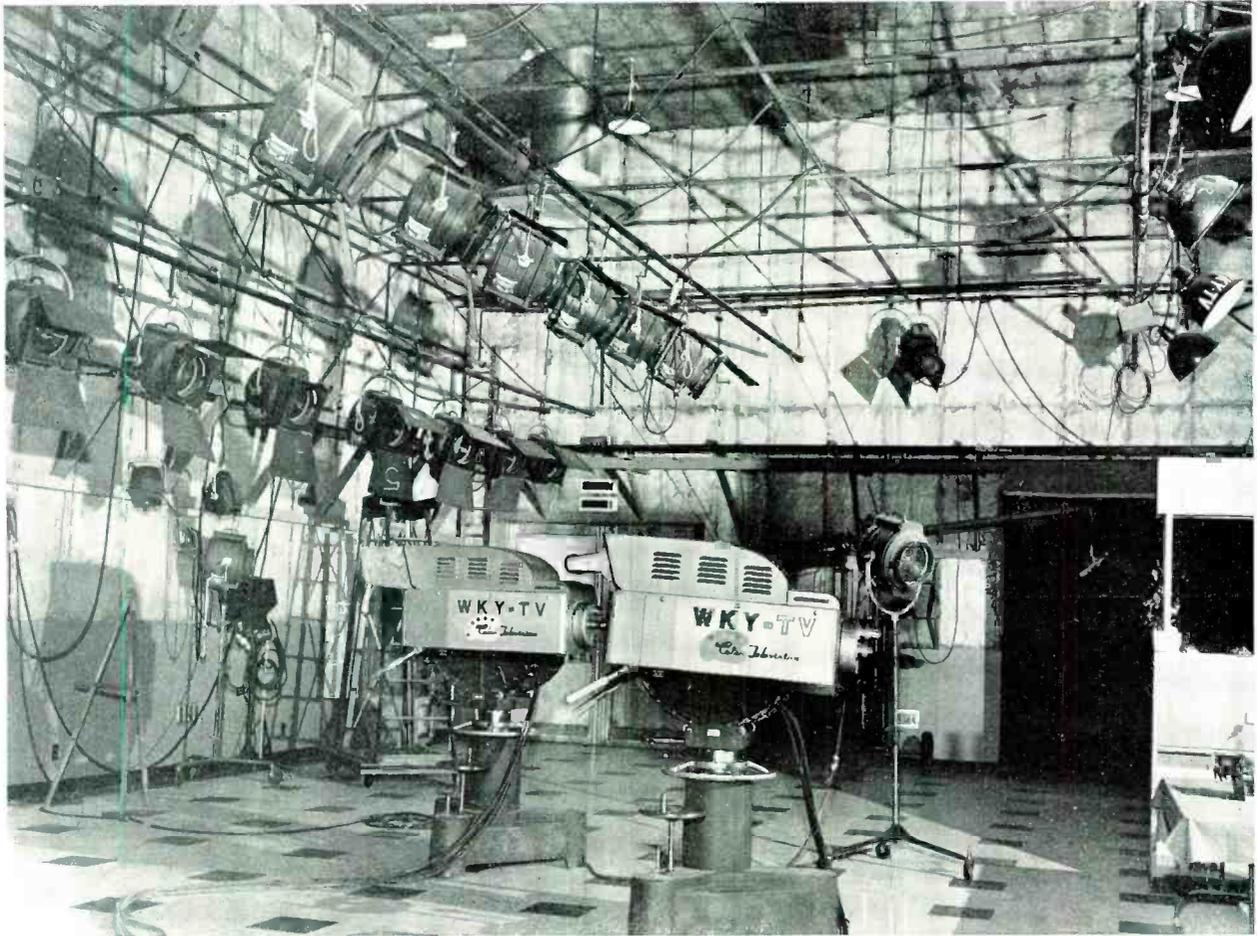


FIG. 15. View of WKY-TV's Studio C showing mounting of light fixtures on pipe battens. Lights are shown as arranged for lighting "Cook's-Book" set, part of which can be seen at the extreme right.

WKY-TV's Lighting for Color

Lighting for color has not been much of a problem at WKY-TV. They are using the same control equipment and fixtures as for black and white with the only changes being a re-arrangement of individual lights to give a smoother spread of light and somewhat greater intensity.

The general arrangement of light fixtures is shown in Fig. 15. Nearly all the lights are either 2 KW spots or 2 KW floods (in scoops). These lights are hung in groups on pipe battens that run the length of the studio. The pipes can be raised or lowered by hand winch up to the height of the grid, which is 15 feet.

WKY-TV uses about 400 foot-candles base illumination, which checks pretty well with experience elsewhere. They feel that the most critical lighting requirement is constancy of illumination over the whole

set. An incident light meter is used and the light level over the entire set is not allowed to vary more than ten percent (unless special effects are desired). Greater deviation results in color changes when action goes from one part of the set to another.

Generally speaking, the lighting used for color is much flatter than black and white. For one reason, "modeling" lights are not so necessary (color produces its own contrasts and depth effects). For another reason, shadows are dangerous in that they may pick up unwanted colors.

WKY-TV uses some back lighting, as may be noted from the lighting plan for the Cook's-Book program (Fig. 14). However, there is little side light and no modeling light on this set. For relatively simple programs of this type they are not needed.

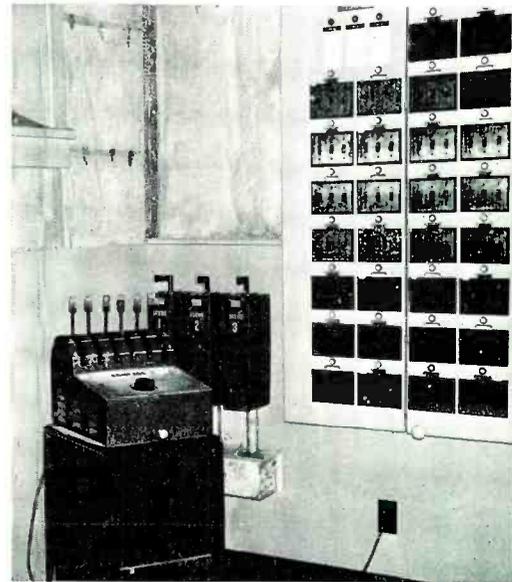
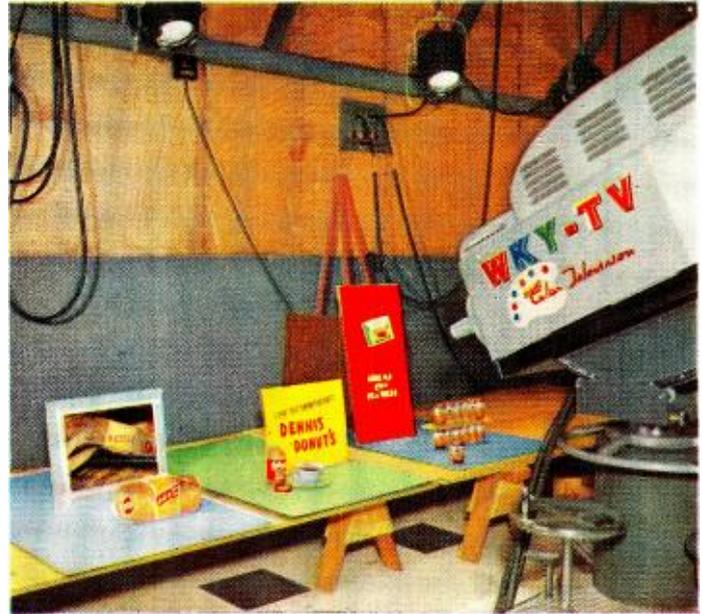


FIG. 16. Pre-set switching and dimmer controls in WKY-TV's Studio C.



FIG. 17 (left) Most WKY-TV color commercials are done "live". Products are attached to color cards or simply placed on a color card resting flat on a table as shown here.

FIG. 18 (below). A low "product table" about 4 feet wide by 16 feet long is placed on the opposite of the studio from the "Cook's-Book" set (see Fig. 14). Products are arranged on table against contrasting color background. At proper time one live camera is turned through 180° and pointed down on product as shown here.



How WKY-TV Does Live Color Commercials

WKY-TV is doing all of the "commercials" on the Cook's-Book program in color. This means eight to ten every day. Some of those used repeatedly are on slides. But, rather surprisingly, in view of the many pseudo-experts' pre-color predictions, most of these commercials are done live. Members of the station staff give two reasons. First, there isn't time to make slides. Even where the same sponsor is on every day he often wants to change daily the product shown. Most of the sponsors are food suppliers (stores, bakeries, canneries, etc.). Sometimes a baker will send in doughnuts (that are still warm) only a half hour before program time. How to do them, except "live"?

A second reason given for "live" commercials is that "they look so much better." In theory this shouldn't be so. In practice (at least for the moment) it definitely is true. WKY-TV's "live" commercials for food products (such as the fried chicken mentioned above) are unequalled by any slide reproductions we have seen.

How are these "live" commercials done? Rather simply—although with considerable care. Fig. 14 shows the studio plan for the Cook's-Book program. On the opposite side of the studio from the action sets is a low table (about 4 ft. wide by 16 ft. long). Commercials are staged here. The arrangements vary somewhat but usually consist of a colored card (20" x 30" show card) as a background for the product displayed. Some cards have lettered titles or lists of features, but most are plain. The station's prop group has a whole box (on wheels) full of these cards. A good contrasting color is usually selected for each product.

One of the color cameras has to be turned around 180 degrees and pointed downward to pick up these "live" commercials. The director must allow time for this in calling his camera action. For the relatively simple types of programs involved this is not difficult. Even though WKY-TV now has their third color camera they do not propose to use it for this purpose as they feel the present method is satisfactory.

All of the commercials are carefully set up during rehearsal time which starts 1½ hours before program time and viewed on the color monitors to be sure they are satisfactory. If they require special lighting, or camera positioning, the proper spots are marked on the floor with chalk.

In view of all the dire predictions about how products would have to be re-styled and re-packaged for color TV, it is interesting to note that WKY-TV production supervisors have found that very few commercial products require "doctoring" to give a true reproduction. When it has become necessary, the retouching has been minor, involving graying-down too brilliant whites or touching up bright reflecting surfaces with a flattening agent. This, of course, does not prove that these products could not be re-styled to advantage. However, added to similar experience elsewhere, it pretty much "debunks" the scare idea that many products will positively have to be re-packaged for color TV.

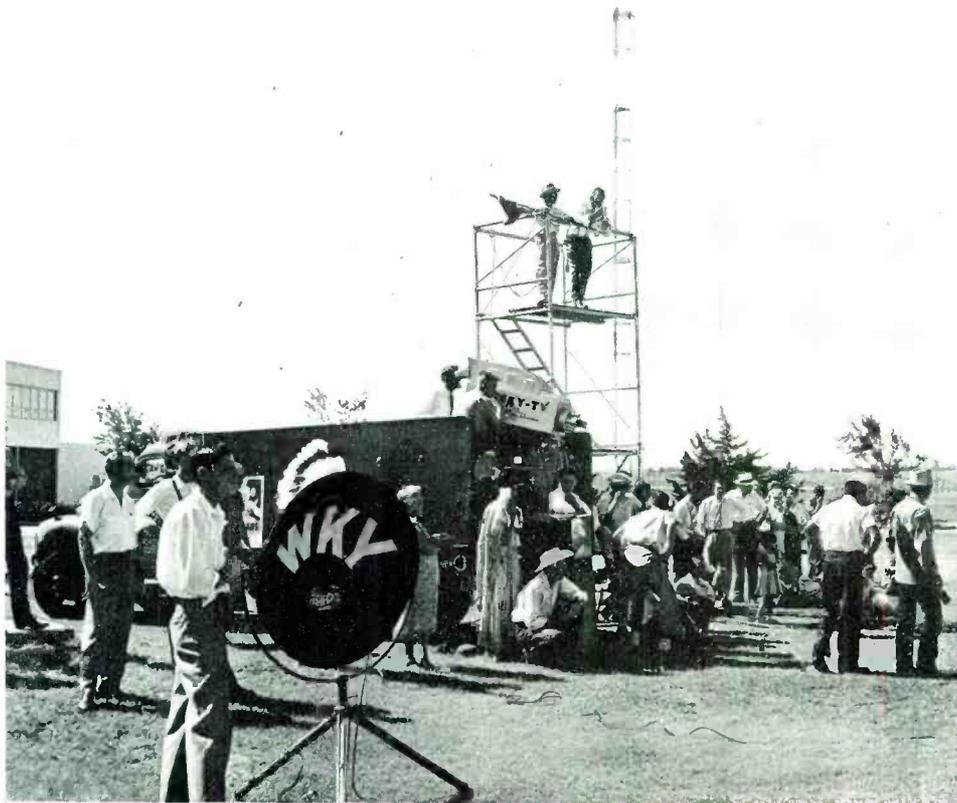


FIG. 19 (left). To make a pickup of Indian Pageantry for NBC's "Today" and "Home" shows WKY-TV mounted its color cameras on trucks operating within camera cable length of the studio building. Men on tower directed Indians in program.

WKY-TV Takes Color Outside

Engineering and production personnel of WKY-TV in Oklahoma City moved their equipment outdoors on August 17 to feed a colorcast of the Anadarko, Oklahoma Indian Exposition to the NBC Network's "Today" and "Home" programs. This was done by setting up a replica of the Indian village on the WKY grounds. Camera cables were run from the control room to the cameras. To permit greater mobility, color cameras operated from truck-bed platforms. WKY-TV Production Supervisor Bob Doty and Stage Manager Billy Nicks directed activities from a position atop a 20-foot scaffolding, employing a public address system to coordinate the movements of the 80 Indians taking part. They had their work cut out for them for many of the Indians did not even speak English. This marked the first time that a local station employed its own facilities to feed a colorcast to any network.

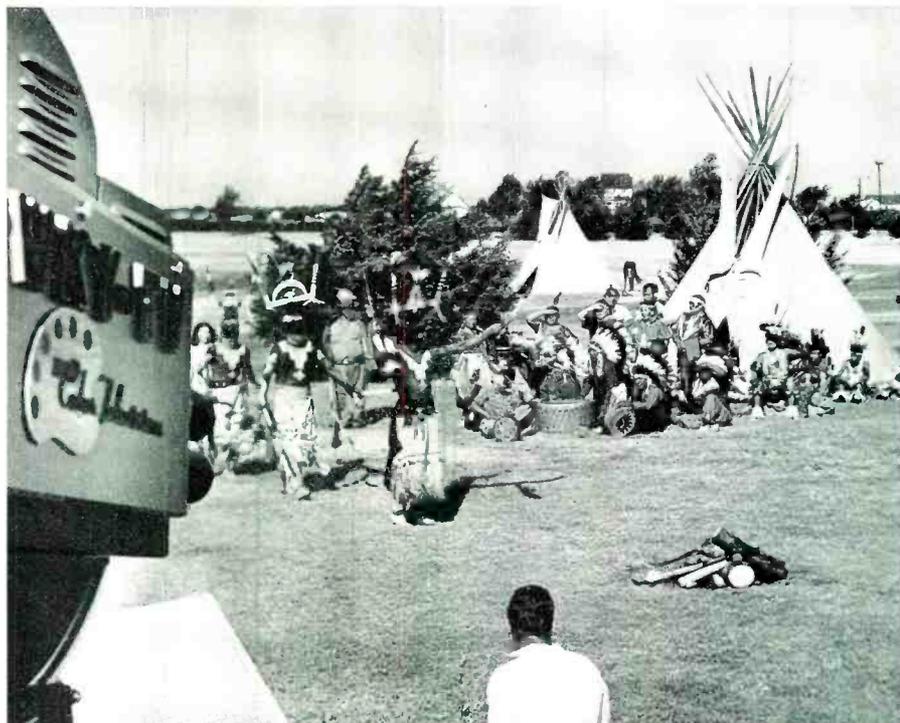


FIG. 20. More than 80 Kiowa and Apache Indians took part in the show. Here is a camera's eye view of part of the ceremony. It was the first time that a local station used its own color cameras to feed a colorcast to the network.

WKY-TV's Experience With Color Equipment

WKY-TV's experience with color equipment far exceeds that of any other station. With over 850 hours logged on their color cameras (as of October 1) they have reached the point where a good appraisal of the equipment can be made. What do they say about it?

First, as to reliability. The facts speak for themselves. In 850 hours of operation WKY-TV has had no major failures; has had no time off the air. The six original image orthicons in the two live cameras were replaced at 800 hours. At this point they were still operative but were showing some signs of stickiness and loss of sensitivity. Any broadcast engineer who has been in the business very long will recognize this as a good record for the first production run of a brand new type of equipment.

Second, as to operating ease. There were many predictions that the complexity of color equipment would make it difficult for station personnel to handle. A few hours spent at WKY-TV will convince anyone that this is a ridiculous idea. WKY-TV's engineers handle their RCA color gear with the greatest of ease. It is true that the engineer whose only experience is in monochrome will, at first, be a little awed by the array of extra equipment and the much greater number of controls. However, in a very short time he realizes that the color camera is simply three black and white cameras in parallel, and that the extra controls are just "more of the same." The only really new operational requirements are the necessity of matching the red, green and blue pictures, and the need for balancing the two cameras. These operations require more "setup" time but are not diffi-

cult and can be easily learned by any competent video engineer.

Finally, how about the quality of pictures? The answer to this is that of the many easterners who have visited Oklahoma City to see these local color programs, almost all have said that WKY-TV's pictures are the equal of those seen in New York. When a direct comparison is made with the color pictures received over the network lines the local color pictures are usually better.

Manpower for Color

At WKY-TV they use two more men to produce Cook's-Book in color than they did to produce the same show in monochrome.

In the studio they have one man on each camera, one light man and one prop girl (who handles the commercials). This is a total of four people.

In the control room are two video engineers (one at each camera control), one audio man and a director, a total of four people. For monochrome they usually have only one video engineer. They feel that for color they need a man on each camera control.

At the present time WKY-TV has three engineers assigned full time to color. One of these is Aaron Britton who has the title of Color Coordinator and is permanently in charge of this part of the operation. The other two color assignments will be rotated among WKY-TV's video engineers so that eventually all will be fully familiar with color operation.

Set-up Time for Color

There has been considerable discussion of "warm-up" time for color and there is

certainly some misunderstanding of the requirements. Thus it is interesting to note exactly what does go on at WKY-TV on a typical day. Here is their approximate schedule:

6:00 AM	Monochrome video crew turns on rack equipment and feeds color bar test pattern 6:30 to 6:45 AM.
7:30- 8:30 AM	Color video crew arrives and checks out rack equipment and warms up cameras.
8:30- 9:30 AM	Cameras checked out on test charts, test pattern, etc., registered, balanced, etc.
9:30-10:30 AM	Rehearsal, sets, subjects, etc.
10:30-11:05 AM	Rechecking registration, color balance, etc.
11:05-12 Noon	Air program.

This is not a rigid schedule but it does give an idea of what goes on.

There are several things to note on this schedule. First, although there is a five-hour period from start to "on-air," a considerable part of the time is for rehearsal. Second, although "warm-up" takes about three hours, only one hour is with image orthos on (the big expense item). Third, although this "warm-up" period is presently necessary every day, it is not necessary before every program. Once cameras are warmed up and balanced they should be good for all day with only minor adjustments. Thus man-hour (and tube) costs of color programs should come down as more programs are scheduled per day.

How WKY-TV is Promoting Color

The WKY-TV management is very enthusiastic about color and has been actively promoting it right from the beginning. Even *before* the beginning, in fact, for the first of a series of four-color full-page newspaper ads on color TV (see opposite page) actually appeared in October 1953, two months before FCC approval of the RCA Compatible Color System.

Most of WKY-TV's current promotion of color is directed to advertisers and agencies. Center point of the campaign is a series of closed-circuit demonstrations

which WKY-TV calls the "Food, Fashion and Furnishing Forum."

The "Forum" series has been organized under the personal supervision of P. A. Sugg, Manager, and Hoyt Andres, Assistant Manager, of the station. It consists of thirty-minute formal productions featuring a colorful parade of packaged products, foods, fashions, cosmetics, and house furnishings. Programs include background music and carefully prepared commentary.

Oklahoma area food brokers, store executives and fashion experts are given the

opportunity, by special invitation, to see their products displayed to the best advantage in "live" color. Invited groups are kept to six or eight persons so that informal discussions can be held after the show. The reactions to this type of demonstration have been extremely enthusiastic.

WKY-TV has had many visitors who have come from far and near to study its color operation. All, it is safe to say, have gone away greatly impressed by what this pioneering station is doing. WKY-TV's live color is a smash success!

Color TV is Coming

and *again* WKY-TV will pioneer the way



THIS Black and White will blossom into a full color picture like THIS

WKY-TV to be nation's first station, outside of networks, to have color television!

Color television is the new frontier in broadcasting. It is the most important development in the history of the industry since the invention of the radio. It is the most important development in the history of the industry since the invention of the radio. It is the most important development in the history of the industry since the invention of the radio.

WKY-TV 4
LOW BAND CHANNEL 4 OKLAHOMA CITY

Oct. 29, 1953

Is it Goldilocks or Little Red Riding Hood?



Makes the Difference

and you'll see the difference on WKY-TV early in 1954

NEWS FLASH!

Wednesday, December 17—The Public Commission on the Expansion of the Oklahoma State Television System, making possible color broadcasts by 5, on 1954 WKY-TV will be first independent full color station in a nation equipped in stations. Local programs in 1.2 color will be on air next week.

WKY-TV 4
LOW BAND CHANNEL 4 OKLAHOMA CITY

Dec. 27, 1953

Harry's colorful in black and white



But you'll enjoy him even **MORE** in **COLOR**



... and it won't be long now!

BULLETIN: From all parts of the color camera has been received on WKY-TV. This is from other equipment for live studio color broadcasts. The camera is equipped to handle outdoor color. This means color coverage on the air. The live broadcast camera will be on the air in the spring from WKY-TV. You can see the best looking on WKY-TV for the best and best!



There is the color camera being described by Dr. Harry Johnson. Each camera costs \$10,000 and it costs an additional \$10,000 to set up and operate. For more details on color, call the WKY-TV color camera.

Yes, color TV is coming and again the pioneer will be

WKY-TV 4

March 28, 1954

WKY-TV...first to **Cook with COLOR!**



Sibyl Johnson's **COOK'S BOOK** to be televised in **FULL COLOR** Starting Today and Every Week Day A Termon



You'll receive WKY-TV's **COLOR** releases in black and white as your present!



The complete color system consists of a color camera, a color transmitter, a color receiver, and a color monitor. The color camera is the most important part of the system. It is the only camera that can handle color. It is the only camera that can handle color. It is the only camera that can handle color.

WKY-TV 4

April 26, 1954



FIG. 1. WBAP-TV's station identification slide for color has the Ft. Worth skyline as a background. WBAP-TV, the first station in Texas to transmit locally-originated live color programs, now airs an hour or more of local color every week-day, averages more than ten hours a week of color programs.

WBAP-TV's experience with live color

FIG. 2. Beverly Smith interviews Chief Nekko-Echo-Noni on WBAP-TV's "Ann Alden Show".



Introduction

At 3 P.M. on Saturday, May 15, Amon G. Carter, Publisher of the Fort Worth *Star-Telegram*, and Brig. General David Sarnoff, Chairman of the Board of RCA, joined to throw the switch that marked the beginning of color television, Texas style. Mr. Carter's WBAP-TV had done it again! The 3 hour WBAP-TV color program that followed the switch-throwing ceremony was the first regular color television program to originate in the state of Texas. And, in fact, it made WBAP-TV the second independent station in the whole country to inaugurate local live color television (WBAP-TV was preceded only by WKY-TV, Oklahoma City, which started local color on April 8).

