BROADCAST NEWS

Richmond, Va. ETV Station Stimulated by Community Spirit Creates Efficient, Progressive Operation

RCA

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ETV STATION RADIATES 1.2 MILLION WATTS TO COVER 50-75 MILE RADIUS

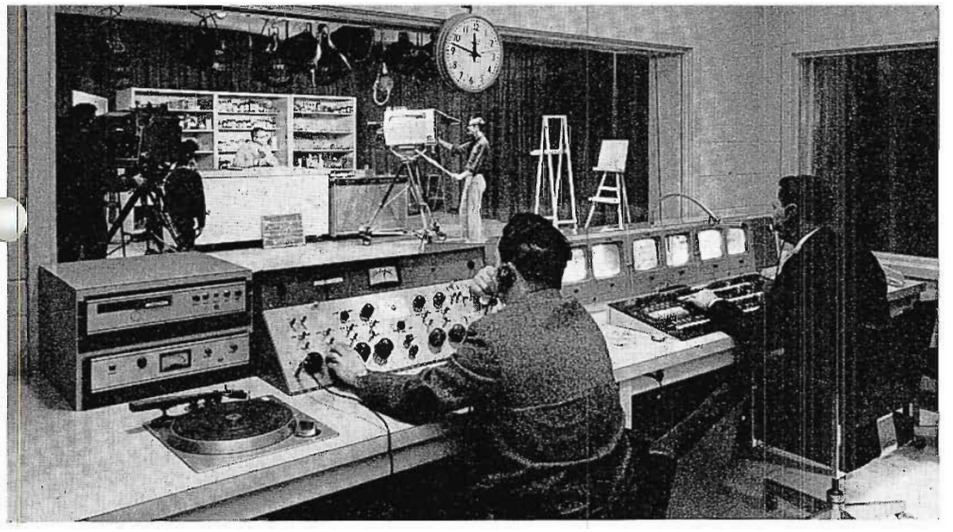
Professional People, Stimulated by Community Spirit and "New Look" Equipment Create Efficient, Progressive Operation

LANGUAGE ARTS TEACHER, Mrs. Hope Mitchell, shown in studio of ETV station WCVE, as she conducts a class for students scattered over a large area of Virginia. Station also telecasts adult education features, cultural, and civic programs, in the evening. Camera is TK-60, 4½-inch image orthicon, same as used in top commercial stations.

The dreams of many civic minded citizens in the Richmond area were realized when, after years of planning and fund raising, Central Virginia's first community-owned ETV station went on the air in September, 1964. Educational programs of the non-profit outlet are now aired for approximately 200,000 students in the classrooms of 450 subscribing public, private and parochial schools—universities and colleges. Community and cultural programs are planned for UHF equipped private homes in 36 surrounding counties and cities. All this is the result of a well planned, above-average operation, including a new building designed specifically for educational television productions, the finest "New Look" RCA equipment, and professional personnel in both the television and the teaching areas.

Surprising Signal Reception

In commenting on the outstanding performance, Mr. B. W. Spiller, station manager (formerly associated with commercial radio and TV stations in Texas and Louisiana), stated that his predictions made to



PRODUCTION CONTROL CENTER designed by station technical staff using RCA "New Look" equipment. Personnel monitor audio and video; perform switching to record programs on television tape. Equipment (L to R) consists of RT-7 Cartridge Tape (and turntable), BC-8 Audio Consolette, TS-40 Program Switcher.

local TV sales and service dealers before WCVE went on the air—that most of the city of Richmond installations would require an outdoor antenna—had not proven true. A simple indoor UHF "ring" antenna attached to the set is doing a good job in very many locations in Richmond. Also contributing to the excellent reception is the better-than-anticipated quality of the school receiving systems. Contractors have been putting up high-performance antennas and distribution systems, which have helped the station in all areas.