This is not the first time that WBAP has led the field. From its very beginning—as a 10-watter in May, 1922—WBAP has had a reputation for leading the way. Under the guidance of Mr. Carter, Mr. Harold Hough, Radio and TV Director of Carter Publications, and Mr. George Cranston, Manager, the station has pioneered in one development after another. Soon after World War II ended, Mr. Carter and Mr. Hough started planning for television. In September 1948, WBAP-TV went on the



FIG. 3. On May 15, Amon G. Carter, Publisher of the Ft. Worth Star Telegram, and his special guest Brigadier General David Sarnoff, Chairman of the Board of RCA, joined to throw the switch that marked WBAP-TV's inauguration of local live color programs. It was the first telecast of local color in the state of Texas, and it made WBAP-TV the second station in the country to start live color programming.

air, the first television station in the whole Southwest (BROADCAST NEWS No. 76). Not long after this it became evident that color was coming—eventually! Most people thought it would be a long time. But Mr. Carter and Mr. Hough were still looking ahead—and with confidence. Thus it was that in the fall of 1949, before anyone knew for sure what the equipment would be like, WBAP-TV placed an order for RCA color equipment—to be delivered whenever ready!

Daily Live Color Since May

Because of its early order WBAP-TV was close to the top of RCA's color priority list. As a consequence it received its live color cameras on April 23rd. These were actually the *third* and *fourth* RCA Color Cameras to be shipped to a station. Most of the station's other color gear had been received a few weeks before and much of it was already installed. By the time the RCA Field Engineers arrived, on May 3rd, the equipment was fully installed and in operation.

On May 15th, WBAP-TV formally inaugurated live color programming with the

gala opening program noted above. On May 21st the Barn Dance was telecast in color and, following that, other regular WBAP-TV programs were colorcast on a one-time basis.

On May 17th, WBAP-TV started regular daily color telecasting of the one-hour "What's Cooking" show. This has been colorcast every weekday since that date. Since then, other shows have been added, as detailed below, to give WBAP-TV an average of 7 to 8 hours a week of live color programming.

Importance of WBAP-TV's Color Operation

As long as live color was strictly a network proposition, most of the independent stations were interested—but only in an academic way. Sure, they would have it some day—but no hurry. They could—they told themselves—wait until there were a few million color sets out before taking the plunge themselves. And, anyway, they doubted whether live color was ready for everyday station operation.

The start of regular live color programming by WBAP-TV, WKY-TV, and

WTMJ-TV (and the imminent start by several other stations) has certainly changed this situation. The WBAP management is noted not only for its pioneering, but also for its business acumen. Harold Hough, WBAP's director, has been one of the industry's acknowledged leaders for many years. He has served on its boards and committees, sat in on its innermost councils. His judgment is respected everywhere. Thus, the fact that WBAP-TV has started regular local color programming has unusual significance, and what it is doing is of interest throughout the industry.

To find out more about WBAP's thinking on color, as well as what it was doing and how it was doing it, we spent several days at WBAP-TV watching and studying their color operation. We talked to members of the WBAP-TV staff, questioned them about their procedures, discussed with them their results. This article is a compendium of all the material gathered at WBAP-TV. It is hoped that by presenting it in this much detail other stations just starting their color planning will be aided by having the advantages of WBAP-TV's experience.

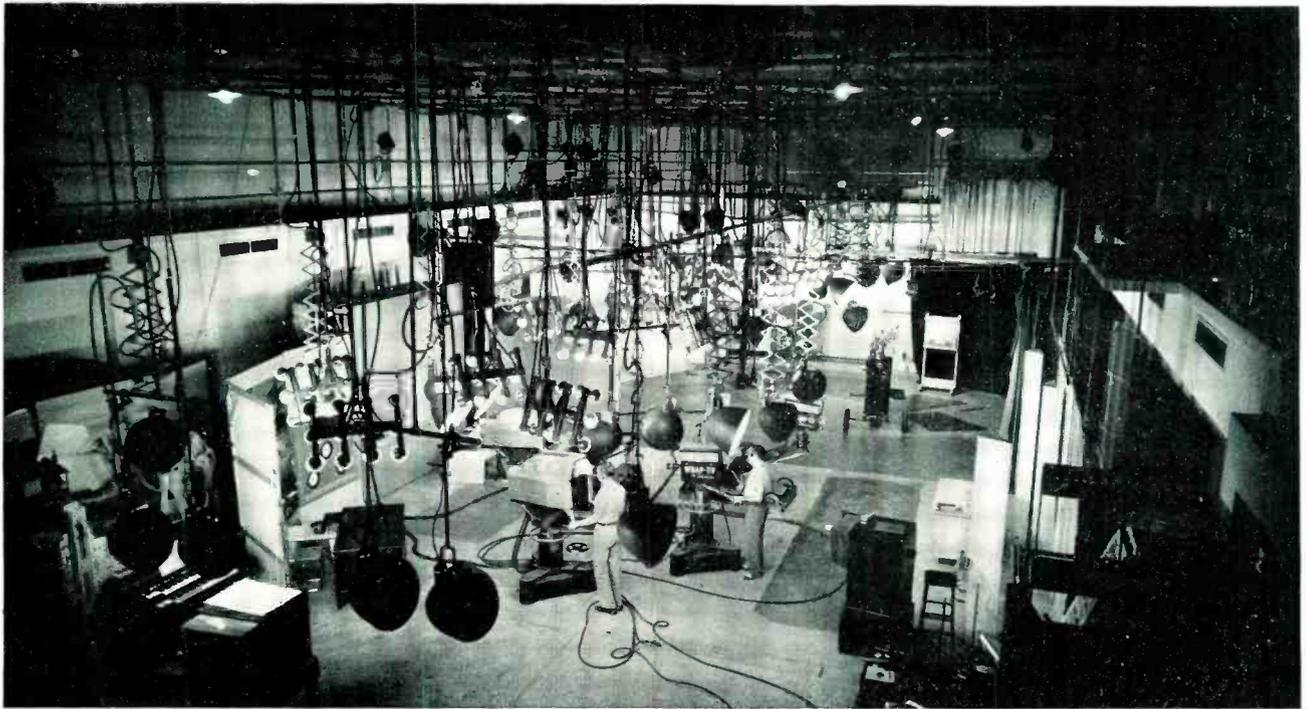


FIG. 4. WBAP-TV's Studio No. 1 as viewed from the clients' lounge (above the master control room). In this extra-large studio (82 feet by 45 feet) sets are arranged along the sides and across the far end. Cameras operate in the center area, moving easily from one set to the next. Since color and monochrome are completely integrated at WBAP-TV the normal equipment complement of this studio includes two RCA TK-40A Color Cameras and three RCA TK-10A Monochrome Cameras.

WBAP-TV's Approach to Live Color

Color Preparation

It would be an exaggeration to say that WBAP-TV did a large amount of advance preparation for color. Still, what they did was important and worth noting.

Management study and appraisal of color was certainly an important advance step. Mr. Hough personally attended a number of RCA's progress demonstrations on color, studied not only the possibilities of the medium but the practical aspects of color operation. Thus, when it came time to specify equipment he knew what he wanted.

He also recognized that the new and complicated equipment would place a considerable burden on the WBAP-TV engineering staff and he arranged for them to get at least a modicum of advance training. R. C. Stinson, Chief Engineer, and Rupert Bogan, TV Supervisor, attended RCA's color seminar in Camden in December. In addition, Rupert spent a week with NBC engineers at the Colonial Theater color studio in New York.

When WBAP-TV learned, about the first of the year, that their color equipment would be arriving in April, they started moving. Plans for placing the color equipment were finalized and necessary rearrangement of monochrome equipment was started. By the time the color equipment was received WBAP-TV was ready to move it right in.

Color Completely Integrated with Monochrome

Harold Hough, Director of Radio for Carter Publications, is a strong believer in color. It is his feeling that in a relatively short time all TV programs will be in color. This being the case he feels that color should not be treated as a separate operation but rather should be integrated immediately into the station's regular operation. This principle is being followed to the letter in all aspects of WBAP's color operation. Thus all of WBAP-TV equipment is completely integrated physically with its monochrome equipment. No station personnel, either engineering, production, or commercial, is assigned exclusively to color.

Instead, assignments are rotated so that everyone will, eventually, be equally familiar with the medium. Even the programs are not specifically "color" programs but rather are regular station programs which have been on for some time and are being carried on without change of general format (although minor changes, such as method of presenting commercials, have been made in order to take full advantage of color).

Because of this very practical approach, the WBAP-TV color operation is somewhat less spectacular than is the case where elaborate special shows, particularly designed for color, are being aired. Such shows require elaborate preparation and many man-hours, both engineering and production. Thus only a few hours a week are possible, at best. The WBAP-TV approach allows a very impressive number of hours (presently 8 hours a week) to be aired with existing manpower. In addition, it has the very great advantage of insuring a gradual (and consequently smooth) transition to eventual all-color operation.



FIG. 5. WBAP'S studios are located in this beautiful sandstone-colored brick and red tile building located on "Video Hill" about four miles from downtown Ft. Worth.

FIG. 6 (right). First floor plan of the WBAP building. Camera control room is in space formerly occupied by FM transmitter (which was moved to new transmitter building).

Studio Space For Color

WBAP's studio and transmitter building (AM, FM, & TV) was described in detail in *BROADCAST NEWS* No. 76 (Sept.-Oct. 1953). There are, at present, two television studios (see Fig. 6). One of these, Studio No. 1, is very large, being 45 ft. wide by 82 ft. long, and 28 ft. high. The smaller studio is 20 ft. by 30 ft. with a 20 ft. ceiling. Most of WBAP-TV's color programming is done from Studio No. 1. Sets for several hours of programming are arranged around the sides of the studio. Cameras in the center area move easily from one set to another.

Following out the idea of integrating color into the regular operations, no specific studio area has been set aside for color, although so far all color programming has been done in Studio No. 1. Thus, with exception of the rather immobile "kitchen," the color sets are placed wherever they fit most easily into the studio use pattern. The color cameras are in the center area along with the regular black and white cameras and are moved from set to set in the same manner.

Most of the station's programs are of the informal type, requiring little rehearsal. For such operations the WBAP-TV studio arrangement works out very well.



WBAP-TV's Color Equipment

The WBAP-TV management does not do things piecemeal. Having decided to go into color they called in RCA Engineers and planned a color installation that would be capable of handling in color any type of studio program that station was doing in black and white. The equipment ordered included:

- (a) RCA Color Network Equipment
- (b) RCA Color Test Equipment
- (c) RCA Color Sync Generator Equipment

- (d) RCA Color Slide Camera Chain, Type TK-4A
- (e) RCA "3-V" Color Film Camera Chain, Type TK-26
- (f) Two RCA Live Color Studio Camera Chains, Type TK-40A

All of this RCA equipment was described in BROADCAST NEWS No. 77 (January-February 1954) with the exception of the "3-V" film camera which was described in BROADCAST NEWS No. 78 (March-April 1954). WBAP-TV had originally ordered one of RCA's flying-spot film scanners.

However, when tests made in the laboratory indicated the great superiority of the new RCA 3-Vidicon Film Camera, the station switched its order to the latter.

WBAP-TV was high on RCA's color equipment priority list and received its two color cameras and most of the rest of its color equipment in April, just a few days after WKY-TV received theirs. When the 3-V Film Camera is received (December) the station will be completely equipped for all types of color—network, slide, film, and live studio.

FIG. 7. This is a lengthwise view of WBAP-TV's camera control room. Monochrome camera control units (for cameras in Studios No. 1 and No. 2 and film cameras) are in the foreground. Color camera control units (two live and one slide) are at the far end of the room with the TK-4A Slide Camera just beyond. Twenty-four racks at the rear of the room (twelve in a back row not visible here) contain power supplies, processing amplifiers and other auxiliary equipment. Floor layout is shown in Fig. 8 on opposite page.



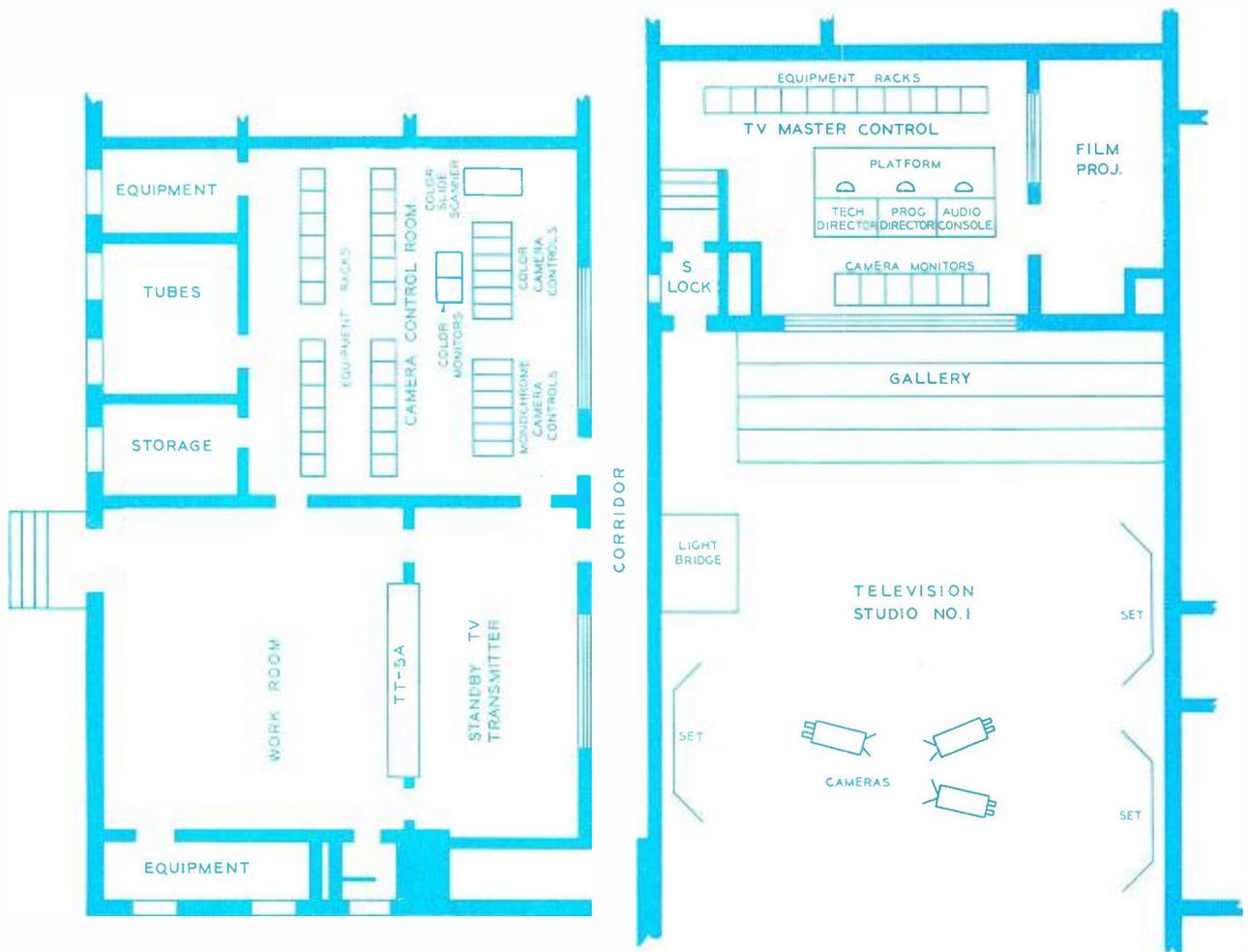


FIG. 8. Floor layout of the control room area in WBAP-TV's studios. The camera monitors in the TV Master Control Room are extension monitors from the camera controls in the camera control room. The six monochrome monitors are mounted on a rack above the studio window (see Fig. 12), and the three color monitors are directly below. The concentration of all camera controls in one area has reduced confusion in the master control room and simplified maintenance. When its 3-V Film Camera arrives WBAP-TV plans to move the TT-5A Transmitter to new transmitter building and use area it occupies for a color slide and film projection room.

Location of Color Equipment

Every TV station going into color finds that its first problem is where to put the equipment. The larger size of the color equipment, together with the fact that it must be used in addition to (rather than instead of) the monochrome equipment often seems, at first, to pose an insurmountable space problem. The difficulty is not lessened by the fact that all control rooms are, ipso facto, too small to begin with.

Eventually most stations find a way—or make one! WBAP-TV's engineers did so by taking advantage of a fortunate coincidence. This was the fact that a new transmitter was being installed in a separate building several hundred feet away. By moving WBAP's FM transmitter to the

new building, they gained a precious space close to the TV studios. (See floor plans, Fig. 8.)

At this point WBAP's Chief Engineer, R. C. (Super) Stinson, and his staff really started cooking and decided that while they were moving things around they could improve their monochrome operations as well. This they did by making the old FM transmitter room (and the space behind it) into a "camera control and equipment room." In this room they put their new color camera control units and associated equipment racks—and also their six monochrome camera control units and the monochrome equipment racks (see Fig. 7). By moving the latter out of the TV Master

Control Room they made space available there for color extension monitors. At the same time they feel they improved monochrome operation by getting their video men out of the control room. (This is in line with current thinking in most TV engineering groups.)

Fig. 12 shows the control room after these changes were made. Where the camera control units previously stood is a large double-shelved framework. On the top shelf are six extension monitors for the six monochrome cameras (two in Studio 1, two in Studio 2, two film). On the bottom shelf will eventually be four color extension monitors for its four color cameras (two live, one slide, one film). The audio man, tech-

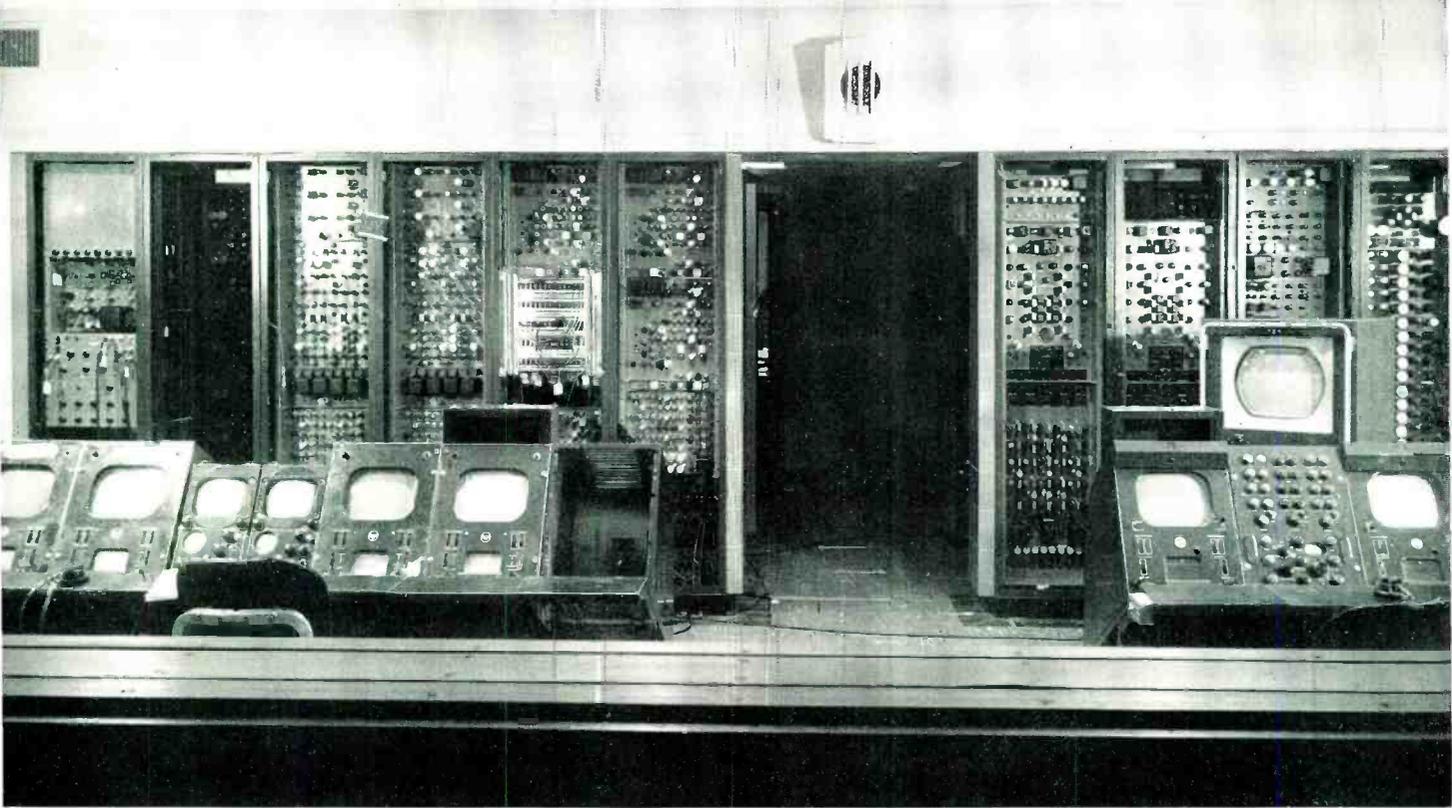
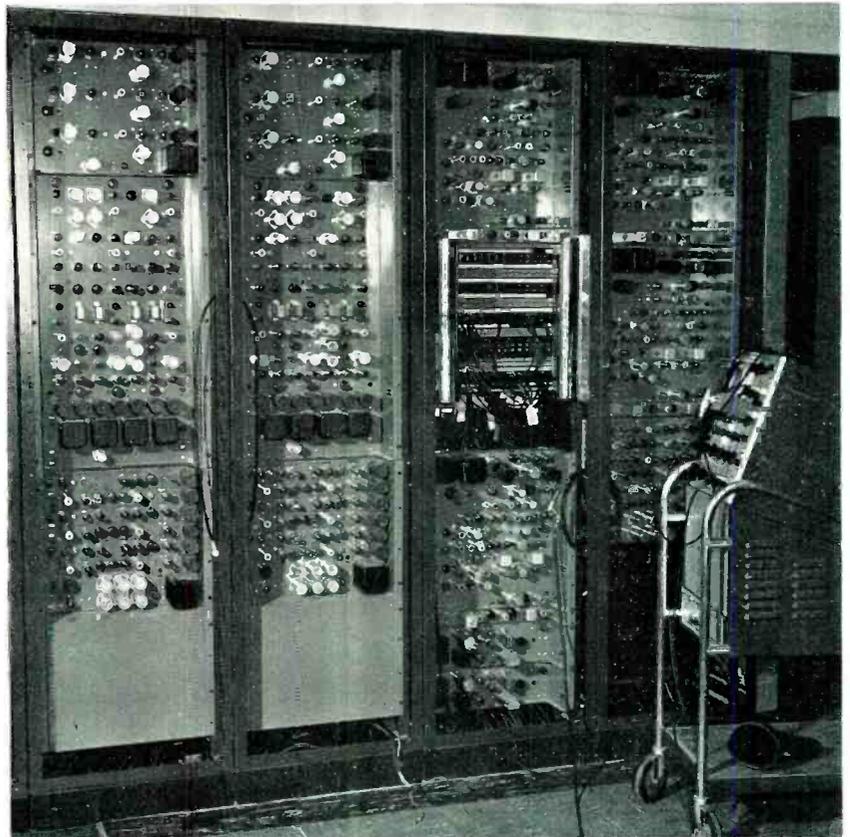


FIG. 9. WBAP-TV's Camera Control Room as seen from the corridor through the observation window. Monochrome camera controls are at left, color camera controls at the right. At the far right is the RCA TK-4A Slide Camera. Forming the rear wall are twelve racks containing processing amplifiers, colorplexers and associated items. Power supplies are on another twelve racks mounted in the rear of those visible here. At the time this picture was taken some equipment items had not yet been installed.

FIG. 10 (right). Closeup view of racks containing color processing units. Rack at left contains, from top, aperture compensator, control amplifier and gamma amplifier for Live Camera #1. Next rack to right contains similar units for Live Camera #2. Third rack contains two colorplexers, jack panels and two Color Frequency Standards. Fourth rack contains two colorplexers and gamma amplifier for Slide Camera.



nical director, and program director, sitting on the raised platform, will all be able to watch these monitors as well as see into the studio.

Fig. 9 shows a view of the camera control and equipment room as seen from the corridor window. Fig. 8 is a floor plan with the major units identified. At the present time the color slide camera is also located in this room. However, in the near future the old TV transmitter (in the next room) will be moved to the new transmitter building. The space that becomes available will then be made into a color film room in which will be placed the color slide scanner and the new 3-Vidicon Color Film Camera. The resulting overall arrangement and location of equipment will be as good as if the layout had been planned that way from the beginning.

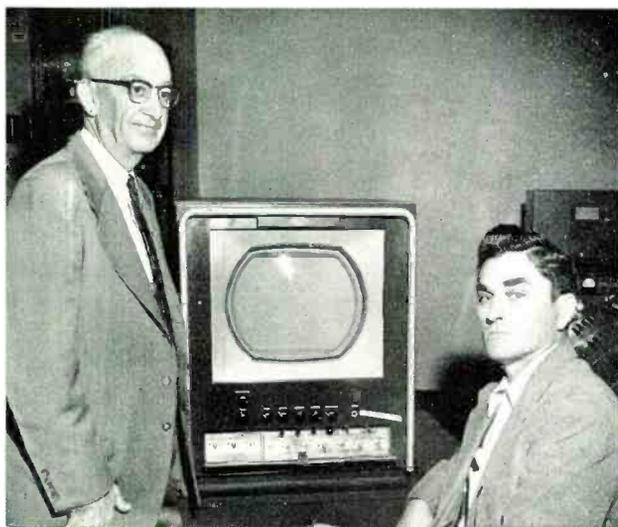
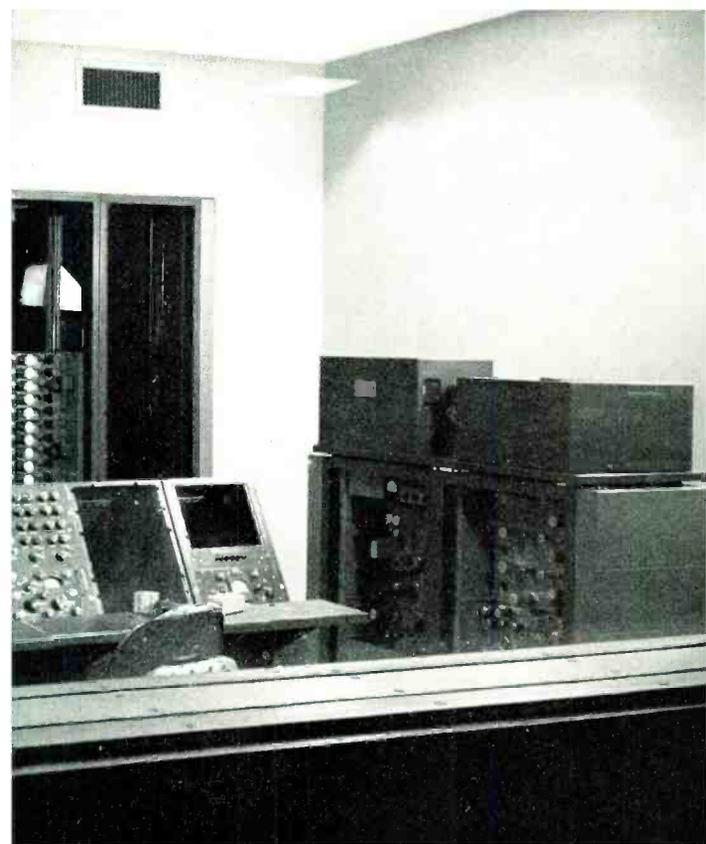


FIG. 11. Responsible for planning and operation of all technical aspects of WBAP-TV's color operation are R. C. Stinson (left), Chief Engineer of WBAP, WBAP-FM and WBAP-TV, and Rupert Bogen (right), TV Supervisor.



FIG. 12. WBAP-TV's Television Master Control Room (see floor plan Fig. 8). Audio engineer, program director and technical director sit on raised platform. The six monochrome camera monitors are mounted above the studio window. The three color camera monitors are located just below these and are not visible in this view.



WBAP-TV Color Programming

WBAP-TV's color programming experience falls in three categories: (a) a three-hour variety extravaganza on "C-day," (b) a series of one-time colorcasts of a number of WBAP-TV's regular TV shows, and (c) three shows (two dailies and one weekly) which are aired regularly in color.

That WBAP-TV could stage a three-hour color show on its opening color day seems almost impossible, but they did—and with many of the industry's VIPs there to see it! Only in Texas do you find the colossal nerve to try such a stunt. Believe it or not, everyone who was there says the pictures were very good.

WBAP-TV's one-time-only color shows have covered almost every type of show the station does. Included were: the Zoo Club;

a comedy show called Peter's Straightshooters Club; a dramatic show, "Theater of Romance"; a musical show (pianist and quartet) called "Musical Muse"; and the "Beauty School of the Air."

Of greatest interest from the practical operating viewpoint are the three shows WBAP-TV is airing regularly in color. Only when a show is colorcast a number of times can various techniques be tried out and compared. And only when the show becomes a regular does it shake down enough to develop an economical everyday operating procedure. WBAP-TV now has three shows which have gone through this process.

(a) *The "What's Cooking" Program*

This hour-long show, which is presented

every weekday from 1 P.M. to 2 P.M., offers recipes, cooking demonstrations, household hints, and interviews in the usual potpourri of a typical homemaker's program. The cooking demonstrations, which are rather more detailed than in most shows of this kind, are conducted by WBAP-TV's popular personality, Margaret McDonald. In the interviews and commercials, Margret is assisted by Frank Mills, WBAP-TV announcer.

The set for "What's Cooking" (see detailed description below) consists of two parts—one is the kitchen proper and the other a living room effect (see illustration, Fig. 13). A typical show opens with Margret McDonald mixing up something appetizing and putting it in the oven. While it bakes, interviews and commercials are in-

FIG. 13 (opposite page). This is the set for "What's Cooking", an hour-long show aired in color every week-day by WBAP-TV. Cooking demonstrations are conducted by Margret McDonald in "kitchen" part of set. For interviews with invited guests Miss McDonald moves to the "living room" part of set (far left).



FIG. 14. "Barn Dance", a half-hour western variety show is aired in color every Friday evening by WBAP-TV. In the set shown here the background is a plain grey canvas backdrop illuminated with colored lights (see text). Other sets for this show are used exactly as they were made up for monochrome.

terwoven in a planned but informal fashion. For example, on the day we visited this set, a group of four "guests" were interviewed about a local art show then in progress. In addition to the usual discussion, the visitors exhibited a number of the paintings from the show.

Commercials on "What's Cooking" are mostly done live. Some of them simply show the product on the "product table," a gadget WBAP-TV production people dreamed up (see description under "Commercials" below). In other instances Mills and/or McDonald go back to the kitchen set and put some action into the commercial. For instance, opening and drinking canned juice. Usually this action is used in combination with the static product display.

The program usually ends with McDonald triumphantly taking the masterpiece out of the oven and exhibiting it closeup (often with mention of sponsor's ingredient). You'd be surprised how effective this is. Color can make a lemon meringue pie something out of this world. People often speak admiringly of the 4-color cake and pie illustrations in the women's magazines. Wait till they see the same things in color television! Color TV has a sort of third dimensional effect, which, added to the motion, gives a sincerity that

the magazine illustrations often lack. It's what the ad men call "believability."

(b) *The "Ann Alden Show"*

This is a fifteen minute "women's show" aired in color every weekday, 4:15 to 4:30 P.M. It features fashions, decorating ideas, and related news of interest to women viewers. Sponsored by Striplings' (Fort Worth department store) and conducted by Ann Alden, it is intended to publicize Stripling's reputation as a fashion center and build traffic by showing current merchandise of special interest.

Sets used are varied (see below) to fit the program theme. On the day we saw this show a bright living room set was used. The show opened with Ann Alden entering in a smart new coat which she modeled for the audience. She then took off her coat and showed her bright print dress. Her pirouetting was accompanied by much talk about the fashion highlights of the coat and dress—and, of course, the fact that they came from Stripling's. This is an opening gambit sure to tie-down the female audience. And it is a commercial which is not only pleasant but extremely effective.

Following the opening Miss Alden introduced and chatted with her guest of the day who, on this occasion, was the new

"Miss Texas" (just selected the night before). Miss Texas, it seems, is studying architecture, and her display of "talent" was a series of drawings of a house she had designed, including finished "interiors." These were in color, made a beautiful display, and, of course, furnished a wonderful "hook" for a discussion of home decorating. If this program is this good every day, it's a wonderful place for using color. It may well be the key to the local department store advertising accounts.

(c) *The "Barn Dance"*

This is WBAP-TV's oldest regular program. Typical of all "western" barn dances it is replete with natural color and lots of motion. Except for some experimental work with colored-light backgrounds (see below), no changes have been made for color. About all shows of this kind need to adapt them for color is a lot of light (evenly distributed across the whole set) and some care with the makeup of the stars who are to appear in closeups. A perfectionist might want to change the costumes of the cast, but the general feeling is that the swirl of color and motion irons out imperfections in detail. We did not have an opportunity to see this show ourselves. However, opinion around Ft. Worth seems to be that it is one of the best things the station does.

Color Operating



FIG. 15 (left, top). Margret McDonald interviewing a guest in the "living-room" part of the "What's Cooking" set.

FIG. 16 (left, center). WBAP-TV's "Ann Alden Show" is a 15-minute style and fashion show aired in color every week-day afternoon. Sets used are selected from stock to complement the fashions to be displayed.



FIG. 17 (left, bottom). Peter's Straightshooters Club, starring WBAP-TV's own comedian, famed Billy Peters, is typical of regular WBAP-TV shows which have been aired occasionally in color. WBAP-TV has found its existing props entirely suitable for color.

Sets

WBAP-TV production people haven't found sets for color to be a problem. Right from the start, six years ago, WBAP-TV made up all of its backgrounds in color. Thus they now have available a large supply of backdrops and props—all in color. Practically all of the sets they use for color are made up from this available material. There is one big advantage to this, namely that these sets have already been proved out for black and white—so that is no problem. And, insofar as color is concerned, they have found that, with few exceptions, a set that looks natural and in good taste to the eye will be good on the color screen.

The "What's Cooking" set is shown in Fig. 13. The left hand part of the set, where interviews are conducted, is a sort of modernistic living room arrangement. The flat portions of the wall are finished to simulate a brick wall of dull red color. The fireplace in the center is simulated brick in a medium green shade. Furniture is selected according to number of guests, type of props to be used, etc. Most of the time the product table is positioned at the far left of the set. However, as it has its own background, it can be placed anywhere that it is handy and yet out of the way of the action.

The right hand part of the "What's Cooking" set is a typical kitchen setup. The cabinets are natural wood (including the base of the sink). The original range was white and had to be grayed down for color.



Experience

FIG. 18. WBAP-TV does most of its color commercials "live". On the "What's Cooking" show Margret McDonald often works them into the script. When done separately the product is usually set up on a table with appropriately colored background, as shown here. WBAP-TV also has a small "commercial" table (about 2 feet square) which is mounted on wheels so it can quickly be moved into convenient spots for camera pickup.



Recently this has been replaced by one of the new ranges which comes in a very light apple green. This comes out very well on the color receiver. Everyone is very happy about this because the grayed-down range was depressing to the cooks. There is a white freezer and a bright copper refrigerator at the left of the "kitchen." Fortunately these come into view only infrequently. The white, of course, glows a little, and the copper is full of highlights. However, since the picture never focuses on these units, only a perfectionist would question their use.

For the "Ann Alden Show" the backgrounds are varied to suit the theme but are always made up of standard backdrops and props (the pre-color stock). It is obvious that backgrounds for this type of show are not critical. The people in the show are the focal point and the background should do nothing to draw interest away from them. Thus the background should be not too light, not too dark, not too "busy"—not, in fact, "too" anything.

The day we watched the Ann Alden show the set was a living room wall with a large window in the center. Outside the window the art director placed a large bunch of forsythia. We almost shouted "stop"—it seemed its yellow blooms were much too bright. However, when we looked on the monitor screen we were amazed—it was just right. Maybe it was because the flowers were far back, or possibly because the small specks of yellow do not have the

deleterious effect of a large yellow patch. Whatever the reason, it made a very good picture.

Inside the set the director placed a large divan with its back to the window. Miss Alden sat here to interview her guests. Actually most of the camera time was on closeups. Thus what might have been a too "busy" background for the action was only seen occasionally when the camera dollied back or panned up. This occasional view of the rather bright background, we felt, added interest.

This brings up a point worth noting. At this stage in the color revolution most viewers are anticipating a lot of color. In order to satisfy them it seems desirable (where possible) to give them a little more color than occurs naturally in most settings. If they don't get it they feel gypped.

Color Commercials

Nearly all of WBAP-TV's color commercials are done "live." Most of those on the "What's Cooking" program show the actual product (usually food of one kind or another) displayed on the special "product table" shown in Fig. 18. This table has spaces for four products so that for most programs all commercials can be set up ahead of time. The four spaces have different colored backgrounds so that an appropriate color for the background can be selected. The table is mounted on rubber-covered wheels so that it can be turned around during the program, or moved from

one side of the set to the other. The object is to have it out of the main picture but close enough that one of the cameras can be swung around, at the right moment, and focused on the product.

Other commercials on the "What's Cooking" program, and all of those on the Ann Alden Show, are worked directly into the script and are usually shown in the main picture.

So far WBAP-TV has used very few color slides for "commercials" (although they do use them for station identification). Their reasons are (a) it takes too long to make slides, and (b) live color pictures look much better. This feeling, which is shared at other stations, is rather surprising and may lead to some revised thinking about local advertising. However, for "national spot" color slides still look like a good bet.

Color Rehearsals

WBAP-TV has not found it necessary to do any more rehearsing for color programs than for monochrome programs. It must be remembered that the types of programs they are doing in color are of simple format without a prepared script (except for some commercials). With only occasional exceptions they do no formal rehearsing of these. At most they "check out" for color the clothes worn by the hostess and her guest. Also any props that may be used close up. In most cases this is done in the ten or fifteen minutes just previous to air time.



FIG. 19 (above). This view of WBAP-TV's Studio 1 gives a good idea of the lighting as rearranged for color. Main light complement consists of thirty scoops, mounted on pantographs, 20 TV Associates Fixtures, and thirty spots mounted on catwalk around sides of studio. Lighting is controlled from a new light bridge (right in above view) which is on the studio floor for easy access.

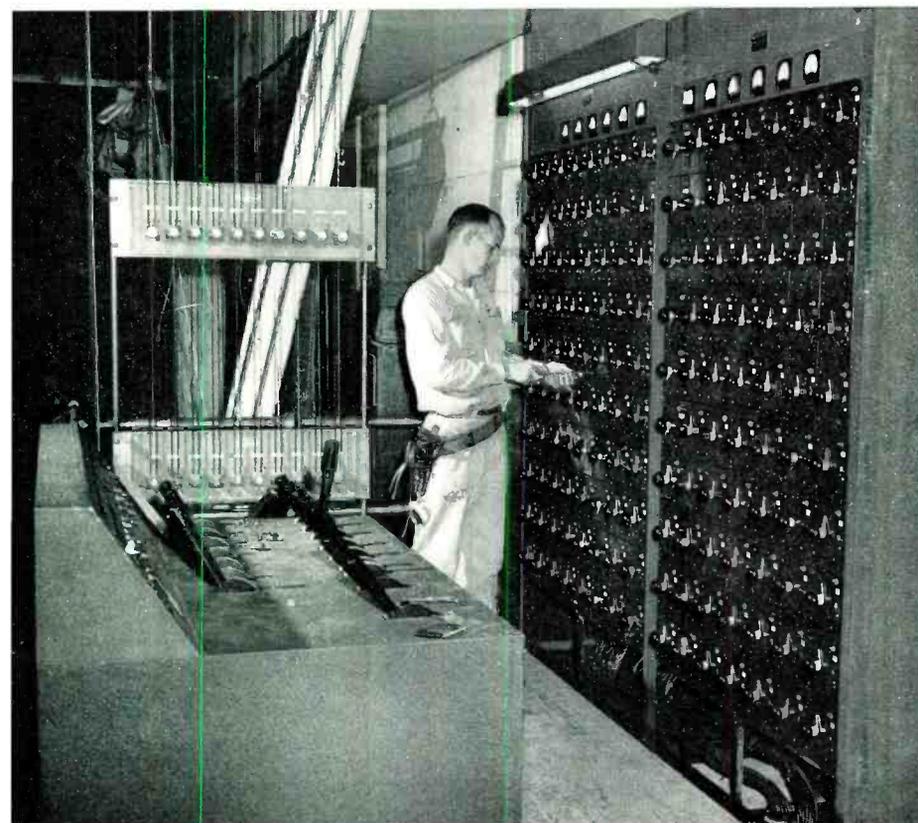


FIG. 20 (left). WBAP-TV's new light bridge consists of a Kliegl 140-position dimmer panel (left). At rear are the rope controls for the TV Associates Fixtures. From the bridge to the studio floor is just two steps. This is particularly convenient when one lighting man has to make a setup all by himself, as, for example, during rehearsals.

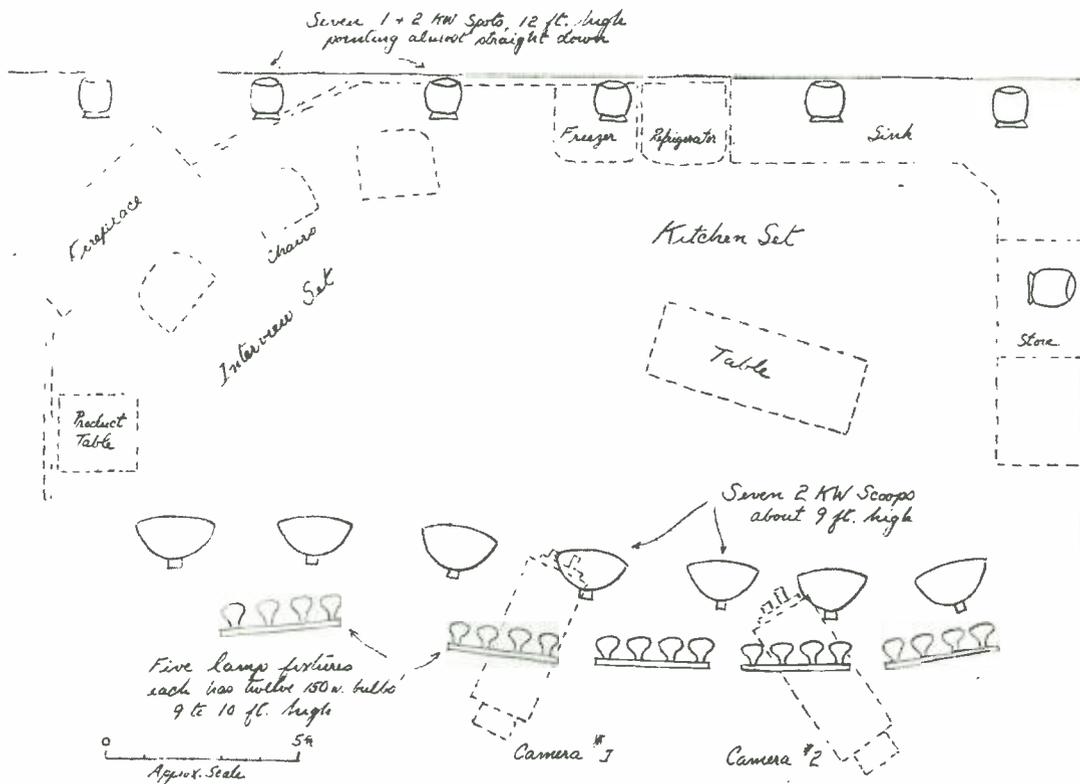


FIG. 21. This is a "quickie" sketch of the lighting arrangement for the "What's Cooking" show. Scoops and incandescent fixtures furnish the base lighting. Back lighting is supplied by spots mounted high overhead (on the catwalk railing).

Lighting For Color TV

To prepare for color, WBAP-TV made extensive changes in its lighting system. These changes consisted of (a) considerably increasing the load capacity, (b) removing the fluorescent fixtures which made up about half the original total, (c) adding a large number of scoops, (d) moving the light "bridge" from the catwalk to the studio floor, and (e) installing a new Kliegl light control board. These changes were made as follows:

For monochrome WBAP-TV had been using 100-200 foot candles for base lighting. For color they use about 400-foot candles. In order to make this possible they increased the load capacity of their system from 200 amp. to 600 amp. That they did not go too far overboard is indicated by the fact that on the "Barn Dance" program they use it all.

Originally WBAP-TV used 16 incandescent banks, 15 fluorescent banks and some dozen spots in Studio 1. For color the fluorescents were removed entirely and re-

placed with large scoops. The light fixtures' complement of the studio is now:

- 30 Kliegl scoops (2 KW)
- 30 Kliegl spots (1 & 2 KW)
- 20 TV Associates Fixtures (1.8 KW)

The scoops are all mounted on pantagraphs in two rows down the center of the studio (see Fig. 19). The 12-lamp fixtures, also in the center studio area, are provided with the standard TV Associates rope controls so that they can be rotated and tilted from the light bridge. The spots are mostly mounted on the catwalk railings (or on pipe battens suspended from the catwalks). They are used for back lighting and side lighting. Typical set-up of lights for a color show is indicated in Fig. 21.

One of the striking innovations in the "changes for color" at WBAP-TV was moving the light "bridge" from the elevated platform along the catwalk to the studio floor. The big advantage is that it makes possible "one-man" lighting. Previously a light man on the floor and one on

the bridge were constantly shouting back and forth. With the "bridge" down on the floor the lighting man on the set can make his own adjustments quickly and easily. Even on larger shows, where two lighting men may be used, it is a great convenience because they can easily get together to discuss procedure. The only evident disadvantage is that it uses up valuable studio space. At WBAP-TV the studio is large enough to make this unimportant.

Color-Lighted Backgrounds

For the "Barn Dance" program WBAP-TV uses mostly a plain canvas backdrop. With so many colorful costumes a fancy background is obviously uncalled for. However, in order to add variety WBAP-TV has been experimenting with colored spots to light the backdrop. Phil Wygant, WBAP's TV Production Supervisor, is quite optimistic about the possibilities of the technique. He uses Cinemoid jell for his color filters and puts six to eight of these colored spots on a grey canvas back-

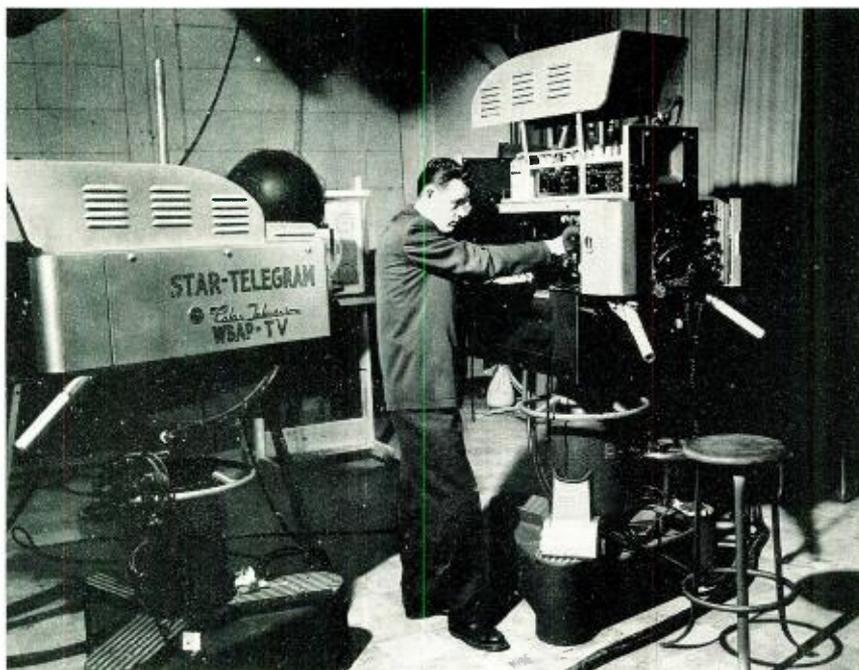


FIG. 22 (left). Checking out color cameras takes a little longer, but WBAP-TV engineers have had no trouble learning how.

color than monochrome and this means more engineering man hours are involved. At present, the time for setup as compared to program time is considerable. However, as most of this time is required only once a day, the ratio of setup time will come down fast as program hours increase.