WCVE Educational Programming

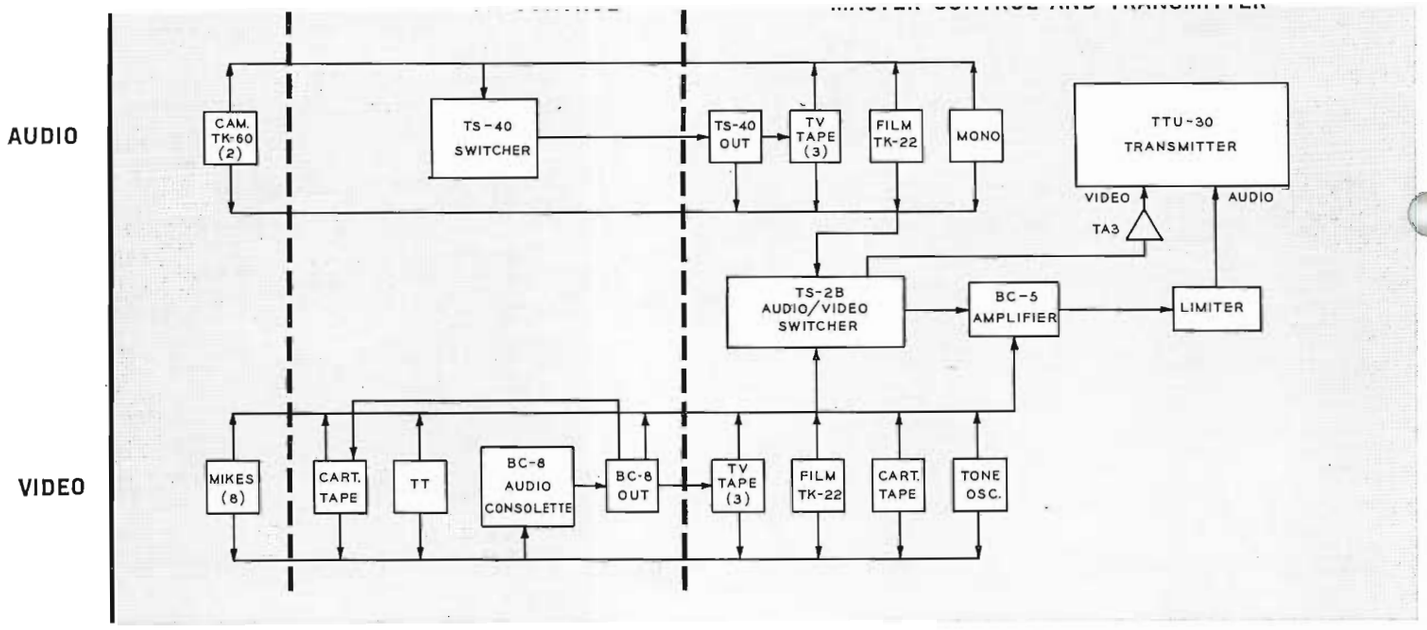
WCVE broadcasts 28 telecourses weekly to approximately 450 schools in 40 school divisions, representing 200,000 students in the State of Virginia. WCVE's daytime classroom programming consists of six hours of week day televised instruction for elementary and secondary school students, plus one hour of late afternoon adult education and college credit courses. Examples of the latter are in-service training courses in high school biology and Modern Elementary Mathematics. In addition, WCVE broadcasts approximately two hours of nighttime cultural, educational, and public affairs programs designed primarily for adults. At present, no programs are broadcast on Saturdays or Sundays.

WCVE Ownership

WCVE is owned and operated by the Central Virginia Educational Television Corporation, a non-profit community organization founded by civic, educational, and business leaders dedicated to the concept of educational television. The major portion of the $900,000 capital for the WCVE station and equipment came from contributions from local businesses, industries, civic and educational groups, and foundations. Operating costs are absorbed by fees paid by participating school divisions at $1.00 per pupil enrolled and by membership dues.

HOME RECEPTION IS POSSIBLE for sick or temporarily incapacitated students. The simplest of indoor antennas is usually sufficient to receive the picture, since the station is extremely powerful.

200,000 STUDENTS IN 450 SCHOOLS receive educational instruction. Public and private schools subscribe at cost of one dollar for pupil per year. Classroom teacher prepares pupils for the lesson, supervises viewing, and conducts follow-up after the program. Instructional television supplements classroom instruction.



SIMPLIFIED BLOCK DIAGRAM. This shows paralleled audio and video switching facilities, at production and master control positions. This arrangement was designed by the station technical staff.

Conservation of Manpower

WCVE was planned and designed by Spiller and his chief engineer, John Prather. Their broadcast experience enabled them to layout the complete system, write equipment specifications, evaluate the bids—then supervise building construction and system installation. The timetable was about like this: Spiller began recruiting his staff in March, 1964. By August, the building was completed and the equipment installed. September 14 the station went "on-air."

The design objective was to conserve manpower in order to reduce costs, but without compromise in equipment quality or sacrifice of operational facility. Since no attempt was to be made to teach television operation, and only professional people (preferably with broadcast experience) were to be used, efficient use of manpower would do most towards lowering of costs. In this way more funds could be directed toward the procurement of teachers, thus promoting the primary purpose of the station—education.