Experience with Equipment

WBAP-TV has now (as of October 1st) logged over 700 hours on its two live color cameras. This wouldn't be long in most businesses, but in color TV it's quite a while. Enough certainly to have "shaken down" the equipment. And enough to give WBAP-TV engineers a good idea of what it will do.

How do they feel about it? They just point, with great satisfaction, to the record. WBAP-TV has always prided itself on having an all home-town crew. In 1948 when they went into TV they didn't import any experienced TV personnel, but rather started right in at ground level and taught themselves. When color came along they did the same thing. Except for the one week that Rupert Bogan, TV Supervisor, spent at NBC, and the week's course that he and "Super" Stinson took at RCA, Camden, they had no advance training in color. When they unpacked their equipment in April most of the staff had never seen a color picture. Nevertheless, the WBAP-TV engineering staff was able in less than a month to install this equipment, and get it operating before the RCA field engineer arrived to make the final adjustments.

Since May 15th, WBAP-TV has been carrying local color programs every week-day, plus everything that NBC puts on in color. There have been no major failures, and no color time lost due to equipment failures. The WBAP-TV engineers think that's a pretty good record, and so do we.

What about complexity? Can regular monochrome engineers operate this equipment? Again WBAP-TV says look at the record. So far Rupert Bogan, TV Engineering Supervisor, and Tom Bedford, Assistant TV Supervisor, have been doing the maintenance and camera check out. However, they have been rotating their regular video men on the color cameras and the color controls. These men have had no difficulty with these assignments and will shortly be started on camera check out assignments. WBAP-TV thinks all its video men will be color experts in a very short time.

drop for the Barn Dance. We didn't see this ourselves. However, from comments of those who have, it is evident that this will be one of the important tools of the color producer.

Setup Time for Color

Color "setup" time—meaning the time to get the equipment and cameras warmed up, checked out, balanced and ready for use (rehearsal or programming)—is certainly greater than for monochrome. How much time it should take is a matter of some disagreement. It depends considerably on how much of a perfectionist you are on the matter of camera balance (color comparison between cameras).

At WBAP-TV they have tried to take a practical viewpoint—a sort of in-between course. Their setup schedule has shaken down to something like this. They ordinarily start setting up cameras at about 11 A.M. (for their 1 P.M. show). At noon the prop men start arranging the set. From approximately this time on, cameras are available for checking the set and props. Ordinarily there is no rehearsal for this program. However, they usually set up the products to be featured on the commercials and check them for color attractiveness. Since the set is used the same way each day there is seldom need to rearrange the lighting.

After the "What's Cooking" show is over (at 2 P.M.) the video men have about an hour before they have to start checking the

set for the Ann Alden Show (4:15 P.M.). They keep the equipment warmed up and sometimes use the period for more camera checking. They feel that this is probably not a necessity—that they could run shows back-to-back if necessary. There is no reason, in fact, why color cameras cannot be operated continuously for several hours. If color balance tends to drift, this can be corrected without interfering with the program.

Manpower for Color

WBAP-TV's experience in manpower needs for color can be summed up very easily: They use exactly the same number of men on a color show as they use on a monochrome show.

On a typical color show such as "What's Cooking" the crew in the studio consists of two camera men (engineers), one prop man (who helps move the big camera dolly), one audio man, and one lighting man. In the camera control room there is one man. This man handles two camera controls and the slide scanner. At present not many slides are used and it works out all right. When slide use increases, and certainly when color film equipment is installed, another man will be needed at this point. The crew in the control room (which functions as both studio control and master control) consists of one audio man, the technical director, and the program director.

Of course, the camera setup time for color is an hour to two hours longer for

WBAP-TV Color Promotion

WBAP-TV has been promoting its color operations in several ways. In the newspaper of its parent company, the Ft. Worth Star-Telegram, it runs a box ad daily listing the color programs for the week (see Fig. 25). In addition larger space ads are used occasionally to list WBAP-TV's color programs and tell the public the location of dealer's stores where they can see color

(Fig. 25). These efforts, of course, are intended to sell the public and the dealers.

To sell its advertisers on what it is doing in color WBAP-TV uses two approaches. One of these is its house organ, the "WBAP Merchandiser" (Fig. 23), which in each issue carries a story on WBAP-TV Color. Another is a series of full-page ads in industry magazines (Fig. 24) calling atten-

tion to WBAP-TV Color.

The management of WBAP-TV can honestly be described as "overboard on color." They feel sure it will be but a short time before all TV is color. All their planning is directed that way. The visitor to WBAP-TV, whether he went as a skeptic or an aficionado, is sure to come away an overboard color enthusiast himself.

WBAP MERCHANDISER
and Program Schedule

KIT CARSON, WILD BILL HICKOCK TO NEW TIMES

WBAP Merchandiser
Carson, Wild Bill Hickock to New Times

WBAP Merchandiser
Carson, Wild Bill Hickock to New Times

WBAP Merchandiser
Carson, Wild Bill Hickock to New Times

FIG. 23. Stories on color operation appear in each issue of the "WBAP Merchandiser".

WBAP-TV presents
"WHAT'S COOKING"
IN FULL COLOR!

The personality and charm of Margaret McDonald has made her the favorite wife of thousands of Fort Worthers as she shares her wonderful "What's Cooking" with the thousands of full color.

What's cooking... the popular afternoon show on WBAP-TV, featuring Margaret McDonald, is now being presented in full color... Monday through Friday. WBAP-TV offers this hour of fun and fun to be had in an all color broadcast.

PLUS... about the New Alden Show... an afternoon program featuring fashion, decorating ideas and news of special interest to women... Monday through Friday.

WBAP-TV CHANNEL 5
THE STAR-TELEGRAM STATION • FORT WORTH, TEXAS
ANCH CARTER | ANCH CARTER, JR. | HAROLD HOUGH | GEORGE CHANTON | BOY SACUS
FREE & PETER, Inc. - National Representatives

FIG. 24. WBAP-TV has used a series of full-page ads in trade magazines announcing its inauguration of local live color (left) and also worked the announcement into its regular ads (right).

COLOR ON WBAP-TV

FULL POWER SOON NOW!

The first local color television show in Texas was presented in a giant two-hour review by WBAP-TV, May 15. Another Number ONE in the history of Channel 5. WBAP-TV - first in the Southwest in every way.

There are now
381,428

sets in the great Fort Worth - Dallas area.

And right away the 1113 foot WBAP-TV tower-antenna with 100,000 watts will provide full power for this tremendous market.

WBAP-TV CHANNEL 5
THE STAR-TELEGRAM STATION • FORT WORTH, TEXAS
ANCH CARTER | ANCH CARTER, JR. | HAROLD HOUGH | GEORGE CHANTON | BOY SACUS
FREE & PETER, Inc. - National Representatives

FIG. 25. The STAR-TELEGRAM publishes WBAP-TV's color schedule daily, as well as in a weekly "where to watch color" ad.

Where to watch COLOR TV this week—July 11-17

ARLINGTON
Goodyear Service Store
Carswell Jewelry & Appliance

DALLAS
Baker Hardware Company
Boedeker & Sons
W. A. Green Company
Groom Brothers
A. Harris & Company
Inman Radio Service
CRID-TV
Ardel Home Appliance
Ind-rnase Appliance
Cliff Radio Service
Lawn Home Appliance
Lawn Sam
nter Brothers
rs, Roebuck & Co.
m's Radio Service

3025 University Dr.
The Crump Company
Elliston's
4001 Ohio Garden Road
Everybody's
Fair Store—Downtown
Goodyear Service Store
Trnett Kimzey Company
1513 W. Vickery
Leonard's
Mannig's
Marvin Electric Company
Oakhurst Appliance
Knox & Poff
1518 Memphis
Sam's Sten & Shop
2308 E. Rosedale
Stalnakr Furniture Co.
1617 N.W. 25th
Television Service Co.
1019 Jennings
Texas Hotel Lobby
WRAP-TV
Reception Room

SEE THESE COLOR SHOWS THIS WEEK!

HOME—NBC-TV's giant, hour-long electronic magazine for 1 women starring popular Arlene Francis with helpful hints in every phase of homemaking. Color segments Wednesday and Friday, 9-10 a.m.

MUSICAL MEMO—Twenty fun-packed minutes of music and song with Pianist Jimmy Livingston and the lyrical stylings of the Imperial Quartet. Monday through Friday at 11:00 a.m.

MUSEUM ADVENTURES—Exciting, true-life adventures into the fascinating kingdom of animals, plant world and other scientific realms with Children's Museum Director Bill Hassler. Friday at 11:30 a.m.

WHAT'S COOKING—Cooking made easier, faster and more fun with your hosts, Frank Mills and Guss'e Lee Fuller, substituting for vacationing Margaret McDonald. Monday through Friday at 2:00 p.m.

THE MARRIAGE—Broadway Stars Jessica Tandy and Hume Cronyn in a dramatic half-hour concerning the problems of a New York lawyer and his lovely wife. Thursday at 8:00 p.m.

BARN DANCE—A hayloft full of good old-fashioned, toe-tapping music and songs plus your favorite square dances and dancers. Friday at 9:30 p.m.

AND... this fall, with time change, there'll be television shows in color almost every night in the week, topped by NBC's giant "spectaculars"! Make your plans NOW to enjoy television at its best... in the exciting new dimension of color!

WBAP-TV CHANNEL 5
THE STAR-TELEGRAM STATION

LOOK FOR COLOR ON CHANNEL 5

FOR THE COMING WEEK!

MON. through FRI.
"What's Cooking" - 2:00 P.M.
"Ann Alden" - 4:15 P.M.

WEDNESDAY
"Home" - 9:00-10 A.M. (Inserts)

THURSDAY
"The Marriage" - 8:00 P.M.

FRIDAY
"Barn Dance" - 9:30 P.M.

WBAP-TV CHANNEL 5
THE STAR-TELEGRAM STATION

STAR-TELEGRAM WEEK'S WBAP-TV COLOR SCHEDULE

Local:
Monday through Friday 11:00-11:20 a.m. "Mus Mevo."
Monday through Friday 2:00-3:30 p.m. "What's Cooking!"
Friday—11:30-noon "Musical Adventures"
Friday — 9:30-10:00 p.m. "Barn Dance."
Network:
Wednesday—9:00-10:00 "Home."
Thursday — 8:00-9:30 "The Marriage."
Friday — 9:00-10:00 "Home."

Good Mornin'
WBAP-TV WEEK COLOR SCHEDULE
9:10 a.m. Wednesday Friday: "Home."
2:30 p.m. Monday thru Friday: "What's Cooking?"
4:15-4:30 p.m. Mon thru Friday: "Ann Alden."
8-8:30 p.m. Thursday: "Marriage."
9:30-10 p.m. Friday: "Barn Dance."

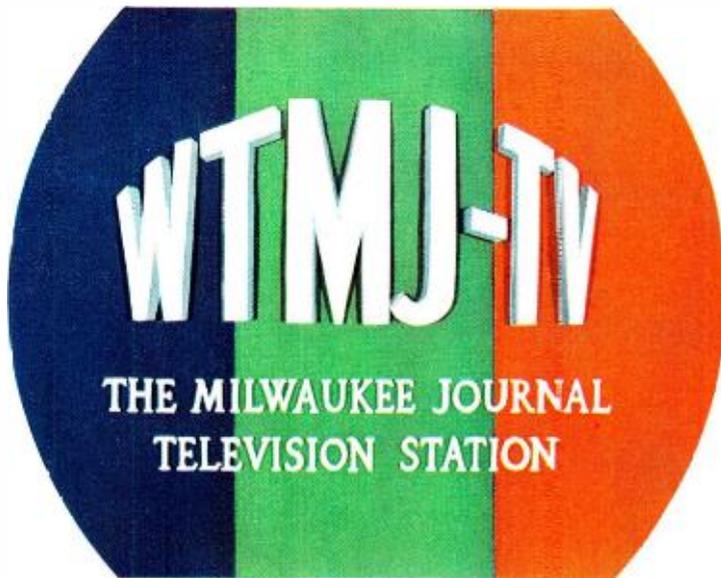


FIG. 1. WTMJ-TV's color ID is a relatively simple design which was selected from a number of ID slides which were made up and tested on the air.

The Milwaukee Journal is one of television's real pioneers. Its first application for a TV license was filed on May 5, 1930, and on September 4, 1931, it received a license for experimental television station W9XD. WTMJ engineers have been working on television almost continuously ever since. In 1941 the Journal applied for and received a permit for a commercial television station. An RCA Field Camera was purchased and placed in operation and a 300-foot TV tower and a transmitter building were erected. However, before the station could get on the air the war intervened and construction was frozen. Finally, on December 3, 1947, WTMJ-TV went on the air, the first television station in Wisconsin and the 11th in the nation.

In October 1953 the first big NBC color show—starring Donald O'Connor—was viewed in WTMJ's studios on a closed circuit over network lines. During December 1953 both of WTMJ-TV's television transmitters—the RCA TT-25BL (25 kw) and the standby RCA TT-5A (5 kw) were converted for color. Since that date all NBC network color shows have been carried by WTMJ-TV.

WTMJ-TV'S experience



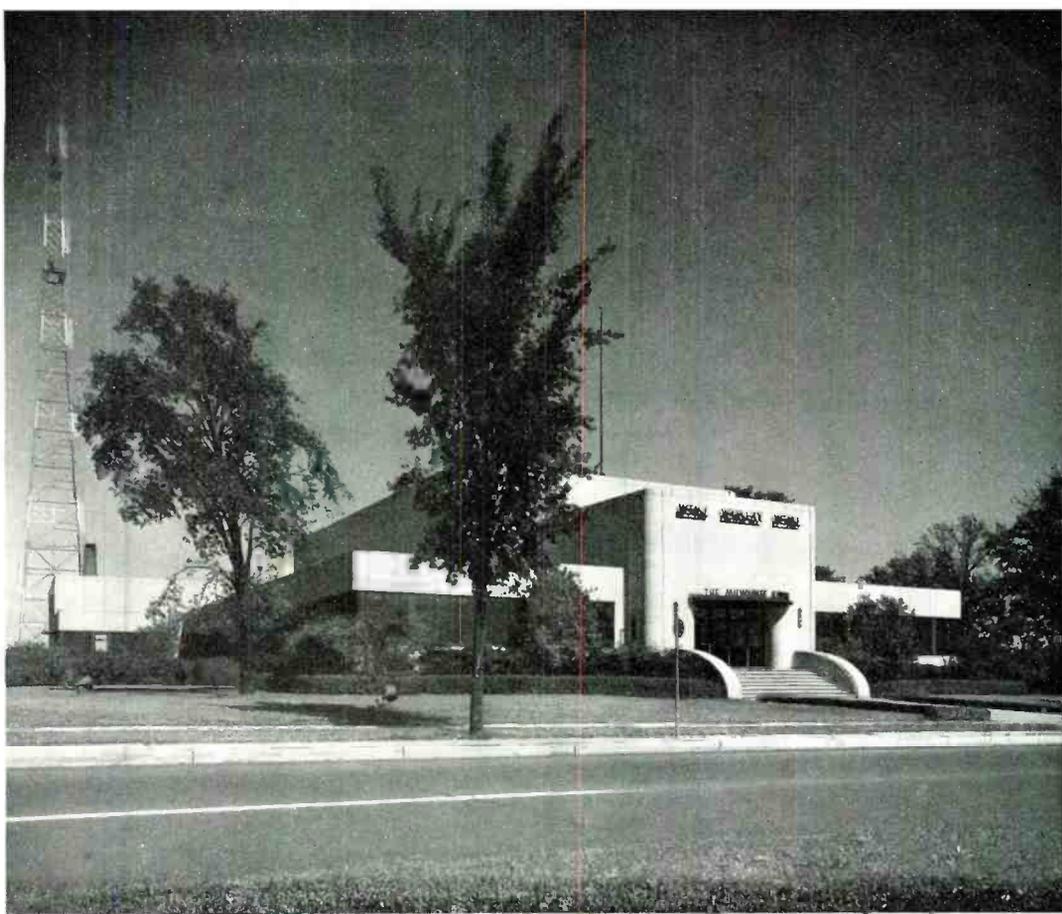
FIG. 2. WTMJ-TV's live color camera focuses on "Pedro" Alex Mayer of the Hotshots and the Winkert sisters, featured vocalists on the Hotshots program.

WTMJ-TV received its live color camera equipment about the middle of May, installed it completely (without any factory help) and had it operating by the last of June. The first two weeks of July were utilized as an "experimentation" period during which production and programming people were given an opportunity to get the feel of the equipment.

Live Color Since July

On July 18 WTMJ-TV inaugurated color TV with a gala one-hour presentation of the "Grenadiers" in a specially-produced show. The first commercial show (for Blatz) followed on July 20. Since that date WTMJ-TV has been airing an average of two shows a week in color. These are regular station shows without special adaptation for color (see below). This is in line with the station's announced plans to give all its local advertisers an opportunity to view their own program in color as soon as possible.

FIG. 3. WTMJ's studio and office building, "Milwaukee's Radio Center", houses both radio and television operations of the Milwaukee Journal stations.



with live color

WTMJ-TV's color program makes them one of the leaders in local live color origination. In order to give BROADCAST NEWS readers a complete report on WTMJ-TV's experience with color we spent several days in Milwaukee. The story on the following pages is based on the things we learned from watching WTMJ-TV's color operation, talking to WTMJ-TV staffers and executives, and studying their color record to date.

Preparing for Color

WTMJ has always gone all-out to maintain its position of technical leadership. The fact that its engineers have been working with television (experimentally and commercially) for nearly twenty-five years is one evidence of this. WTMJ began thinking about color as early as 1940.

The first period of color preparation at WTMJ was one of watchful waiting. During this period WTMJ executives attended all of RCA's color demonstrations and "reports to the industry," as well as demonstrations and conferences by other groups. Finally,

after the NBC Affiliates' meeting and color demonstration at Princeton in May 1953 they became convinced that color was ready and would soon be here. The very next day Phil Laeser, Manager, Radio and TV Engineering, was in Camden making up an order for equipment. WTMJ was on the way to color!

The next step was to get the engineering supervisors oriented on color equipment. Mr. Laeser, Ed Cordes, TV Chief Engineer, and Nick Brauer, Color Supervisor, each spent a week with the NBC staff at the Colonial Theatre. In addition, they attended the first of RCA's color seminars at Camden. Finally, all three, plus WTMJ's other plant supervisors and some half-dozen of its video engineers attended the NARTB Engineering Conference and Exhibits at Chicago in May. Thus, when the station's color equipment started arriving the WTMJ engineering staff was already fairly familiar with the gear and ready to go to work assembling it.

WTMJ's programming staff was also

preparing. Hugo Birmingham, Production Supervisor, and Joe Fox, Color Coordinator, attended the NBC Color Clinic. In addition they made a study of all available printed information relating to the problems of color production.

With all of this preparation WTMJ-TV was all set to begin operations the minute the equipment arrived. Nevertheless, a "take-it-slow" schedule was purposefully adopted. The several weeks' period which intervened between the time the equipment was operative and the first on-air show (July 18) was a part of this planned preparatory program. Looking back on it, the station staff feels this "warm-up" period was a very good idea. The idiosyncrasies of color were learned more rapidly with all-day closed-circuit experimentation than they would have been with a few minutes a day "on-air." Mistakes were made in private instead of public. And the station staff was able to work out a smooth "team operation for color" which has paid off with smoothly run shows ever since the station went on the air with regular color programs.

WTMJ-TV's Color Studio Arrangement

When it came to finding space for color operations WTMJ-TV was relatively fortunate. Their AM-FM-TV Studio Building (Fig. 3), which they call "Milwaukee's Radio City," was constructed in 1941 with the needs of the future in mind. Thus a more generous than usual amount of space is available for TV studio operations.

Referring to the floor plan of the building (Fig. 4), studios A-1, A-2, A-4, D-1 and the auditorium Studio C, are used mainly for TV programming. The fact that the studio space is divided among five studios was also advantageous in that it allowed color operation to be kept somewhat apart from regular monochrome. Because WTMJ's "plan for color" was to try it on all types of programming, they chose the general purpose studio D-1 for their color installation.

D-1 is a medium size studio, approximately 31 ft. by 53 ft. and 24 ft. in height. In this size studio a very large set (or two smaller sets side by side) can be placed at each end of the studio and a very generous amount of camera space left in the center. In emergency it is possible to have a third set along one side (Fig. 8) so that the camera is at the center of a large U. The width of the studio is not sufficient to get a wide-angle shot of the set along the side. However, if the arrangement is planned so that only medium and close shots of the side set are called for then the setup works out very well. WTMJ-TV has used this arrangement several times.

An interesting extra feature of Studio D-1 is the very large door in the side away from the control room. This door, which is 10 ft. wide by 12 ft. high, opens into a wide open space in the prop storage area (see Fig. 8). This wide space leads directly to a grand-daddy size elevator (10 ft. wide, 20 ft. long and 12 ft. high). This elevator makes it easy to bring cars and even medium-size trucks right into the studio. But this is only one of the features of the arrangement. A second is the fact that when the production staff wants an extra long shot they simply fasten the doors open and place their set out in the area toward the elevator. There is still a third use. This is to provide space for the background projection screen. Many stations do not use their background projection equipment very much because of the space it takes. WTMJ-TV has solved that problem. They simply mount the screen in the door opening and

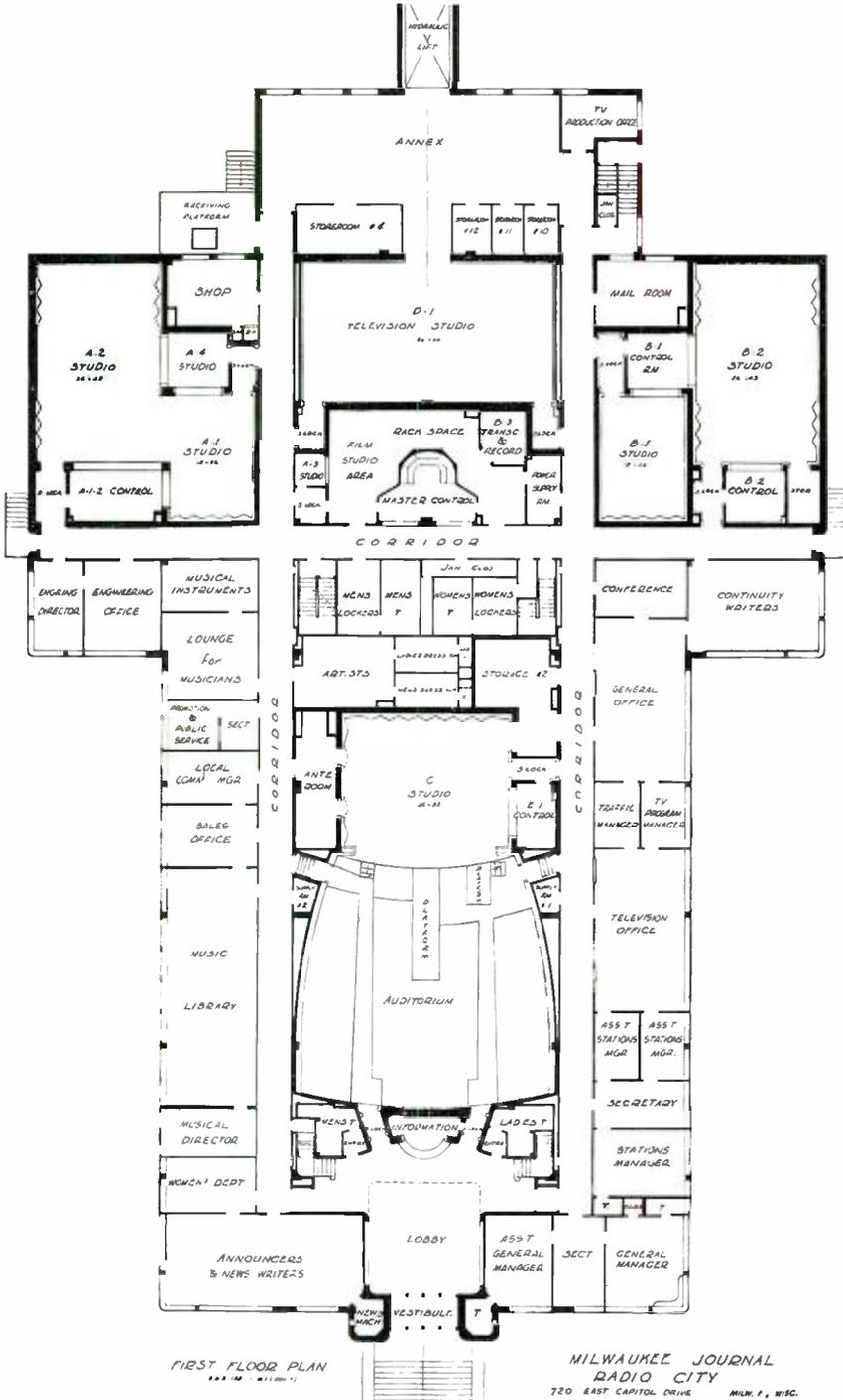


FIG. 4. First floor plan of WTMJ's Studio Building. (Second floor plan is shown in Fig. 7, Pg. 54). WTMJ's business offices, as well as its radio and TV studios, are housed in this building. The front part of the building contains a large auditorium-type studio which is equipped for either radio or television programming through provision of separate control rooms (C-2 control room is on second floor over C-1). The master control room handles both radio and TV simultaneously. Studios B-1, B-2, B-3 and A-3 are equipped for radio only. Studios A-1, A-2, A-4 and D-1 are normally used for TV only. To date most color programs have originated from D-1; however, WTMJ has used other studios for color, especially the "kitchen" studio A-1.

FIG. 5. WTMJ-TV's 12-bay RCA Super-Gain Antenna is mounted on a 1035-foot tower (center foreground). The old 300-foot tower (to the left) with 4-bay super-turnstile is maintained as a standby, the studio building is at the lower left corner in this photo.

place the projector out in the area beyond. That way it uses no studio floor area.

In converting Studio D-1 for color, WTMJ-TV allowed for the fact that they would still want to use it part of the time for monochrome. Thus all of the outlets for monochrome cameras were left in place, as well as the camera control equipment in the control room (see below). Outlets for the live color camera cable were installed and changes and additions made to the lighting system (see below). Otherwise the studio is pretty much as it was for monochrome.

In addition to using Studio D-1 for color, WTMJ-TV has tried out their live color camera in other areas. For example, they have recently used it in Studio A-1 which is their "kitchen studio." It is also likely that they will try it in their "outdoor studio" which is an area adjacent to the TV studio area. This "outdoor studio" has been very popular for monochrome shows and is used almost every day. It looks like a natural for color. The outdoor studio is equipped with two manholes each containing necessary camera, microphone and intercom cables. Asphalt camera runways lead to several sections of the plot, for example, the reflecting pool, the garden plot, etc.

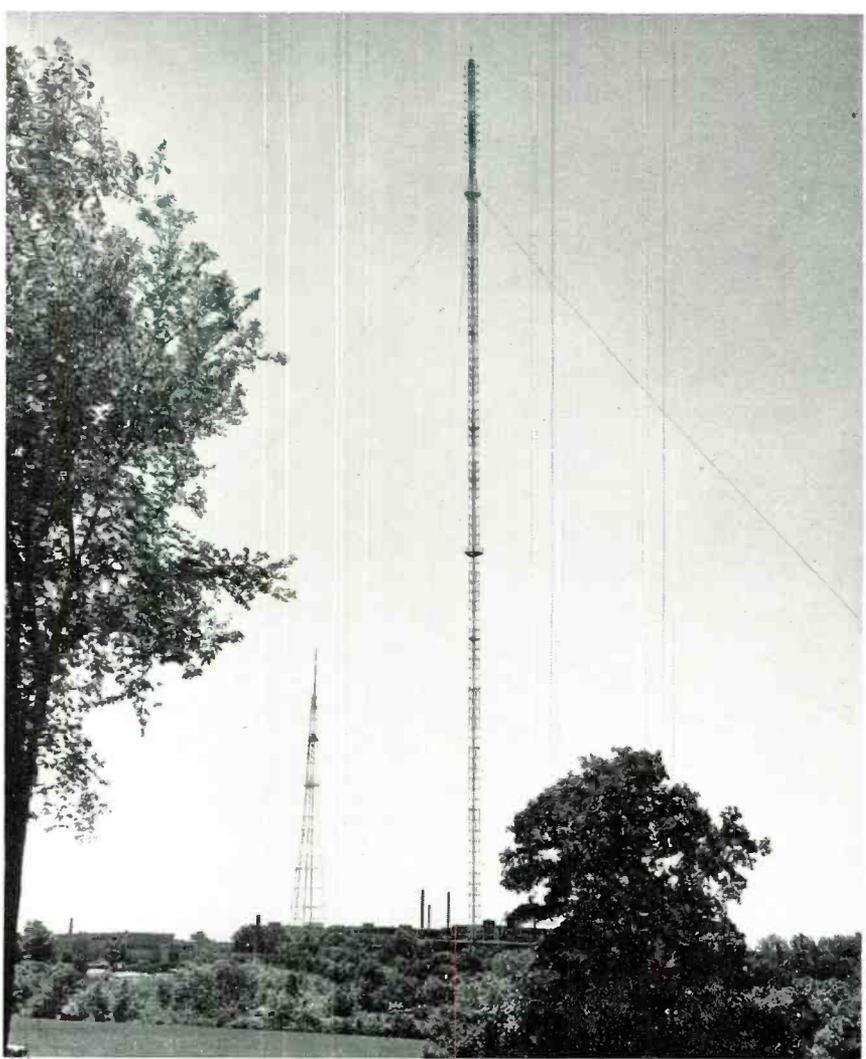
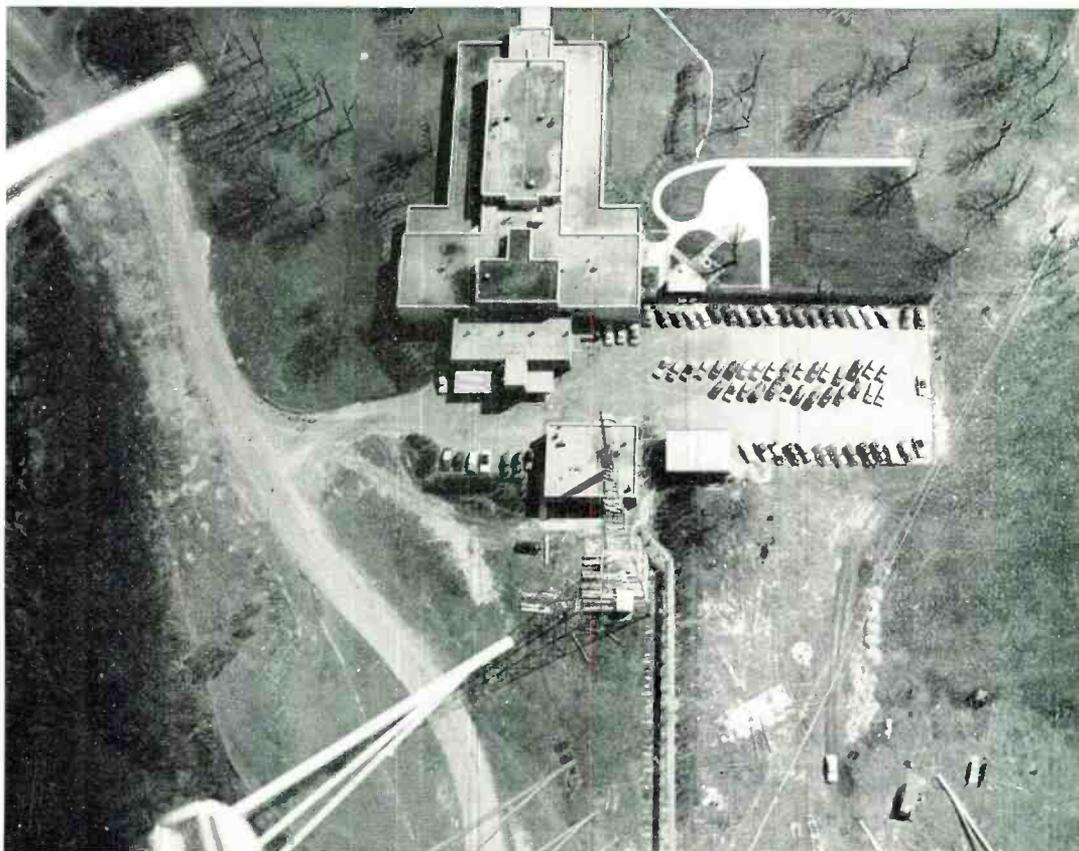


FIG. 6. Looking down on WTMJ's plant from the top of the 1035-foot tower (elements of the RCA 12-bay super-gain antenna can be seen at the left and bottom). The studio building is at the top. In the center is the transmitter building and next to it WTMJ-TV's old 300-foot tower (with RCA 4-bay super-turnstile antenna) which, together with WTMJ-TV's old TT-5A Transmitter, is maintained as a standby setup.



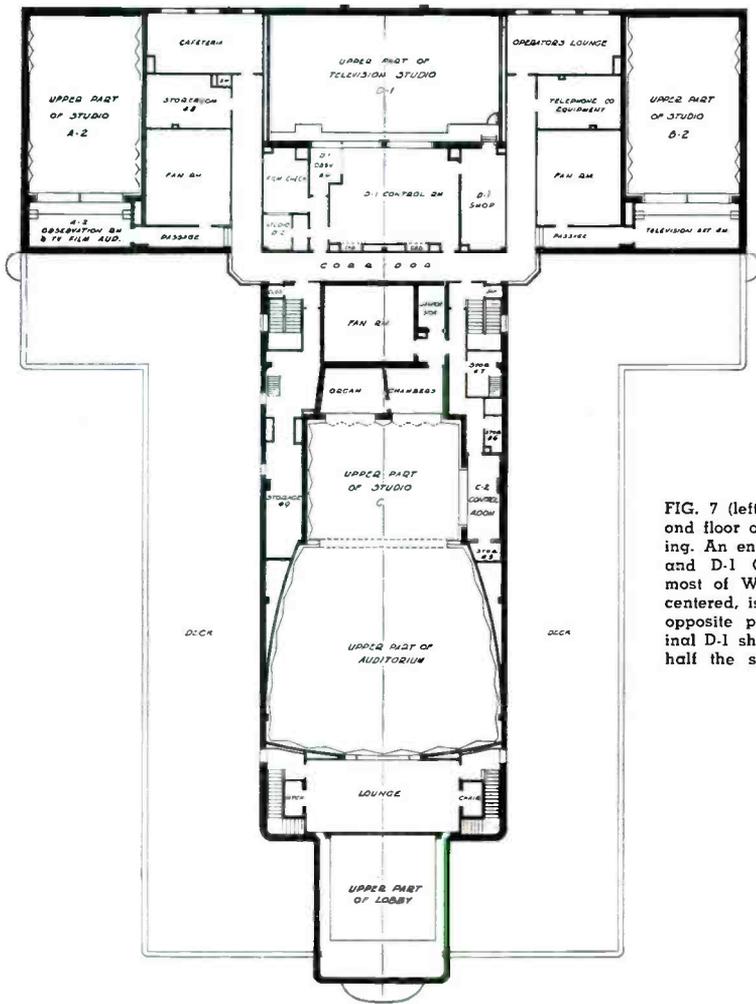


FIG. 7 (left). Floor plan of the second floor of the WTMJ studio building. An enlarged plan of studio D-1 and D-1 Control Room, in which most of WTMJ's color operation is centered, is shown in Fig. 8 on the opposite page. Note that the original D-1 shop has been divided and half the space used for a power supply room.



FIG. 8 (above, right). Detailed plan of Color Studio D-1, Control Room D-1 and adjacent areas used in color programming. The trans-lux projector and rear projection screen are shown in the operating position. When not in use they are wheeled into the storage area.

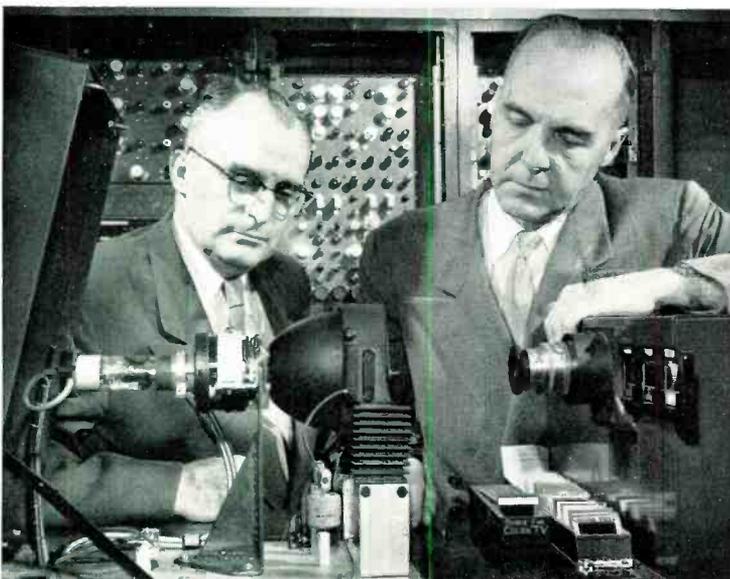
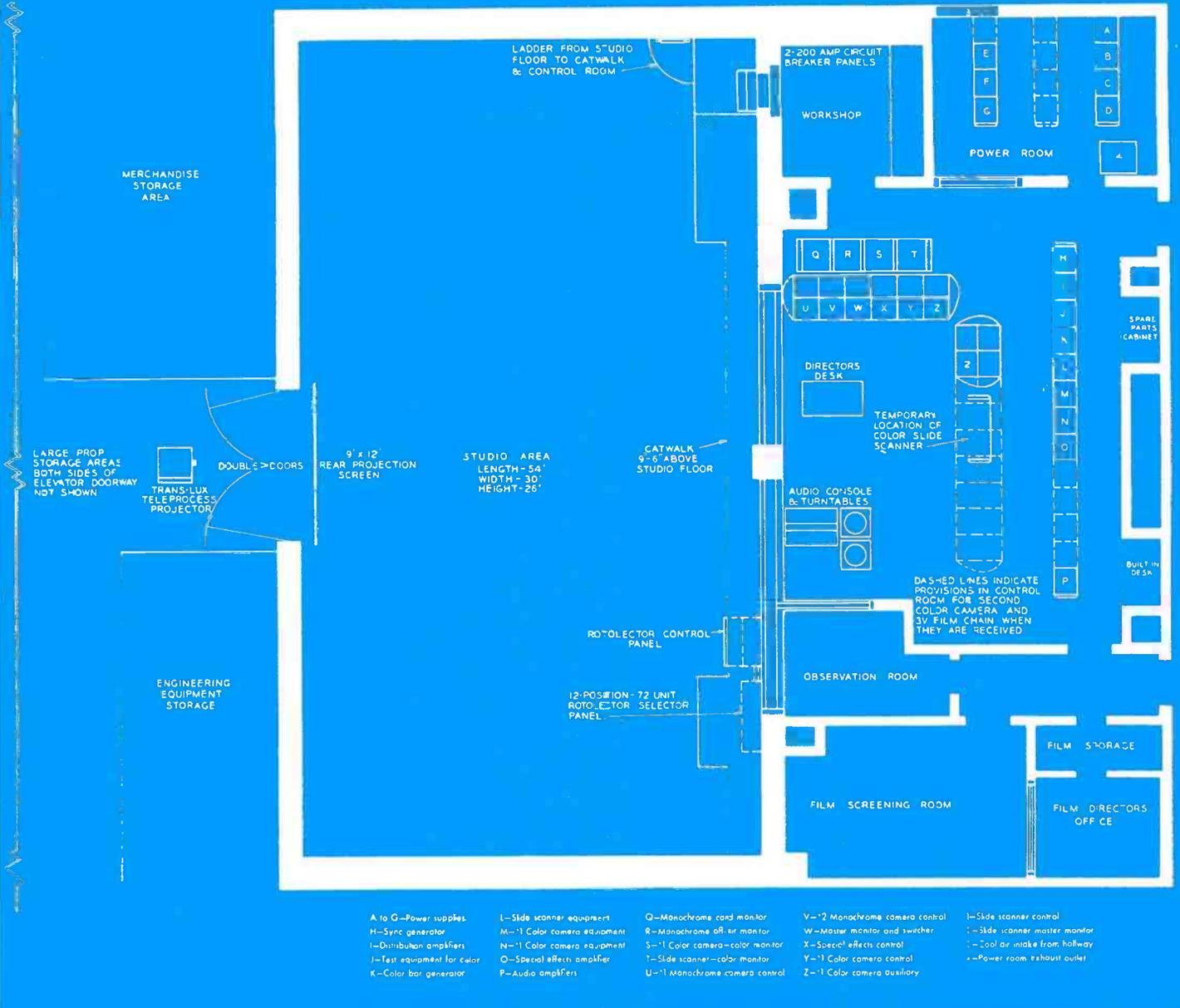


FIG. 9 (left). Phil Laeser, Manager, Radio and TV Engineering, and Ed Cordes, TV Chief Engineer examine the RCA TK-4A Color Slide Camera which WTMJ-TV uses for color slide transmission.



WTMJ-TV's Color Equipment

With his several years advance study of color, Phil Laeser was all set to go when the WTMJ management gave the signal. Bearing in mind the station's determination to try color on all its regular programs in turn he reasoned that he would need color equipment to air every type of program, but that he would not need much duplication (since they planned to try only one program at a time). In essence, what he wanted was one of everything needed for full color operation—but no extras to gather dust and become obsolete.

When Laeser sat down with RCA engineers in Camden in May 1953 to plan his

order, the equipment packages described in the recent color issue of BROADCAST NEWS (No. 77, January-February 1954) had not yet been assembled as such. Nevertheless, the result was very much as if he had ordered one each of these packages (and the fact that the final lists so nearly coincide may not be entirely coincidence).

As presently constituted, WTMJ-TV's color equipment includes (a) complete network color equipment items, (b) color synchronizing equipment, (c) color test equipment, (d) a Type TK-4A Color Slide Camera Chain, (e) a Type TK-40A Live Studio Color Camera Chain, and (f) a

Type TK-26A 3-Vidicon Film Camera Chain. Originally the station had ordered a flying-spot-film projector system for May 1954 delivery. However, after watching the prototype of the new 3-V Color Film Camera in operation at Camden they decided to wait for this superior-type equipment.

The 3-V Color Film Camera was installed the first week of November. With this addition WTMJ is well-equipped to air any kind of color program, whether it be a color program from the network, or locally originated color slides, color film, live color studio programs, or any combination of these four types of programs.

Arrangement of Color Equipment

D-1 Control Room (see 2nd Floor Plan, Fig. 7), which is located on the second floor level was, very farsightedly, made quite large. Thus it was ideal for the installation of the color control equipment. The monochrome equipment was rearranged and the color equipment fitted in with it to provide an integrated operation.

Fig. 8 is a floor plan of the color control room, while Figs. 10 and 11 show two photographs of the equipment in the control room.

In the camera control console the two original monochrome camera controls are next to the studio window. Next to these is the switcher. This is a TS-10 which has been modified (slightly) so that the color cameras, as well as the monochrome cameras can be fed into it. To the right of the switcher are the camera control units for the live color camera. Around the corner of the L is the camera control console for the color slide camera. The color slide camera itself is next to this (see Fig. 8).

The color monitors and two 21" monochrome receivers are mounted on a pipe framework just back of the camera control console. The two color monitors are across the output of the two color camera chains (live and slide). One of the 21" receivers is used as a "line" monitor and the other as a "cue" or "preview" monitor.

The program director and the studio supervisor (technical) sit at a table just back of the video engineer. From this position they have a good view of the elevated monitors. The program director can look

down into the studio through the window at his left.

The audio console is just back of the program director's table. From this position the audio engineer can also see the monitors—and he too can look down into the studio. The audio equipment includes an RCA 76-B Consolette, to which has been added an extra unit which provides for a second line output with separate monitoring, and two 70-D Turntables.

The Type TK-26A Color Slide Scanner is located in the control room. Space was allowed to mount the 3-V Vidicon Film Camera alongside of it. (The 3-V had not been received when the pictures shown here were taken.) When the 3-V Color Film Camera was installed the control unit was placed in the space originally occupied by the slide scanner. The latter was moved about 5 feet further along the side of the L.

The amplifiers and colorplexers associated with the live and slide color cameras are mounted in the racks along the back of the control room. The unfilled space in the rack lineup (Fig. 8) is reserved for the rack equipment associated with the 3-V Color Film Camera and possibly a future second live color camera.

All of the power supplies are mounted in racks in a "power supply room" which occupies half of the space marked "D-1 Shop" on the floor plan (Fig. 7). The shop was cut down in size to provide room for the 12 racks of power supplies. This room, which can be seen in the far rear of Fig. 10, is provided with exhaust ventilation.

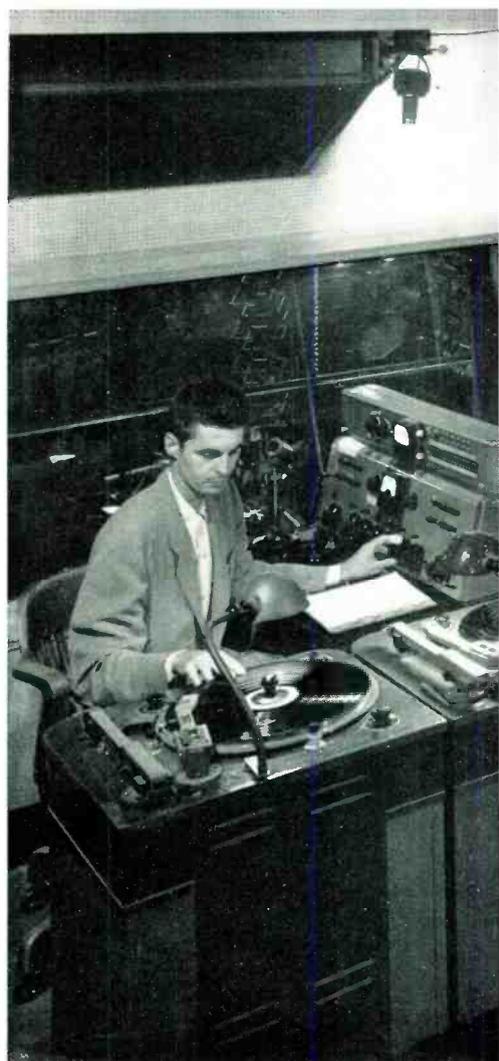


FIG. 10 (below). Studio D-1 Control Room as seen through the window of the observation booth. In the foreground is the audio engineer's position. Directly beyond are the program director's desk and video control position. At the right center is the color slide camera and at the extreme right the auxiliary equipment racks. Through open door in the rear can be seen the power supply racks.