Production Control

In line with the minimum manpower operating concept, a new switching system was designed to permit the taping of lessons and the airing of taped lessons at the same time—with all necessary production switching performed by one man and from one point in production control. This meant building into the switching position complete operational controls for film, slide, and tape machines, knowing that not too much attention would be needed at camera control positions. The station's two TK-60 cameras helped in this. Their exceptional stability makes it possible to produce entire programs in the station's eight-hour operating day—without anyone shading the cameras. Further, use of an audio-follower switching system combined video and audio switching functions into one operation for on-the-air switching (which could be performed either in production control or in master control).

The result is a more efficient, one-unit production console with a composite, "non-mechanical" look. Sketch (above) shows a simplified block diagram of the system.

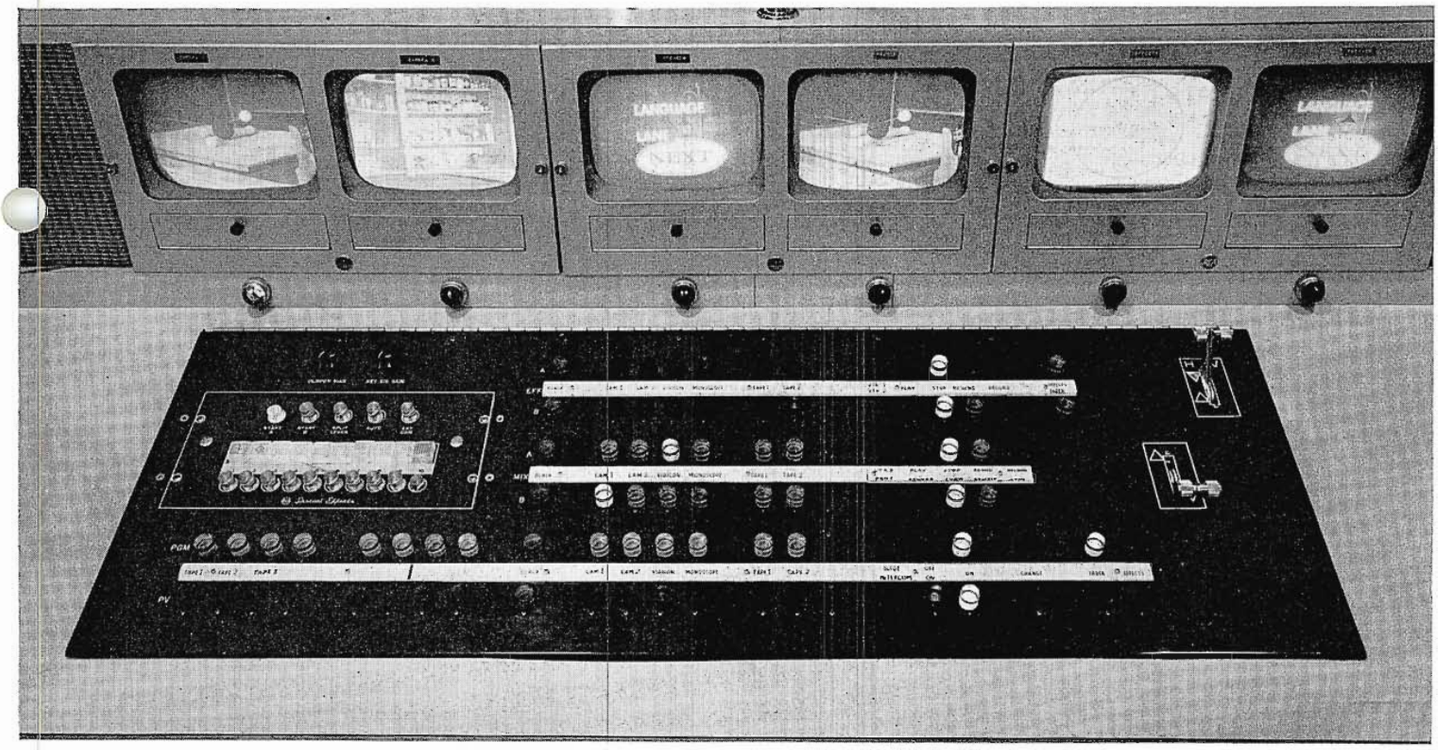
Master Control

One large open area, combining the usual master control and transmitter rooms, houses a control console, the transmitter, tv tape, film system and support equipment.

The console contains the studio and film camera controls, picture and wave-form monitors, a line monitor switchable between the input and output of the transmitter, TS-2B program switcher, video level and operating controls for the tape machines. Also a BC-5 Consolette that was repackaged to fit into the console desk section. (It is actually used as a line amplifier in this application.)

One operator at master control handles all the switching, machine controls, transmitter control, and monitoring. This efficient control central was designed by the WCVE staff under supervision of Mr. Spiller (see illustration at right).

SPECIAL 8-INCH TAPE REEL used to conserve space, save on reel and shipping costs. This accommodates the usual half hour program. Mr. B. W. Spiller, station manager, uncovered a source for the cost-saving product.



REMOTE OPERATION OF TAPE, FILM, SLIDES is made possible by this staff-designed modification to a standard RCA TS-40 Transistorized Switching System. (Only 6 inputs of this 12-input switcher are used for switching.) Monitors are for two TK-60 Studio Cameras, TK-22 Film Camera, live, preview, tape.

MAJOR TV EQUIPMENT

2...TK-60 Studio Cameras
2...TR-4 TV Tape Recorders
1...TR-3 TV Tape Player
1...TK-22 TV Film Camera
1...TP-66 TV Film Projector
1...TP-7 TV Slide Projector
1...TS-40 TV Switcher and Special Effects
1...TS-2B Relay Program Switcher
1...BC-8 Audio Consolette
1...BC-5 Audio Consolette
2...RT-17 Audio Cartridge Tape Recorders
1...Audio Turntable
1...TTU-30 TV Transmitter

COMPACTNESS OF NEW LOOK EQUIPMENT, such as 30-KW UHF transmitter and television tape machines provide spacious master control in a relatively small room. Supervisor Dennis Starling can control studio and film cameras, transmitter and switching, and audio. Also, tape and film machines may be operated.