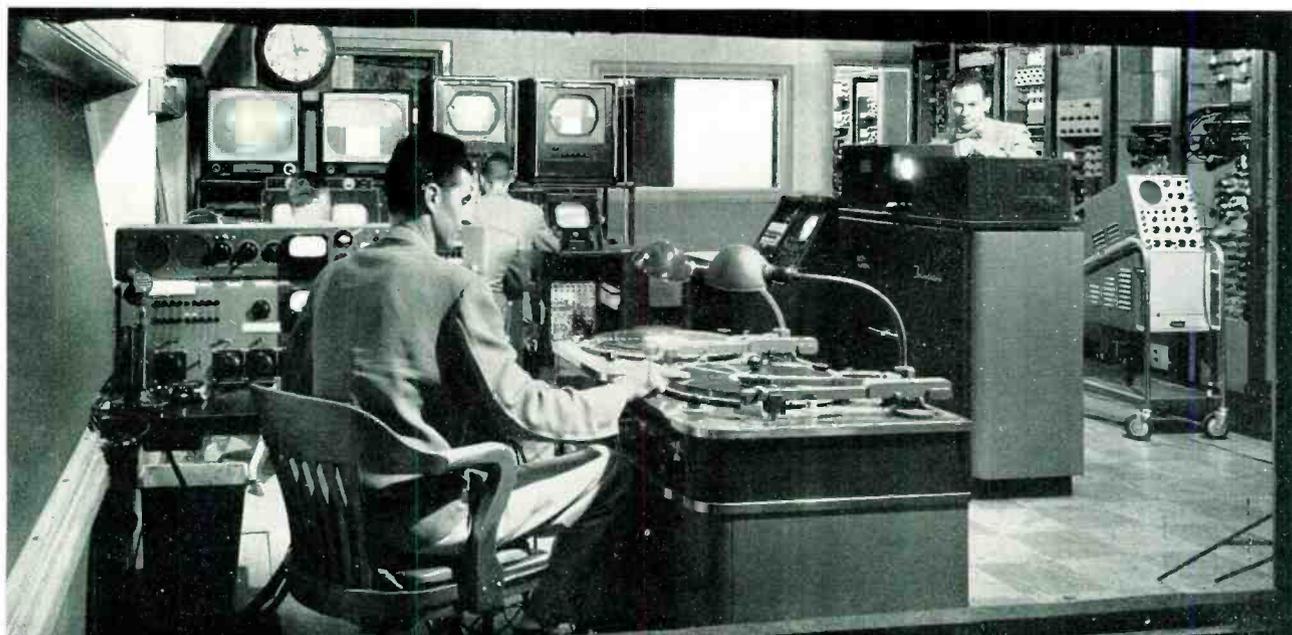




FIG. 11 (above). WTMJ-TV's Studio D-1 Control Room where most of its color gear is located. The audio engineer's position is at the extreme left. At the desk in the center are the program director (next to window) and the studio supervisor. Directly in front of them is the video control position which includes both color and monochrome facilities. Beginning at left, the video console units include two monochrome camera controls, studio switcher, special effects (behind video engineer), color camera control, and color camera monitor. Around the corner of the L are the color slide camera control and monitor units and the color slide camera proper. Above the video console are two monochrome monitors ("on-air" and "pre-view") and two color monitors ("live" and "slide"). The audio engineer and the program director have a good view of the studio floor through the large slanted windows at their left.

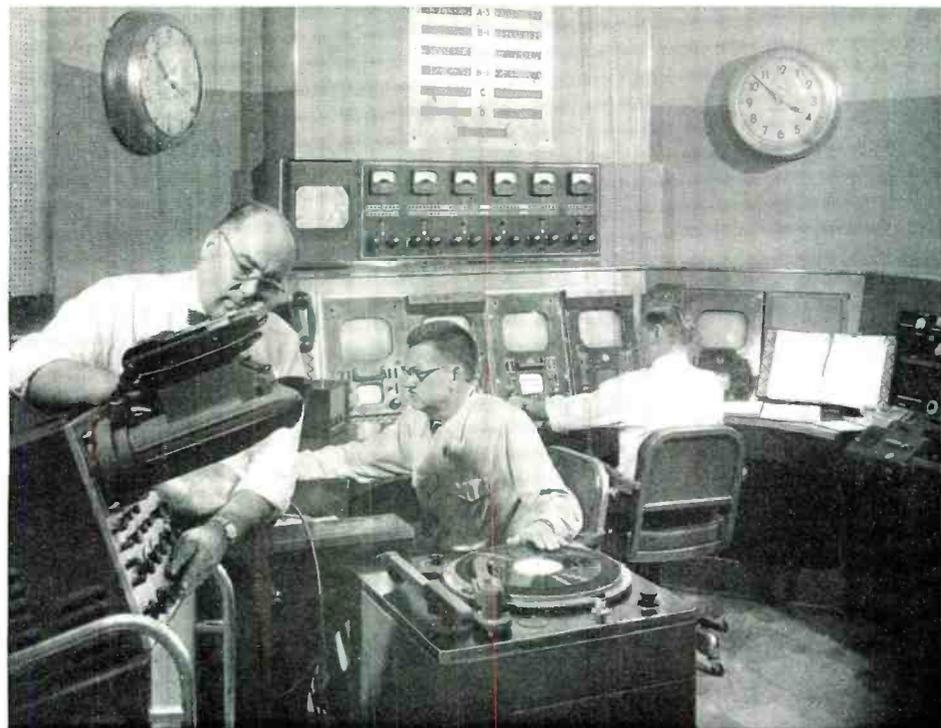


FIG. 12 (right). This is WTMJ's Master Control Room which handles both TV and radio operations. This point is the control center for six TV studio areas, film projection, network and remotes plus three standard broadcast studios. The six-position pre-set radio switching board is mounted above the video monitors in the center of the console. The radio operating position is on the left side of the U-shaped console. At the left, Nick Brauer, TV studio supervisor checks oscilloscope prior to using recording camera.



FIG. 13. This is the "Trading Post" set used on WTMJ-TV's color telecast of "The Hotshots" program. Standing in front of the board fence are "Pedro" (Alex Mayer) and Gordon Hinkley, m.c. of the Hotshots, and the Winkert sisters. Note the Electrazoom lens which gives WTMJ-TV almost as much flexibility as a second camera, and saves the labor of "dollying" in and out.

WTMJ-TV's Plans For Color Development

Walter J. Damm, Vice President and General Manager of Radio for the Journal Company, is an enthusiastic believer in the future of color television. He has backed his belief by seeing to it that WTMJ-TV is equipped with a complete color setup—the best of everything throughout. At the same time, however, he has analyzed the practicalities of the situation and his color program for the station is based on a very down-to-earth line of reasoning.

Mr. Damm has for several years been chairman of the NBC Affiliates Committee and as such he is very conscious of network-station relationships. As he sees it the local color programming of most network-

affiliates will be largely limited (as local monochrome programming presently is) to daytime and late evening hours. This, he feels, means mostly kid's, women's and cooking programs (and some film). He agrees that these are important revenue producers (and may become more so); but they are not, he points out, elaborate productions. And they certainly do not require elaborate facilities and operating staffs. Therefore, since local color is to be limited to these programs, the local station certainly does not need color facilities and color crews of the size envisioned by network operations.

With this thinking in mind, Mr. Damm's

present directive to his staff is not to build special shows for color, but rather to find out what will be needed for WTMJ-TV to originate in color its present local shows. To do this the station has undertaken a schedule which in coming months will see each of its regular shows done several times in color. This exploratory program, Mr. Damm thinks, will take about a year. In the meantime, he feels that the big network color shows and the introduction of large-screen color receivers will have prepared the public for all-out color. By then, WTMJ-TV, with its experimenting all done, and its plans made, will be ready to go ahead with a full-scale color operation.

WTMJ-TV's Color Programming

WTMJ-TV, as we have noted, has a very definite plan for color programming. This is that they will not build shows for color but rather will take each of their present monochrome shows in turn and try it out for color. They believe that by doing this they will learn quickest just what are the possibilities of color for local programming.

With the exception of the two opening-week shows all of the color programs WTMJ-TV has aired have followed this dictum. Their original schedule was to do two color shows a week to start—one a sustainer and one sponsored. With minor changes this schedule has been followed. Perhaps the best way to indicate what has been done is to list and describe briefly the color shows WTMJ-TV aired in its first six weeks of color operation.

July 18, 1 hour

Opening celebration—variety program with circus atmosphere featuring "The Grenadiers," a nine-piece orchestra which has been a WTMJ radio favorite for two decades. Included were singing and dancing acts plus the usual magicians. Background mostly colored drapes festooned with ribbons and balloons.

July 20, 1½ hours

"The Layton Art Story" (sponsored by Blatz Beer)—a documentary built around the locally famous Layton Art School included discussions of all types of art; sculpture, water-colors, oils, industrial design, etc. Illustrated by artworks mounted on panels that made up the background for the set.

August 3, 15 min.

Gretchen Colnik (sponsored by Mrs. Karl's Bread)—women's show (non-cooking) featured flower arrangements on this day.

August 6, 15 min.

"Sports Picture" (daily participating sponsorship)—announcer and featured guest in interview-type program featuring collection of guests.

August 12

Kitchen Show—cancelled because of mechanical difficulties in getting equipment into Kitchen Studio.

August 17, 30 min.

Foreman Tom—crackerhouse cowboy comments between film segments.

August 19, 15 min.

"Play Ball" (sponsored by Spic and Span)—a baseball quiz program, with mc, umpire and four guests. Somewhat difficult to get all on one camera.

August 23-27, 15 min. daily

"The Hotshots" and "The Grenadiers" alternating. Both one man or two piece musical groups with soloists. This program was put on especially for viewers at the State Fair.

August 26, 10 min.

Color insert on NBC "Home" Show, featuring Wisconsin State Fair Craftwork was originated by WTMJ and fed to the network.

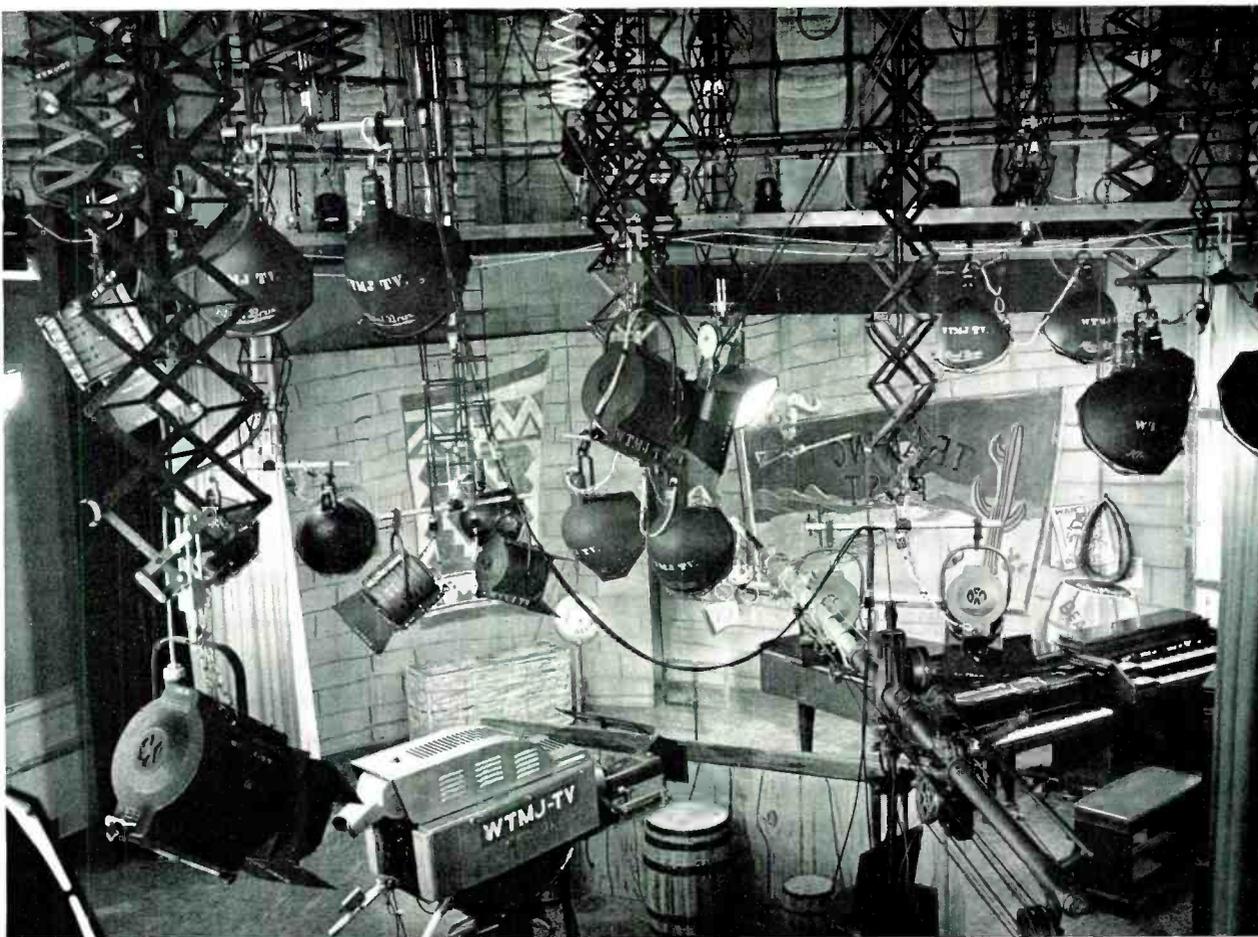
September 1, 15 min.

Let's Experiment (public service program). Commentator using props from museum. This day's subject is crystals.

September 3, 30 min.

The Woman's World with Beulah Donohue (station-produced participating women's show). Home decorating as feature on this day.

FIG. 14. This view of the "Trading Post" set shows more of the details and also gives an idea of the lighting arrangement.



Color Operating Experience

Color Rehearsals

With the exception of its two big opening shows WTMJ-TV has not found it necessary to do any special rehearsing for color. All of its other color programs have been regular station shows, most of them of the type not formally rehearsed (such as interviews, panel shows, small musical groups, etc.). For these shows all WTMJ-TV did in advance was to "check them out for color," i.e., make sure there were no features (costumes, makeup, props, etc.) which were really bad in color. On the average this took from a half to one and a half hours. At first this was done a day or two before the scheduled program, at some time when the color camera equipment would be warmed up for that day's show. Recently this check period has been shortened and scheduled preceding the normal rehearsal or the show itself.

Local station performers are usually quite excited over the prospect of being on in color. Not infrequently they are rather fearful of the outcome. A rehearsal a few days in advance is of value if for no other reason than to allay these fears.

WTMJ-TV has found, as have others, that most of the stories about color's pe-

culiarities are greatly exaggerated. They have noticed, for example, that many performers are perfectly all right for color with no makeup at all. Those who do need makeup do not always require the special (CTV) color makeup. Quite often the makeup they have been using for monochrome will be satisfactory. Possible exception to this is lipstick which is rather critical. Bright red tends to become too red. Dark red goes muddy. Best color is on the orange side. Fortunately, it is mostly the ladies who need "glamorizing" for color. And they, of course, take to it like ducks to the water. WTMJ-TV maintains no "makeup" department, finds its regular performers quickly learn to apply their own. Most guests do not need makeup. When they do, a member of the production staff gives them help.

Color Commercials

To date WTMJ-TV has done only a few "commercials" in color. Most of these have been done "live" and fairly well integrated into the show.

On the opening commercial program (for Blatz) which told the story of the Layton Art School the "commercial" was worked in by telling the story of the Blatz triangle

monogram (an example of industrial design, sic). This commercial opened with a shot of the Blatz bottle surrounded by beautiful flowers, the so-called "glory shot." As the announcer went into the story of the Blatz monogram, the camera panned over an array of Blatz bottles of yesteryear showing how the monogram had been used for several generations. Following this, slides were used to show use of the monogram in ads, on billboards, even on the truck-driver's uniform. This commercial ended with a dissolve back to the announcer.

As contrasted to this "institutional" type selling, the commercial for Mrs. Karl's Bread, as done by WTMJ-TV in color, is a close-up of blue-checked package next to a plate full of colorful sandwiches made from the bread. Cheese and other fillings give the color. Really very good!

On the "Play Ball" program mentioned above the commercial for Spic & Span (dry cleaning firm) was a live shot of the "specials" for the week (certain types of garments) panning around and into a closeup of a model of the client's store front with one of the delivery trucks in front.

WTMJ-TV, in the future, expects to do more of its commercials on slides. It feels that this will be safer and more satisfactory. It will also ease the camera operation. Doing commercials live in a one-camera operation requires considerable advance planning, trying out lighting, etc.

Sets

In line with its policy of trying out (for color) its regular program "as is" WTMJ-TV has not built any sets for color. Moreover, it has made only very minor changes in existing sets. The established procedure is to "check out" for color the existing set just as it has been used for monochrome. Only if it is glaringly bad is any change made. WTMJ-TV has always used color in its backgrounds and its experience to date indicates that most of these backgrounds are fairly satisfactory for color. Where changes have seemed desirable they have been accomplished by substituting available color panels from other sets. In a few cases colored balloons or colored drapes have been used to "brighten up" the existing backgrounds.

Most of WTMJ-TV's color shows have been done with a single set at one end, or the other, of Studio D-1. However, they have done a show with three sets, one at each end and one along the side. These sets

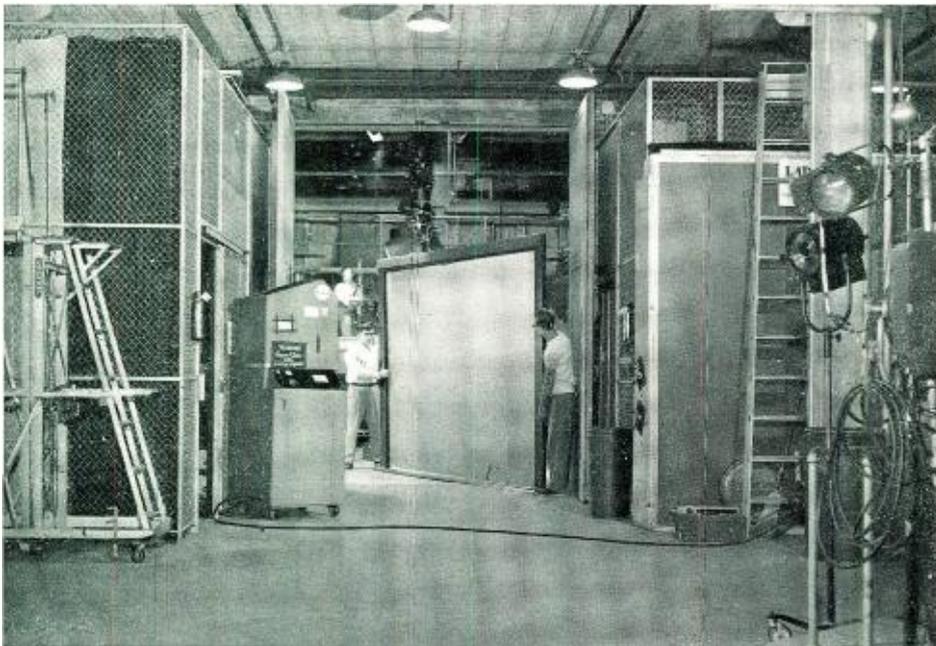


FIG. 15. This view, looking from the elevator through the double doors into the studio, shows the rear projection screen being mounted in the doorway for use on a program. The Trans-Lux projector is at the left of the doorway. By setting the projector out in the corridor, WTMJ-TV does not use up valuable studio floor space.

at WTMJ-TV

FIG. 16. Rear Projection in use on a WTMJ-TV studio program. To date it has not been used for color. However, WTMJ-TV engineers feel that they will be able to work out a method of using it, despite higher base lighting needed for color.



formed an arc with the camera at the pivot. This arrangement is satisfactory provided the continuity is so arranged that the camera can pan from one set into the next (without having to skip over).

Of course, one way to get from one set to another (when using only one live camera) is to have slides, either "commercial" or program inserts that break at the right point. This technique was employed quite successfully on WTMJ-TV's first two color shows which were among its more ambitious undertakings and thus required such handling.

Use of Background Projection

WTMJ-TV has a unique and convenient method of using projection. As mentioned previously, there is a large corridor from the studio to the elevator. By using this space for the projection equipment (Fig. 15), with the screen set in the studio doorway, no studio floor space is required.

WTMJ-TV uses their background projection equipment frequently on monochrome. So far they have not actually used it on a color program. However, they have experimented with it and feel that it has possibilities. The problem, of course, is how to sufficiently light the set without washing out the background. It's not easy, but someone will probably figure out how to do it.

Operating with One Camera

WTMJ-TV presently is using one live camera in Studio D-1. It's really surprising

what they can do with it. Of course, to produce an extravaganza with one camera would be impossible; large dramatic shows and most audience participation shows would be difficult. But such shows are seldom produced locally. The programs which most stations produce themselves are usually small musical groups, interviews, kitchen shows, fashion shows, kid programs, the weather and so on. Most of these can be done quite well with one camera. Providing the production and program people exercise a little ingenuity they can be made as interesting as two-camera shows.

WTMJ-TV has worked the technique out very well. By planning the action and sets with single camera continuity in mind, and using increased movement by participating talent to make up for lack of shot variety, they are producing shows which the viewer at home would never distinguish from two camera shows.

There are certain limitations which must be kept in mind. One of these affects overall planning to some degree. This is the fact that considerable studio space must be left available for dollying back to get a "long shot." Since lenses cannot be changed during the program, it is necessary to use one lens (usually 50 mm.) for both "close" and "long" shots. This lens has an angle of 34° which means, for instance, that to take in 15 ft. wide set the camera must be back 20 ft. with six feet more for camera and operator this requires 26 ft. of dollying space in front of the set. Because of this

depth requirement, and because the camera is rather hard to move laterally, the tendency is to arrange sets in an arc about the camera. The camera then simply turns in and out along a straight line. To make up for inability to switch cameras it is necessary to do this much more than on two-camera shows.

Use of Electrazoom Lens

WTMJ-TV has devised a mounting (on the color camera) for their electrazoom lens and has been using it very successfully on about half of their shows. This lens allows the cameraman to "zoom in" on a part of the set without moving his camera. In a one-camera show this is particularly important because it greatly reduces the large amount of dollying in and out which otherwise is necessary to maintain action.

The Electrazoom does introduce limitations. Because its widest angle is 26° it has to be 30 ft. back to take in a 15 ft. wide set. In addition the camera (with Electrazoom mounted in front) and operator requires another 8 feet. Thus a total space of 38 ft. in front of the set is necessary. In a narrow studio, to get this far back, means limiting the shot to an almost straight-on angle. There is also an undesirable tendency to "immobilize" the camera. For these reasons WTMJ-TV prefers not to use the lens when they have enough manpower (assigned to the show) to move the camera about as needed. But they do like it very much for small shows where the cameraman may be working alone.