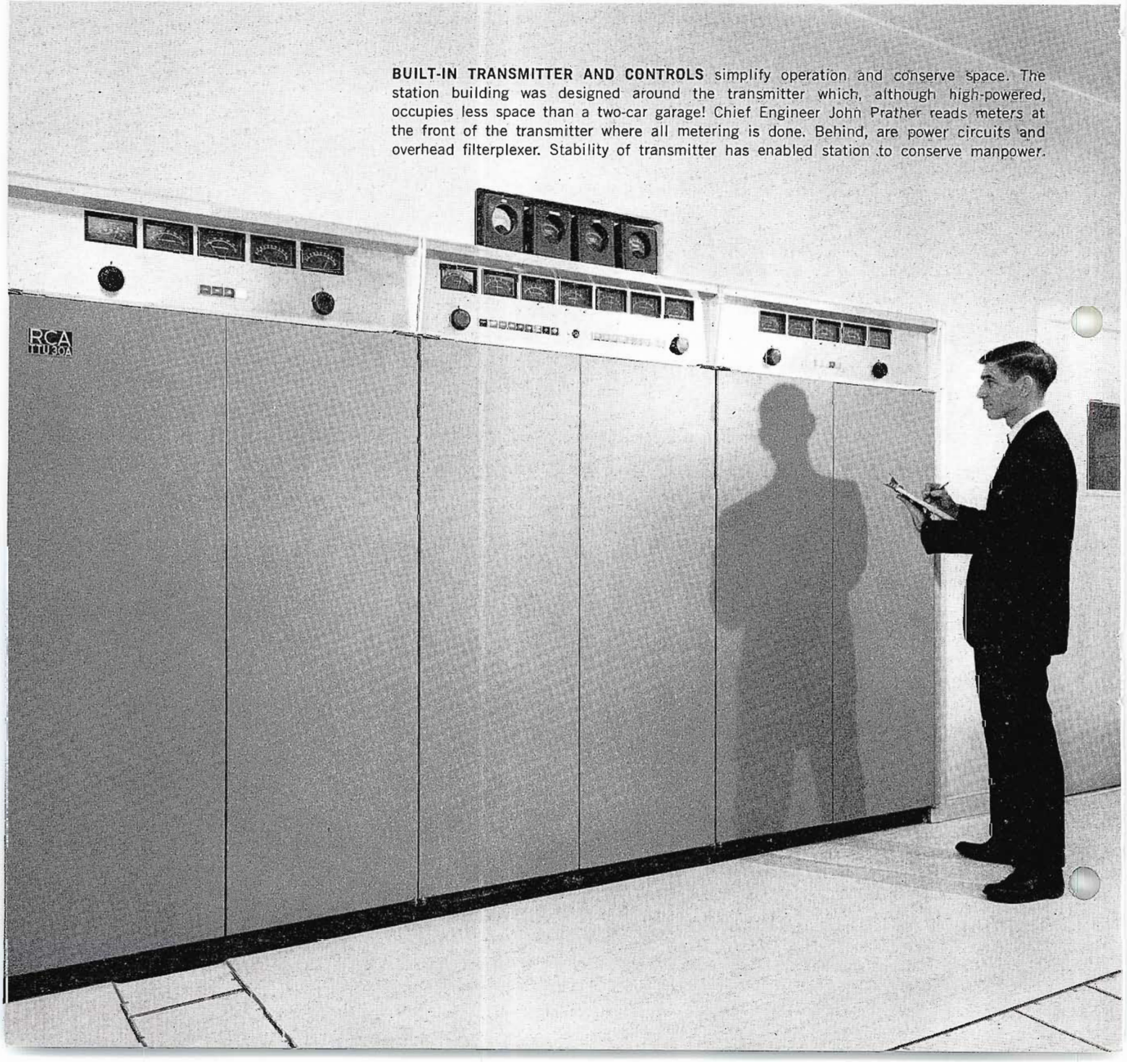
"New Look" Equipment

The RCA television equipment helped WCVE to take the giant forward step often referred to in TV station design as the "new look". This encompasses not only attractive, colorful appearance, but combines compactness, functional layout and new standards of reliability. New modular and transistorized circuits shrink equipment size and power consumption to only a fraction of what it is in older installations. Solid-state equipment is more efficient, has longer life, and requires less attention. Furthermore, the "new look" circuits are self-adjusting, that is, they compensate for normal changes in daily use and do not drift, eliminating manual "touch-up" of controls. These factors make many devices so stable and dependable that they operate virtually unattended.

Compact "New Look" Transmitter

The transmitter is one of the first TTU-30, 30-kw Transmitters delivered by RCA. It utilizes the new vapor-cooled klystrons, which are very easily driven and extremely stable. Furthermore, their efficiency helps reduce cost of operation.

The simplicity and compactness of the high-powered transmitter made it possible to literally design the station building around the transmitter. It requires less floor space than a two-car garage. The low profile front-line cabinets, containing meters and pushbuttons for motor-driven controls, are built into the wall facing master control. Behind, power circuits and components are contained in a walk-in screen enclosure. An "overhead filterplexer" arrangement is used to save additional floor space, since this component never requires any attention. All metering,



BUILT-IN TRANSMITTER AND CONTROLS simplify operation and conserve space. The station building was designed around the transmitter which, although high-powered, occupies less space than a two-car garage! Chief Engineer John Prather reads meters at the front of the transmitter where all metering is done. Behind, are power circuits and overhead filterplexer. Stability of transmitter has enabled station to conserve manpower.

even to reading temperatures of the klystron collectors, dummy load and transmitter room components is accomplished at the front of the transmitter.

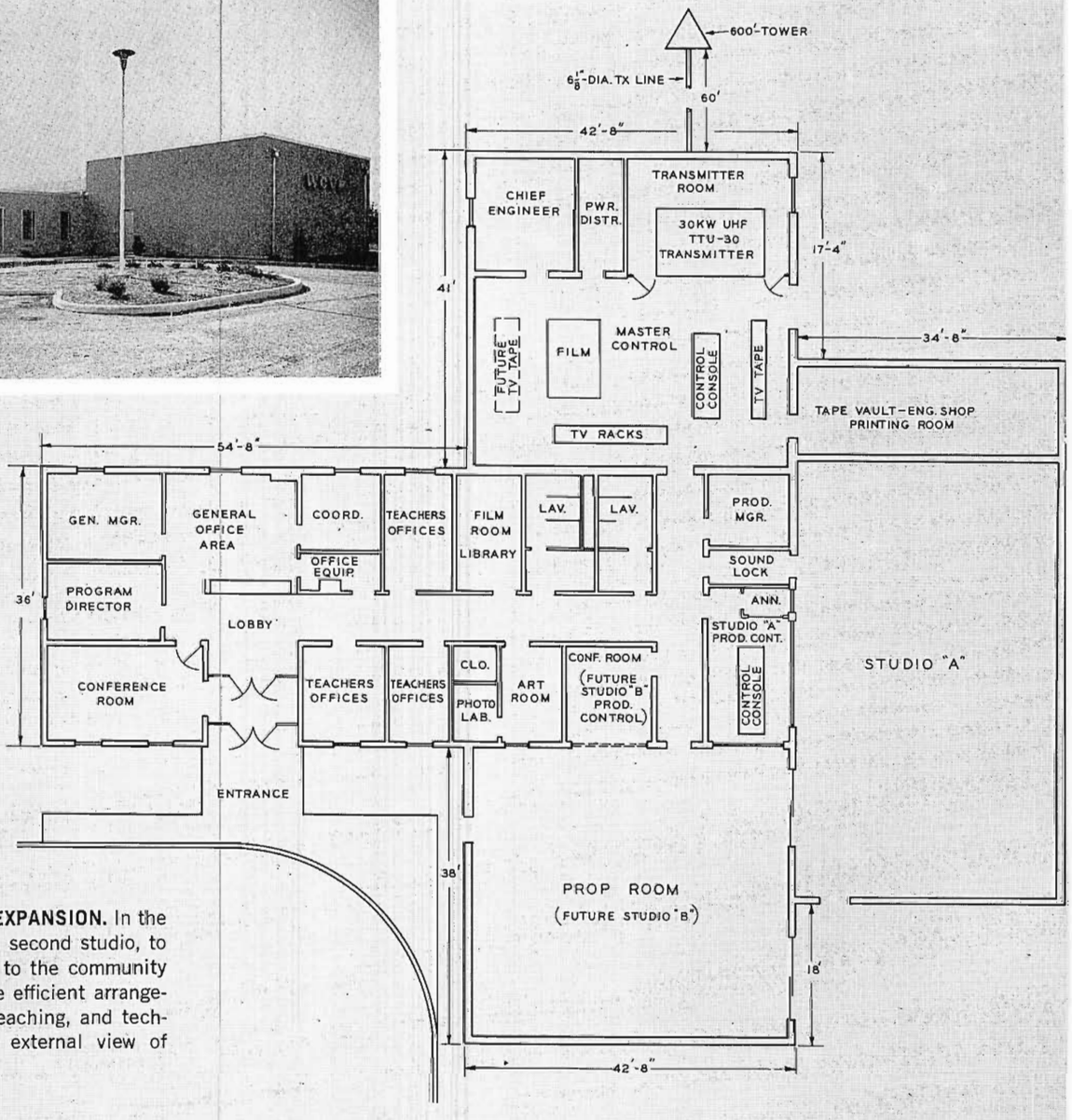
Picture and waveform monitors for the transmitter are mounted in the nearby master control console, a position from which the transmitter panel meters are visible.

According to the chief engineer, stability of the transmitter has contributed significantly to the station's low manpower concept. The transmitter is shut down at the end of each operating day . . . and within three to four minutes after starting, power is up to maximum. No attention of any kind—not even sync or blanking touch-up—is required during the eight-hour operating day.

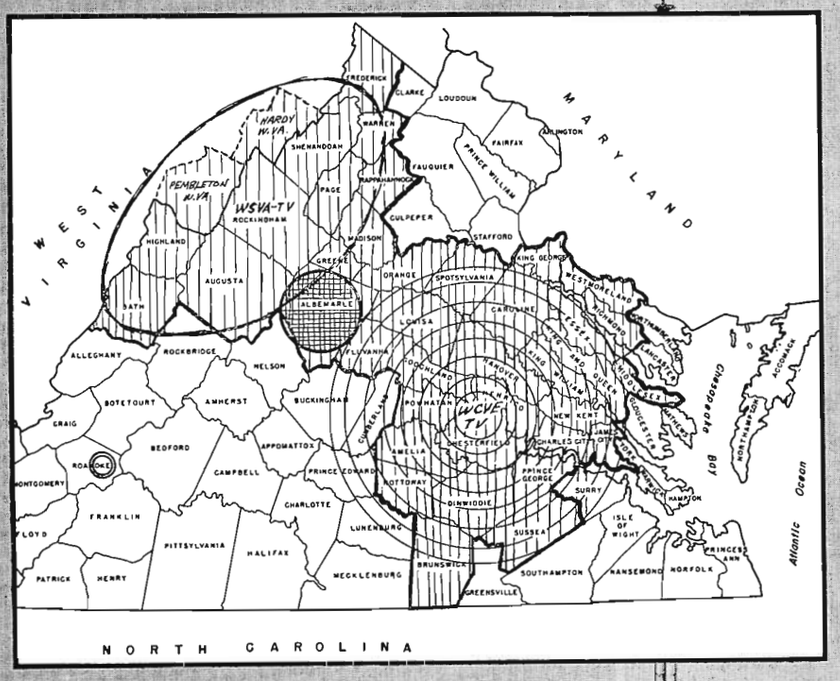
The increased efficiency of the klystrons and the preponderance of solid-state circuits are expected to reduce operating costs to a fraction of what they would have been for the older type high-powered transmitter. These savings in space and operating costs, together with unattended operation, make the transmitter installation very efficient and economical.