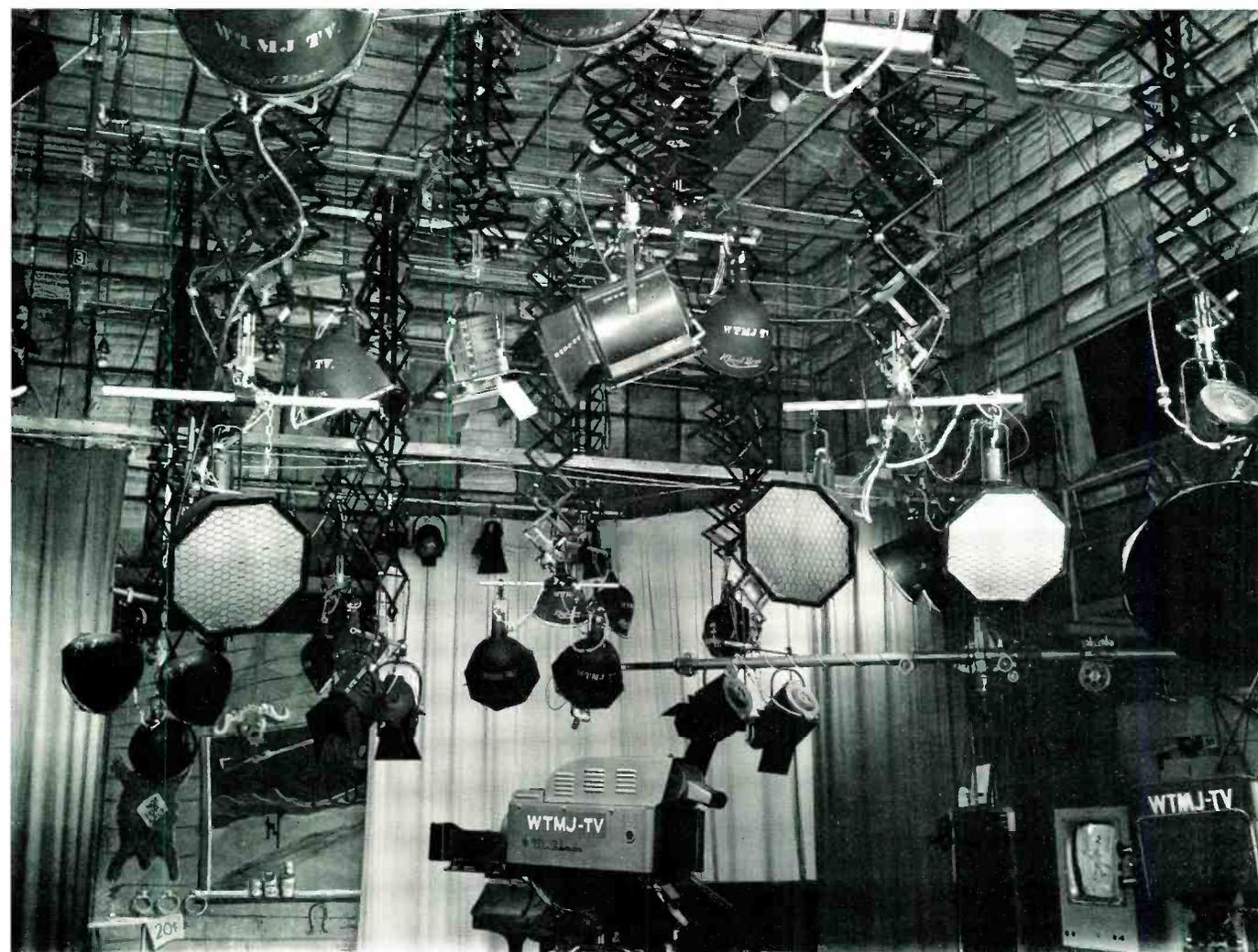


FIG. 17. Scoops and spots used for base lighting in WTMJ-TV's Studio D-1 are suspended on pantagraphs. Smaller spots used for back lighting are attached to pipe supports around three sides of studio.

Lighting for Color at WTMJ-TV

WTMJ-TV made a number of changes in, and a considerable addition to, the lighting facilities in D-1 Studio in order to provide for the increased lighting required in color television. Originally the lighting was part fluorescent and part incandescent. The fluorescent fixtures were removed and additional outlets installed for all-incandescent lighting. There are now 56 outlets on the overhead grid and an additional 32 outlets around the wall and on the catwalk.

The photographs (Fig. 17 and Fig. 19) show the general arrangement of the lighting facilities. 25 Type 3534 Century pantagraphs are mounted in 7 rows across the width of the studio. Each pantagraph has a horizontal bar at the lower end to which are attached two scoops or spots. In addition, there is a pipe rail across both ends, and along one side of the studio, to which small (750 watt) spots are clamped for back lighting. The normal fixture complement of the studio is as follows:

- 26 Kliegl Scoops (1000 watts)
- 12 Kliegl Spots (1000 watts)
- 25 Century Spots (500 watts)

In addition, some twenty portable floor lamps of various types are available.

In order to facilitate handling of the increased number of lights, WTMJ-TV installed in D-1 Studio a new Kliegl Dimmer Board (see Fig. 19). This consists of a 12 point, 72 circuit Rotolector board connected to a dimmer control console. Six points of each rotolector can be dimmed, six are no dim. Each of the six dimmer units can handle 5500 watts. Total capacity of the board is 600 amperes.

The lighting arrangement in WTMJ-TV's D-1 Studio was planned primarily to light two sets at a time (one at each end of the studio). The Blatz show, however, used sets around three walls of the studio. And, of course, for monochrome more sets can be used. Originally a base light of 400 foot

candles was used. However, Nick Brauer, Color TV Technical Supervisor, has been experimenting with somewhat lower levels and reports that good pictures can be obtained at levels around 250 foot candles. This is especially true when the camera is not very far from the performers and less light can then be more effective. The lower level is easier to obtain, more comfortable for the performers, and places less load on the air conditioning system.

The most important requirement of lighting for color is that the whole set be evenly lighted. If it is not the colors will change as the action moves from lighter to darker areas. This is true not only of action across the set but also of action toward or away from the camera. Thus the lighting must be even not only across the set but also in the direction of its depth. To get this even balance WTMJ-TV uses several rows of lights downstage from the performers.

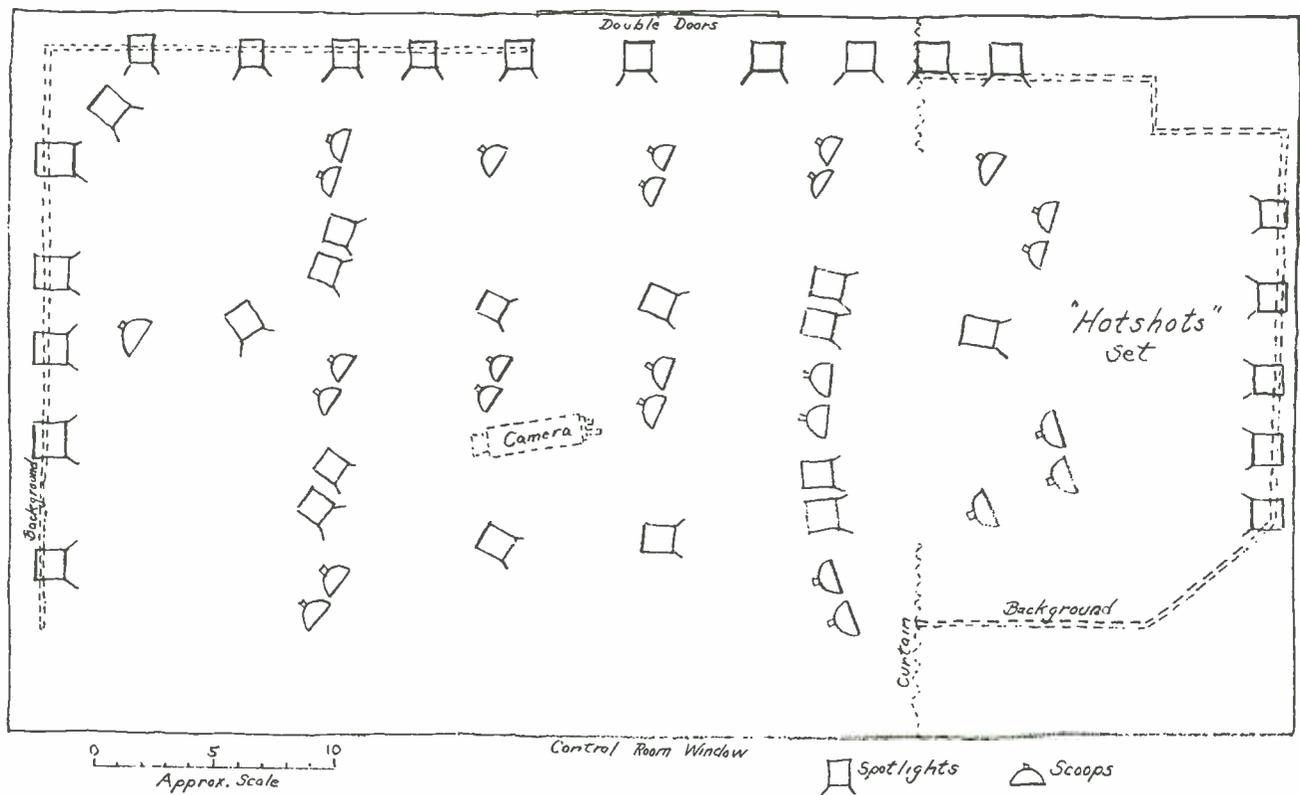


FIG. 18 (above). Sketch of the lighting setup for the Hotshots set (Fig. 13). The last row of lights (to rear of camera) is not in use. The scoops directly over the set are used on the background.

Fig. 18 is a rough sketch of the lighting for the "Hotshots" Program (set shown in Fig. 13). The main row of lights is about 3 ft. in front of the performers. These lights (6 scoops, 4 spots) are hung about ten feet above floor and angled down at about 45 degrees. There are two additional rows of lights about six and twelve feet further back. These two rows are slightly lower and at a somewhat flatter angle. Backgrounds also require full lighting. To get this on the set shown in Fig. 17 four scoops are used directly over the set. These are about twelve feet high and angled down rather sharply. Backlight is provided by five 750-watt spots hung on the pipe rail and pointed almost directly downward (not on the backs of the performers). About $\frac{1}{2}$ to 1 backlight to frontlight is used.

This approximate arrangement of lights is used in most of WTMJ-TV's color shows. Even balance of light over the whole set (side to side, and front to back) is the chief consideration. Floor fixtures or single spots are used only when necessary to "bring up" a shadow on a performer's face or to correctly color an important prop. Ordinarily there is no attempt to use "modeling" light.

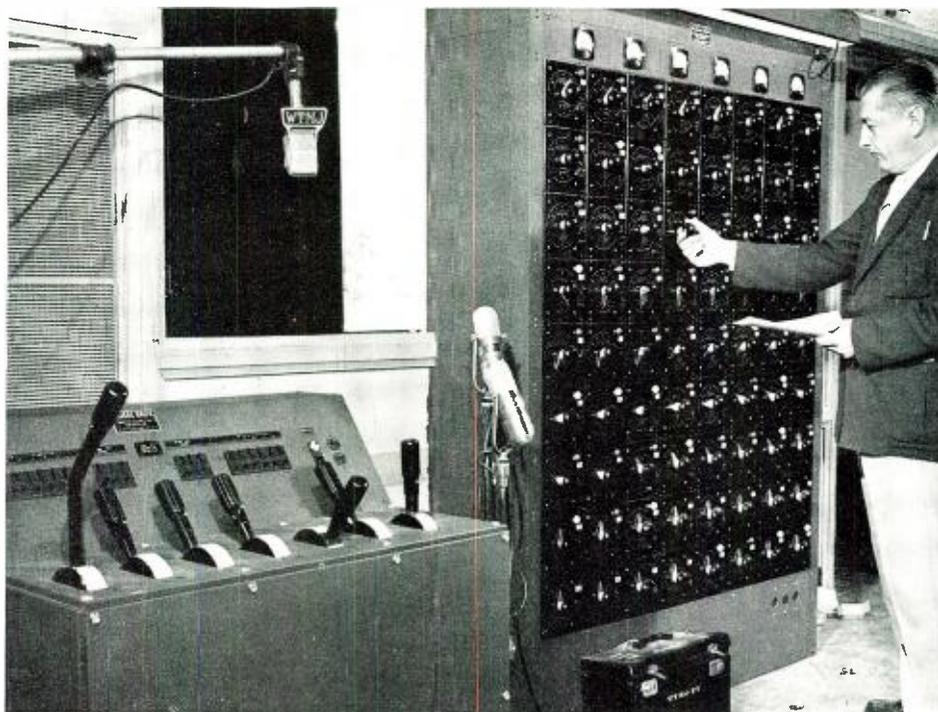


FIG. 19. Lighting in D-1 Studio is controlled by a 72-circuit rotolector board and a six-position dimmer control console. Total capacity is 600 amperes.

Manpower for Color

WTMJ-TV has not added any people to its staff in order to handle color. The station has a good-sized and extremely competent technical staff. During color installation some overtime was necessary. And, of course, the extra checkout time for color cameras adds some additional man-hours per week to the work load. However, they feel that they have enough leeway in their regular assignments to handle this.

The regular technical crew on a WTMJ color studio show includes one engineer on the live camera, one engineer on the boom (sometimes omitted on small shows), one video engineer on camera control and one engineer on audio control. A studio technical supervisor is on duty to coordinate the technical requirements of engineering as required by production. Since color monitoring is done only in the control room he actually does not participate in operation. Switching is done by the video engineer as directed by the program director. This is the same size crew as used on monochrome production and operating procedure is identical.

So far WTMJ-TV is using color slides only for station identification and program titles. If it is decided to use slides as program inserts, or for frequent commercials, it may be necessary to add another man to

the crew. Certainly he will be needed when film equipment is operated and is used in conjunction with live shows. This too would parallel monochrome practice.

At present WTMJ-TV has a "color corps" of a half dozen video engineers. Assignments to color shows are made from among this group. These assignments, however, are not exclusive as these men also work monochrome shows. Eventually WTMJ expects that many more of its engineering staff will be trained in color and available for assignment to color shows.

On the production side the story is about the same. Since only regular station shows are being aired in color, and these with no change in format, there has been no great increase in the production load and no additions to the staff. Program and production people spend a little longer on checking out costumes, makeup and lighting but the total adds up to only a few hours a week.

The station's "color coordinator" is Joe Fox, their Art Director. He has been sitting in on all color shows and acting as a consultant to the production department. At the same time he has been carefully studying the results obtained on each show with a view to recommending changes which might be made to enhance the impact and value of the show in color.

Setup Time for Color

WTMJ-TV has found, as have others, that more time is required for "setup" in color than in monochrome. There are several reasons. One is that the equipment takes longer to warm up. The second is that camera check-out takes longer. A third reason is that lighting is more critical and time must be allowed to properly set it.

The exact time necessary for these operations is difficult to state accurately because they are usually sandwiched in with other chores. Warm-up, for example, is usually going on while other maintenance work is in progress. Camera check-up is done before, during and in between rehearsals and set lighting check-outs. An idea of the setup operation is provided by the following somewhat idealized schedule:

1 hour

Camera Warm-Up by maintenance or camera control man. During warm-up this man checks out rack equipment (colorplexer, gamma amplifier, monitor alignment) with color bar generator.

1 hour

Camera Check-Out by camera man and camera control man. During this period technical supervisor works with production department on lighting and technical requirements of show.

Variable

Rehearsal time depends on the nature of the show—usually rehearsal is done either right before show or on a previous day following that day's color show (so that it is not necessary to fire up the camera just for rehearsal).

15 min.

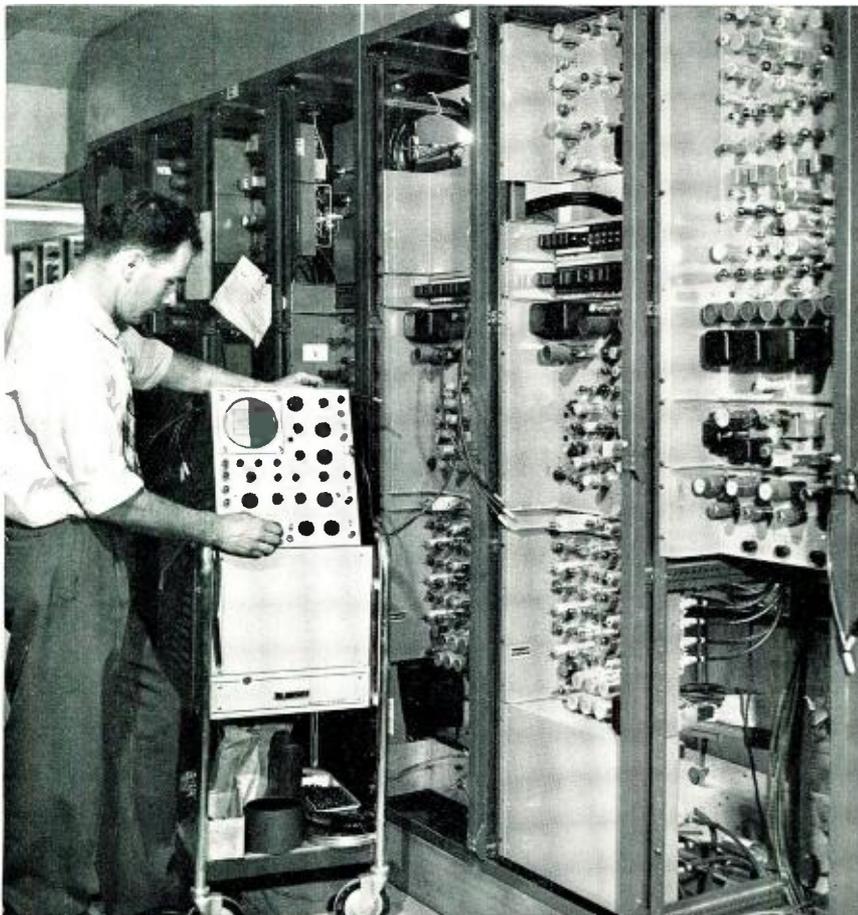
Final Camera Check-Out is done after rehearsal and just previous to show time.

Compared to "on-air" time the setup time seems large. However, as "on-air" hours increase the ratio will improve because only one warm-up period per day will be required. Camera check-out will be reduced to perhaps ten minutes per program.

WTMJ-TV Experience with Equipment

WTMJ-TV's experience with its RCA color equipment can best be summed up as follows: (a) they put it all in themselves and made all adjustments without any factory help, (b) they have kept it operating and are obtaining amazingly good pictures, again without outside help, and (c) they have had no major failures. For such a complicated array of equipment this is a fine compliment both to the ability of the station staff and the quality of the equipment.

FIG. 20. Checking out rack equipment in WTMJ-TV's color studio control room.



Thrills, Aches Found by Novice Skin Diver

First Try at Making Like Fish Results in Debatable Success, but He'll Try Again

By WILLIAM NICHOLS
of The Journal Staff

Moose Lake, Wis. With arctic muscles and noticeable lack of energy, a novice reports debatable success in his debut as a skin diver.

But like most newcomers in the fascinating underwater sport, he probably will go back for more. His first cautious attempt at making like a fish were recorded Sunday at Moose lake in Waubesa county.

When the beginner arrived, stopping gingerly over piles of long, flippers, lead weights and headgear, he was met by Earl J. Hammett, 174 W. Fair Chasm rd., River Hills.

Hammett is president of the newly organ-ized Milwaukee Aqua club, a group of skin diving fanatics who spend spare moments cruising along the bottom of whatever body of water happens to be closest.

With two swimmers near by, he made it to the bottom and nearly had the thrills removed.

"You were too excited down there," a diver said. "You were moving too fast and breathing too hard. It seemed tough because you were fighting it."

Another note: The discussion stayed with skin diving and the novice was told that there were more than one million active divers in clubs across the country this year.

"We're hoping to get legislation passed so we can go spear fishing for game fish," one diver said. At present, only rough fish can be caught with the underwater spear gun.

It was time for the final experiment. Hammett strapped his rebreather on the beginner's chest, took a snorkel and flippers for himself, and together the pair went in.

Air Runs Out Quickly

From the needle indicator on the tank, there was about 20 minutes of air left. Again, the air seemed to run out, and the beginner and Hammett surfaced near a boat in the middle of the lake. The tank was empty.

"You swam in five minutes," Hammett said.

With inaction, the novice was assured that he would make the grade, however, and he headed home for a night's rest.

Aches began to set in between the shoulder blades, and black and blue marks appeared.

The novice spent a sleepless night, silently figuring how to talk his wife into buying him a diving outfit.

More Clubs Forming

"We formed the club about a month and a half ago," Hammett said. "There's another one in Milwaukee—one forming in Fond du Lac, and we're helping a club in Madison get started."

"Our object is a statewide organization of skin divers."

Hammett became interested in skin diving several years ago when the propeller of a cabin cruiser he broke on Lake Winnebago kept fouling. He built his own diving unit to keep the prop free of weeds and got a permanent tag for life below the surface.

Most of the club's 50 members were on hand for the first diving. Hammett, after carefully explaining the equipment lying about, borrowed a diver mask with snorkel attachment and a pair of flippers for the novice.

The mask fits snugly over the face, allowing full vision through the glass plate. With two pipes extending up from each side, it resembles the head of a large bug with antennae.

Prevents Cinescope Tubes

"You can cruise along the top of the water with your face below the surface," Hammett said, "and breathe through the tubes. When you want to dive, water pressure forces the tubes shut. All you've got to do is hold your breath."

Adjusting the flippers and mask, the novice bravely plunged in. The water was warm. It was also cloudy from the activity of nearby swimmers.

But not a little was a success.

Auto Collision Fatal to Four

Three Were on Way Here to Visit When Accident Occurs

An Indiana woman, her husband and her son were injured fatally Sunday while driving in Milwaukee to see her mother, servants, all in a hospital.

The death:

Mrs. Queen Esther Osborn, 32, La Porte, Ind.

Joseph R. Osborn, 81, her husband.

Louis Collins, 16, her son by a former marriage.

Also killed in the two-car collision near Michigan City, Ind., was John Frank King, 28, Evanson, Ill., the driver of the other auto. Indiana state police said young Collins was driving the Osborns.

The family was on the way here.



Crown costumes worn by the Mabine sisters, Janice (left) and Mickey, and Marvin Moran, male splasher of color Sunday in Wisconsin's first color telecast of a local program. The trio appeared in a circus theme program of the Grenadiers broadcast by WTMJ-TV. The Milwaukee Journal television station.

First TV Color Cast Here Is Big Success

WTMJ's New Camera Put on Grenadiers; Hour Long Show Is Hailed as Milepost

By HARRY HILL
Of The Journal Staff

Color television advanced in another major step Sunday in Milwaukee.

WTMJ-TV, The Milwaukee Journal station, turned its new color camera on "The Grenadiers" for the first color telecast of a local program ever attempted in Wisconsin. The hour long show was a dazzling success, both technically and artistically.

Mayor Ziebler, who opened the program with a brief talk, hailed the event as "an extension of the scope of knowledge and culture in this city." He congratulated WTMJ-TV which, he said, has "all ways been a pioneer" in radio and television improvements.

WTMJ-TV will score another first Tuesday night when it presents the first commercially sponsored color telecast. The program, sponsored by the Blatz Brewing Co. at 8:30 p.m., will be "The Layton Art Story," a tribute to the Layton School of Art.

"The Grenadiers" is not a sponsored program. Commercially, it is carried on a participating basis, but for Sunday's color preview the commercial spots were devoted to public service announcements and mention of future WTMJ-TV programs. Color slides were in this city.

Circuit Theme Used

The Grenadiers rose to the occasion with a show built around a circus theme. This provided broad opportunities for a splashy use of color in costuming and settings.

For example, master of ceremonies Gene Froy dressed in a tuxedo, and the show featured a ringmaster in a tuxedo, a lion tamer in a tuxedo, a clown in a tuxedo, a juggler in a tuxedo, a tightrope walker in a tuxedo, a trapeze artist in a tuxedo, a clown in a tuxedo, a juggler in a tuxedo, a tightrope walker in a tuxedo, a trapeze artist in a tuxedo.

21 Inch Color Tube

New York, N. Y.—Up-Union of America Sunday announced the development of a 21 inch infrared television picture tube with a picture area of 250 square inches.

W. W. Watts executive vice-president, electronic products division, said the new tube would be demonstrated Sept. 15. At the same time Watts said, RCA will demonstrate a new color television receiver chassis having greatly simplified circuitry. This, he said, substantially reduces the number of tubes and components required in a color set and results in a color set that is smaller and less expensive.