Heat Pump

The WCVE floor plan is shown below. A small area, commonly seen in most station floor plans that will be found missing here is the utility room. Air-conditioning of the building is accomplished by heat pumps. This and associated equipment, which usually occupy as much as ten per cent of the total floor area, are located outside, on the roof of the building.



FLOOR PLAN PROVIDES FOR EXPANSION. In the future WCVE may easily add a second studio, to increase programming service to the community as well as to schools . . . Note efficient arrangements of all administrative, teaching, and technical facilities. (Inset shows external view of station building.)



High-Gain Pylon Antenna

The 30-kw transmitter output power is fed through 6⅛-inch diameter transmission line running the entire length of the 550 foot tower to a type TFU-46 Pylon UHF Antenna. This cylindrical, smooth-surfaced Pylon—a new development of RCA for UHF—provides a power gain of 46. As a result, the station propagates a very powerful signal to the service area—a total of 1,200,000 watts, effective radiated power (ERP).

Coverage Estimates Exceeded

Original engineering studies had indicated the coverage would be out to about 50 miles. However, the 1.2 million watts ERP provided by a TTU-30 30-kw transmitter and high-gain TFU-46 antenna, at a height of 600 feet, have extended the primary coverage area much farther than expected.

Operating from a new studio-transmitter building, located near Bon Air in Chesterfield County, WCVE programming is picked up and used by schools as far as 75 miles to the south in Brunswick County, and 70 miles east at Deltaville.

Coverage is further increased by a translator, owned by the Albemarle County Public School Division, located on Carter's Mountain. The translator picks up the Channel 23 signal from WCVE to retransmit it on Channel 74, for reception by schools in the Albemarle area.

TV Tape System

The original video tape arrangement was designed on the basis of producing several hours of programming daily, and airing anywhere from eight to twelve hours daily. Since the recording and playing operations would frequently occur at the same time, there was need for a minimum of two machines—at the outset.

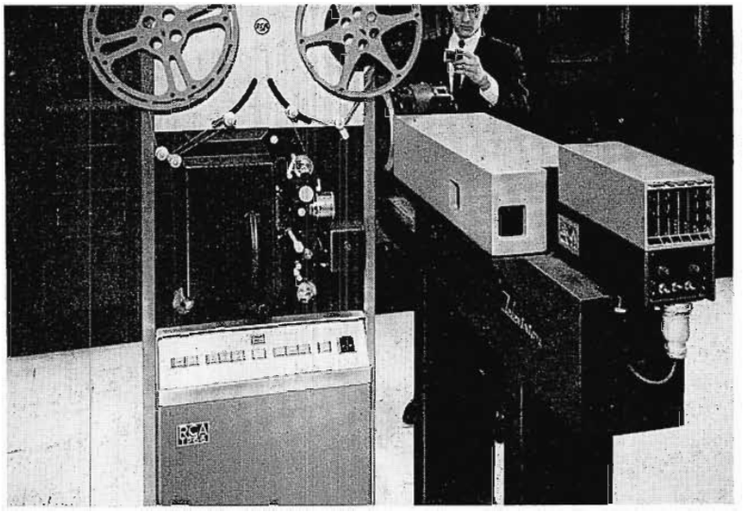
It was soon observed that one machine was occupied solely with the playback function, while the other was used almost exclusively for recording. Although it had seemed desirable to have nothing but complete systems (record-playback machines), it soon became evident that a Tape Player would be a wise addition.

PATTERN COVERS MORE THAN 50 MILES. Station's primary coverage reaches to schools as much as 75 miles away. High-gain RCA antenna on 600 ft. tower radiates 1,200,000 watts erp . . . Automatic translator on Carter mountain retransmits on Channel 74 to Albemarle school system. WCVE tapes are broadcast also by WSVA in Harrisonburg, and WSLS in Roanoke . . . Many receivers operate on small indoor "loop" antennas.

The Player filled the bill for daily airing of programs—in a most economical fashion (it costs less because the recorder electronics is eliminated). At the same time one of the complete machines was freed from the playback function and made available as a back-up for both recording and playing. This is a much more reliable operation.