The new color equipment which cost almost \$300,000, reproduced these faithfully. Flash tubes, which represent a major problem in color TV, were remarkably lifelike.

Station officials said they were delighted with the show. They originally had sought in perfecting their own color technique to match the quality of network color, which thousands of Milwaukeeans have seen.

RCA introduced color sets last year with 19 inch picture tubes, but concluded that the screens was smaller than the public and the industry really wanted, in view of the size of black and white tubes.

Watts said the new tube employed a 21 inch round metal ring with the screen and incorporated many new developments of RCA engineers. The picture area he said, will be 22 1/2" larger than any other or which thousands of Milwaukeeans have seen.

80 to 100 Sets in Area

"We did even better than we expected," one executive has said. "The color was even superior to some the network has produced."

Philip B. Loeber, manager of radio and television engineering, said the staff was well pleased with the operation of the new equipment. No serious technical problems developed, he said.

The program was telecast from station D, which has been converted into a color studio. The audience, which usually watches the Grenadiers in the Radio City auditorium, saw the show this time on a color receiver in the

Introduction price for the tube in equipment manufacturers will be \$175, Watts added.

A new RCA electron gun makes it possible to make the new tubes more and the round metal construction cuts the weight 25% under that of 19 inch glass tubes Watts claimed.

Adjusts Brakes and Makes Test; Lands in Ditch

A motorist who adjusted the brakes of his car in preparation

for a race, was seen to adjust the brakes of his car in preparation for a race.

FIG. 21. The Journal has carried a continuing series of stories on WTMJ-TV's color operation. The illustration in the above spread was printed in full-color. Paper also prints color programs with its daily radio and TV programs.

An ingenious trick used by the WTMJ-TV engineers will be of interest to other color stations just starting up. This is to use old 5820's in the color camera during the period while the camera is being initially lined up. By so doing many hours of life on the expensive 1854 Image Orthicons are saved. And possible damage to new color IO's avoided through the shutdown period.

Another smart thing WTMJ-TV has done equipmentwise is to put a.c. line voltage regulators on the filaments of the more critical units. By so doing they have greatly reduced "drift"—and possibly also increased tube life. They determined which video units were most critical by putting a Variac on the line side of each filament transformer in turn, running the voltage up and down and noting the results on the picture. They found that a dozen 500-watt regulator units strategically placed would reduce the drift by a large factor.

Only real difficulty WTMJ-TV has had was in locating the reason for one color monitor not performing properly. Trouble turned out to be failure of red gun in kinescope. It was found only after someone thought of the idea of pulling picture tube cable over from one monitor and plugging into kinescope in the other. Moral: locate your color monitors close together.

Insofar as time to get equipment installed goes WTMJ-TV says it took them roughly one week to get color bar picture, a second week to get the scanner operating, and a third week to get the live camera going. However, this was in the midst of building changes and they were in no great hurry. They feel that if rushed they could have done it faster.

Promoting Color

WTMJ-TV's promotion of color with its advertisers is tied into its scheduling. As

noted above, it plans to air each of its regular programs in color several times during the coming months. This will give each of its advertisers a chance to see his own program—and product—in color.

In addition, WTMJ-TV uses its large clients' lounge to entertain selected groups of advertisers from time to time. Programs shown to these groups are network, local shows or closed-circuit presentations.

For the public WTMJ-TV has installed color receivers in its auditorium studio and in one of its radio studios. Tickets are offered free on its regular programs. Since the station began colorcasts last December, over 50,000 people have taken advantage of this opportunity to see color.

During State Fair week (August 23-28) WTMJ-TV set up color receivers in the "Communications" building and arranged a daily local color show so that thousands of fair visitors could see "color."

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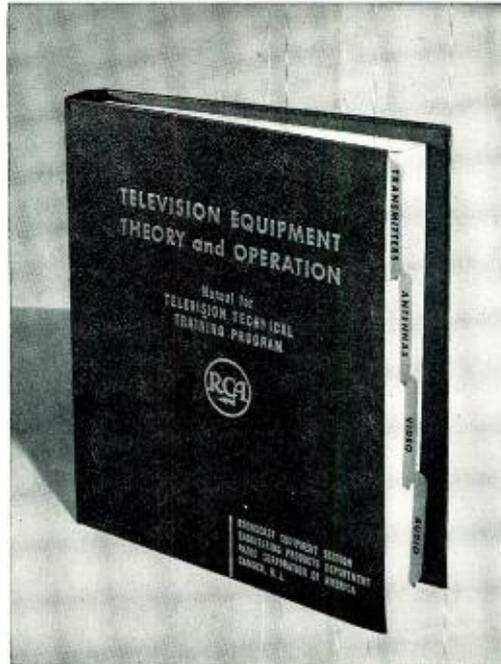
Instruction on latest engineering and adjustment techniques for your equipment.

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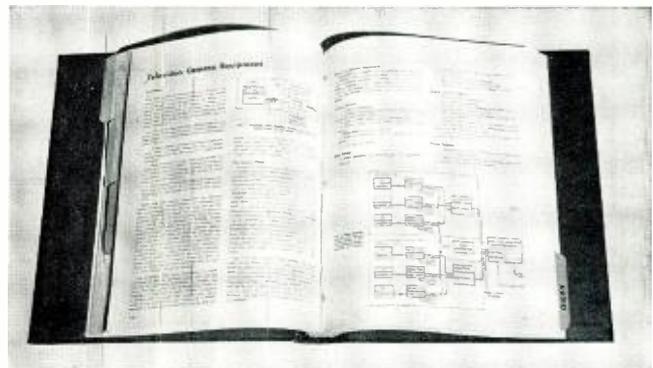
Used as a basis for successful RCA Television Broadcast training sessions, this reference has

earned the approval and acceptance of many Broadcasters.

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Send orders with payment direct to E. T. Griffith, RCA Engineering Products Commercial Service, Building 15-7, Camden, New Jersey. Your RCA Training Manual will be promptly mailed to you.

Typical of the wealth of engineering information on television which the RCA Manual contains, is the spread illustrated here. Floor plans, schematics, circuit diagrams, and theoretical illustrations are included.



MONOCHROME AND COLOR SEMINARS COMBINED AT 20th TRAINING SESSION

The 20th TV Technical Training Program for Broadcast Station Engineers was held in Camden recently for Television Station Technical personnel. The significance of this particular seminar lies in the fact that this was the first seminar where color and monochrome theories, talks, and demonstrations were combined. Previous to this four two-day seminars were held specifically for color television and nineteen were held for monochrome. Realizing the need for a comprehensive course to include all the latest advances in the art of television, RCA engineers provided those attending with a picture of both monochrome and color television theory and operations procedures—from the camera to the antenna.

In all, ninety-one persons attended this course. Representation was well distributed throughout the United States with many of the leading television stations attending. Foreign delegates to this seminar included representatives from Thailand, Brazil, Canada, Cuba, Mexico, Panama, and Venezuela. Also attending were members of the Armed Forces and several leading consulting engineers.

Among the subjects covered were color and monochrome cameras for film and live use, switching and terminal equipment, audio and audio techniques, transmitters and antennas. Basic theory concerning each phase was presented as well as a brief history of the advances made in television.



During each TV Technical Session, Station Engineers become acquainted with all of the latest circuitry. Here, an inspection of the TK-11A Studio Camera is in process.

As a part of the recent Technical Session, Station Engineers operated the TC-4A, TV Monochrome Control Console.



NO POLIO VACCINE CAN HELP THIS CHILD. While science works to protect healthy kids against polio, those already stricken are fighting to live and play again.

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Now—far ahead of its time—Great new 10KW Short Wave Transmitter!

32 new, special features that won't be matched for years — now available in new RCA BHF-10A Broadcast Transmitter!



Front view of BHF-10A transmitter reveals handsome, functional design. Requires only 33 sq. ft. of floor space.

Puts the BROADCASTER far ahead!

The new BHF-10A has sufficient power to cover large service areas; quick frequency change, to increase usefulness; unsurpassed reliability, for unbroken service. The opportunities for commercial stations to increase revenue are *built in!*

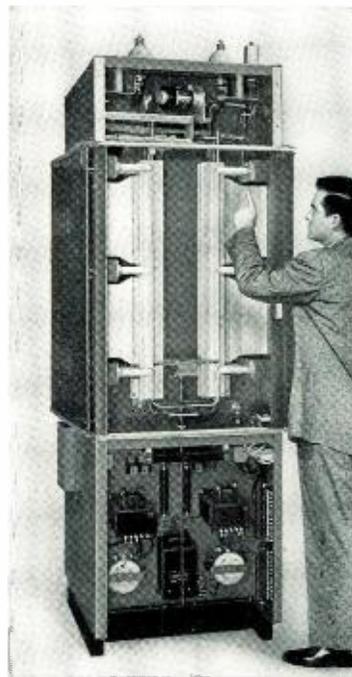
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Here are just a few advantages for the *engineer*: easy maintenance, through use of a limited number of high-gain tubes. Air cooling. Simplest tuning. Electronically protected circuits — and full power for zonal broadcasting in 90, 75 and 60 metre bands, and international broadcasting over a frequency range of 3.2 — 26.1 mc.

These are just a few of 32 special features of this RCA transmitter that ushers in a new era of radio — proud achievement of RCA's 30 years of broadcast pioneering. Write today for booklet giving complete specifications!

Puts the INVESTOR far ahead!

Years-ahead engineering makes the new RCA 10KW transmitter an exceptionally sound investment. Installation costs are low, for this self-contained transmitter can be installed in existing buildings without alteration. Maintenance has been simplified—and routine operation can be handled by non-technical personnel!



Rear view, power output section showing PA tuning and output coupling unit.



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For example—the BC-4A can carry the whole station during slack hours. It is useful as a low-cost, semi-permanent installation in remote locations, such as dance halls or fairs. It is adequate for a new studio, interview room, newsroom, etc. As an "add-a-unit" audio control, it permits "block-building" as needed.

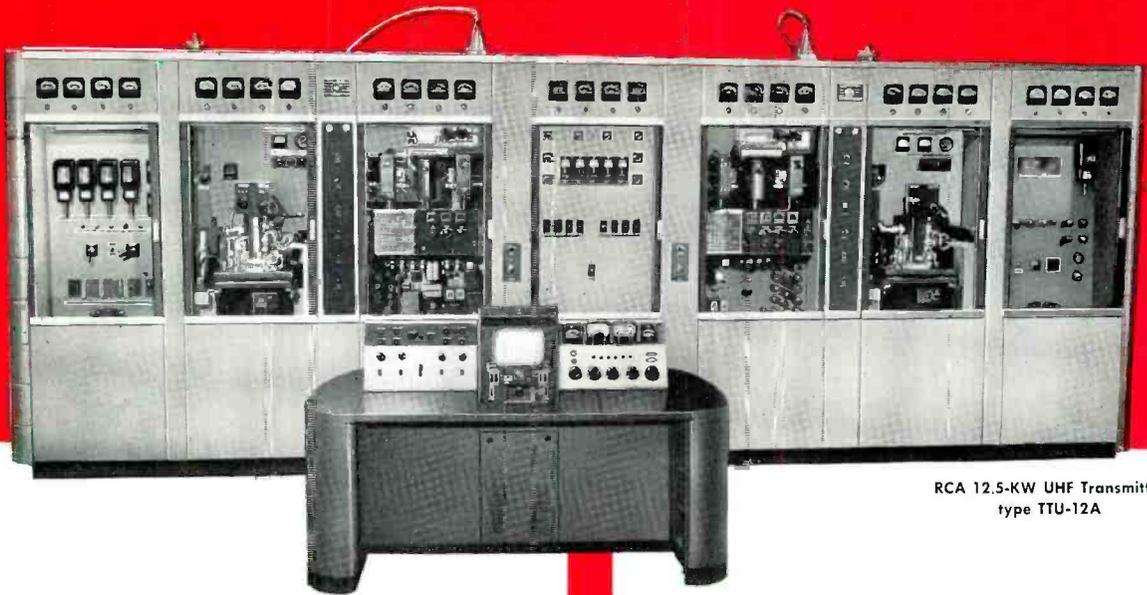
A single BC-4A provides sufficient control and switching facilities for studio, announce booth, turntables, network, remotes and tape recorders. The addition of another BC-4A doubles these facilities and permits complete dual-channel operation.

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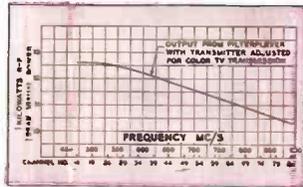
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1 12.5-KW UHF Power Available

With RCA's new transmitter, you get full 12½-kilowatt output (at the low end of the band). Moreover, you get this with all adjustments made for optimum color transmission—and with an extra-large allowance (10%) for losses in the Filterplexer. In most cases, loss is actually much less, so that output on some channels is nearly 14 KW.



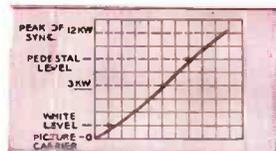
2 Up To 750 KW ERP

Operated in combination with an RCA high-gain UHF Pylon Antenna, Types TFU-6AL/52AM/60AH, this 12.5-KW transmitter is capable of providing an ERP up to 750 KW.

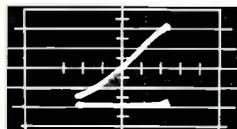
3 Designed for Color

Performance requirements for color are much more stringent than for monochrome. The TTU-12A was designed to meet color requirements. Over-all linearity is virtually a straight line—from white level to sync signal peaks. Wide band width provides excellent response out to 4.2 MC. And the very important phase vs. amplitude response is constant over the whole operating range.

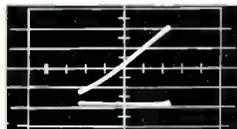
Curve illustrating the linearity characteristic of the RCA TTU-12A transmitter. This overall performance curve was obtained by feeding the transmitter input through an RCA TA-7A Color Stabilizing Amplifier.



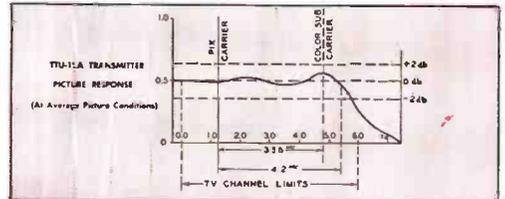
A linearity trace (taken directly from an oscilloscope) of the TTU-12A transmitter at 12 KW "peak-of-sync."



Another linearity trace (taken directly from an oscilloscope) of the TTU-12A when driving the TTU-12A to 12 KW "peak-of-sync." "P.A." output.



4 Unsurpassed Monochrome Quality



Equally important—you get SUPER MONOCHROME QUALITY with this RCA UHF transmitter. It exceeds FCC requirements for satisfactory monochrome operation by a wide margin! Since the RCA transmitter is adjusted for the more stringent color requirements, it is particularly good for monochrome.

5 Conventional Tubes Throughout



The latest circuit principles and techniques are employed in the TTU-12A—but they are easily understood by all station operators. That's because *only conventional type tubes are used*. For example, the RCA-developed high-power tetrode (RCA-6448) is used in both aural and visual "P.A.'s". This tube is small and easy to handle—fits into a unique "glice-in" cavity assembly that can be interchanged quickly and easily. The result is a high-power UHF transmitter that is as simple, reliable, and convenient to operate as standard broadcast transmitters.

6 Economical To Operate

Average power consumption of the TTU-12A is less than other UHF transmitters of equivalent power. Tubes are designed for long operating life. At conservative estimates, these provide total savings up to \$34,000—based on a 10-year operation. See the typical readings and performance characteristics in Table I.

TABLE I

(Typical Transmitter Specifications and Meter Readings)

Transmitter Power Consumption (approx.):		
Average Picture	.....	.85 KW
Power Factor	.....	.0.9
Transmitter Output Meter Readings:		
Power Output (transmitter)	14.0 KW	8.4 KW
Power Output (Filterplexer)	12.6 KW	7.6 KW
Plate Efficiency	47.6%	33.3%
Transmitter Overall Dimensions:		
Width (front line cabinets)	.....	.235"
Height	.....	.84"
Depth	.....	.32-9/16"
Weight	.....	.6000 lbs. (approx.)

Why RCA's 12.5-KW IS PREFERRED BY UHF STATIONS

⑦ RCA 1-KW Driver—Plenty of Reserve

The RCA 12.5-KW UHF transmitter uses the famous RCA TTU-1B 1-KW UHF transmitter as the driver. This transmitter, now used by nearly a hundred UHF stations, has established an outstanding record for performance and reliability. If you want to begin UHF operations with one kilowatt now, you can do so with an RCA TTU-1B 1-KW transmitter. Then add an RCA 12.5-KW UHF power amplifier later.

⑧ Space-Saving Mechanical Features

Horizontally sliding doors, front and back, save on workable floor space—give the operators more elbow room. Small cubicles (27" wide, 32" deep, 84" high) enable you to move them through standard doorways and in and out of standard elevators. Pre-formed inter-cabinet connecting cables reduce installation costs.

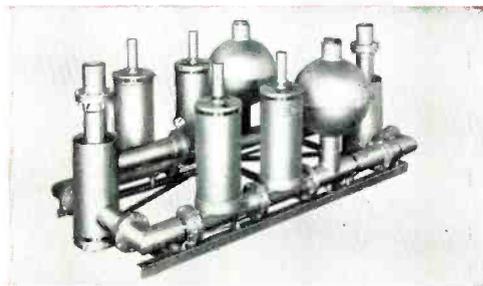


⑨ 10 Micro-Second, Fault-Protection

Unique electronic overload protection completely safeguards power tubes and circuitry against momentary or sustained overload. (For example, the protection circuit will remove power so fast it will prevent damage to a wire as fine as 0.005-inch diameter shorted across the 7000-volt power supply!)

⑩ Hi-Lo Cutback Reduces "Off-Air" Time

With the TTU-12A transmitter you can cut back to a generous 1-KW power level—and stay "on-air" while making emergency repairs to the 12½-KW amplifier. Moreover, small size tube cavities in the power amplifiers may be interchanged in less than 5 minutes—enabling you to return to full power promptly.



RCA TTU-12A Filterplexer

⑪ You Pay Nothing for "Extras"

The price of the RCA 12.5-KW UHF includes the complete transmitter package. No "extra" charge for UHF Filterplexer (combination sideband filter and diplexer). No "extra" charge for one complete set of tubes. No "extra" charge for two sets of crystals, two P.A. "glide-in" cavity dollies, one spare cavity, two water pumps, and pyranol-filled plate transformer.

Specify a Completely Matched UHF System

RCA can supply a completely matched system to meet any station requirement. This includes the antenna and tower, transmitter, console, monitoring equipment, transmission line or waveguide, and the many other accessories needed to put a UHF station on the air. Everything is matched for peak performance and you get everything from one reliable source—RCA!



RCA UHF Waveguide Section

For complete information on the RCA 12.5-KW UHF transmitter—and RCA UHF accessories—call your RCA Broadcast Sales Representative.

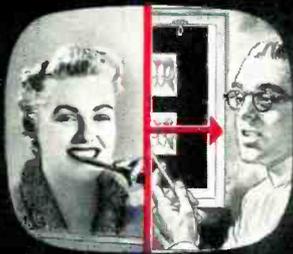
New brochure on the RCA 12.5-KW UHF transmitter. Includes technical specifications, floor plans. Free from your RCA Broadcast Sales Representative.



RCA PIONEERED AND DEVELOPED COMPATIBLE COLOR TELEVISION



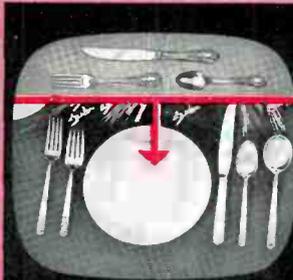
RADIO CORPORATION of AMERICA
ENGINEERING PRODUCTS DIVISION
CAMDEN, N. J.



• Horizontal wipe



• Vertical split



• Vertical wipe



• Vertical wedge wipe



• Diagonal wipe



• Horizontal split



• Diamond insert and wipe



• Controllable corner insert



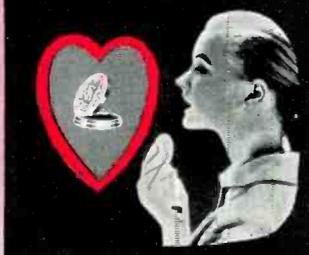
• Horizontal wedge wipe



• Rectangular insert and wipe



• Controllable corner insert



• Optional special effect

12 ways to present your "commercial"

Now—with RCA's new Special Effects Equipment—you can have these 12 attention-getting effects right at your fingertips. You push the button for the effect you want. You swing the "control stick" (rotatable 360°) and put the selected effect in the picture wherever you want it. It's simple, inexpensive—requires no complicated equipment or extra cameras.

RCA's Special Effects Equipment consists of just two separate units; (1) a TG-15A control panel (shown left) and generator, (2) and a TA-15A amplifier. The Special Effects Panel can be inserted in any RCA Console housing. The other units can be mounted in your video racks. Installation couldn't be easier.

For quick delivery, order your RCA Special Effects Equipment direct from your RCA Broadcast Sales Representative.

← RCA Special Effects Control Panel—with 12 push-button selection and 360° rotatable stick control.



RADIO CORPORATION of AMERICA
ENGINEERING PRODUCTS DIVISION
CAMDEN, N. J.

Right From KDKA's Station Log...

"56,050 HOURS ON AIR"

...and going strong!*

KDKA's 50-KW AM power amplifier,
using two RCA-5671's.

...says T. C. Kenney, CHIEF ENGINEER OF STATION KDKA

You're looking at the two RCA-5671 power triodes used in the power amplifier of Station KDKA's 50-KW transmitter.

Both tubes have logged over 56,000 hours *apiece* since they were first placed in service more than seven years ago. And to quote Mr. Kenney, "*They're still performing just as satisfactorily now as they did then.*"

The 5671 is just one of the many RCA power types that are "delivering" long life performance in broadcast transmitters throughout the country. Broadcasters everywhere like the extra dividends of lower operating cost—lower capital investment per hour of tube performance—minimum "down time"—more stable operation, that they get from RCA power tubes.

Your local RCA Tube Distributor is always ready to fill *all* your broadcast tube requirements promptly. Just pick up the phone and give him a call... you'll like his dependable service.

**(as reported June, 1954)*



RCA-5671—forced-air-cooled power triode for 50-KW AM transmitters...the power tube with thoriated-tungsten filament.



RADIO CORPORATION of AMERICA
ELECTRON TUBES

HARRISON, N. J.

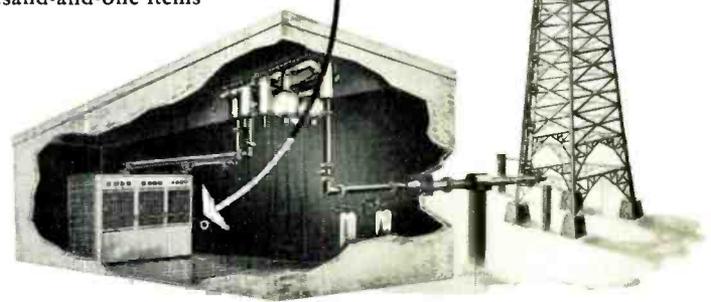


it takes all **3** to plan your system

The correct equipment means "Everything" in a TV station operation. Together, the three books shown here constitute a buying guide covering the minutest of details in this field. They are RCA's answer to the question of what is best and newest in antennas, transmission line, transmitters and accessories. The three books fully describe the thousand-and-one items that make up a UHF or VHF television station.

In 300 pages filled with charts, tables and descriptions, these books present a complete and authoritative explanation of station requirements in the language of the station operator.

Ask your RCA Broadcast Representative for your copies or write Dept. J-22, RCA Engineering Products Division, Camden, N. J., on your letterhead. In Canada, address RCA Victor Company Ltd., Montreal.



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ENGINEERING PRODUCTS DIVISION
CAMDEN, N. J.