At the start, the station was concerned about the ability of the tape machines to operate indiscriminately at either 7½ or 15 inch-per-second speed. (All programs produced by the station are done on 7½ ips tape speed which reduces tape costs by the not inconsiderate fraction of one-half.) On the other hand, programs procured from the National Educational Television Network and from the Great Plains Regional Instructional Library were on 15 ips tape. Could switching from one speed to the other be done without a lot of fuss and bother—involving time and personnel? Was it feasible for the station to program 7½-inch and 15-inch tapes one after another (back-to-back)? Experience has proved that both the TR-3 Tape Player and the TR-4 Recorder-Player can be used in this way.

The question of purchasing lower-cost, portable tape machines was never seriously considered; not merely because they are not in general use but more importantly, because they are not compatible for open-circuit applications. Moreover, the helical scan machines do not seem suitable for closed-circuit use either, since there is no compatibility among the various makes. Further, the problem of conversion to and from quadruplex is a complicating, costly factor and leads to degradation of picture quality.



NEW TELEVISION FILM SYSTEM handles 35mm slides and 16mm motion pictures for use by ETV instructors in their prepared presentations. Equipment includes TP-66 Film Projector, TP-7 Slide Projector, TP-11 Multiplexer, TK-22 Film Camera. This new camera operates without adjustment throughout the entire day.

Standard, professional broadcast equipment is used throughout the station in order to achieve the quality of picture in harmony with the quality of the educational part of the program. In the case of tape, compatible quadruplex machines are used. Costs are reduced by using the 7½-inch speed, but this does not visibly affect picture quality. As a result, tapes can be exchanged between stations and producers without difficulty. This gives a large source of supply.

Film System

A quite simple arrangement is employed using one 16mm TV Film Projector and one 35mm Slide Projector, together with a Multiplexer and a Film Camera. Since films are not projected in their entirety (in audio-visual fashion), there is no need for more than one film projector to insure continuity. The programs produced by WCVE are essentially live presentations, with film clips and slides utilized only occasionally by way of illustration or demonstration.

For convenience of operation, the film projector and slide projector may be operated by the program producer from his position in studio control. Here he can start and stop the film projector, or change slides on the 35mm projector, as required. This gives him complete control of production and assures a smooth flow from live to film (and vice versa) on the taped program.

The foregoing type of operation is made possible by the unusual stability of the "new look" transistorized film equipment. This new design makes possible remote control by the producer-director. The film projector does not require the usual pre-roll, having fast start and instant sound. The 35mm projector is likewise designed for remote change of slides. And the film camera stability is such that no video operator is required to be constantly adjusting control knobs.

COMPATIBLE QUADRUPLEX VIDEO TAPE SYSTEM consists of one TR-3 Player and two TR-4 Record/Players. This combination gives the station ability to record one program at the same time another is being broadcast. In addition, a third machine is available for back-up use in case either a player or a recorder is disabled.

Professional Approach

The instructional television programs are used by teachers throughout Central Virginia as a supplement to regular classroom instruction. The classroom teacher prepares the students for each telelesson, supervises the viewing, and conducts the follow-up after the program. During the follow-up, the teacher may correlate the lesson with other subjects, direct the class in research, and initiate numerous activities growing out of the television experience.

Courses Offered

WCVE broadcasts the following telecourses as basic instruction: 5th and 6th grade Science and 11th grade American History. The remaining telecourses are used by the classroom teacher primarily as enrichment or supplementary instruction. These include Language Arts for grades 1-6, Music for grades 2-5, Art for grades 2, 4 and 5, Mathematics for grades 2-7, Current Events for grades 6 and 7, Science for grades 4, 7, 8 and 9 and a high school course in Guidance, Economics, and The Humanities. All lessons are videotaped locally except Math for grades 4-6 furnished by KQED and 4th grade Science, furnished on tape by Midwest Airborne. The sole "live" broadcast is a 25 minute Current Events program once each week.

WCVE produces about three hours programming daily on video-tape. These tapes may either be telecast immediately or scheduled for later use. Some are "bicycled" by bus, truck, or other carriers for daily telecasts to schools from television stations in other areas of Virginia, such as WSVA-TV, Harrisonburg, and WSLS-TV, Roanoke.

Teaching Staff

The teaching staff of WCVE currently consists of six full time studio teachers who are on leave from various school systems in the state and eight part time studio teachers who are responsible for a limited number of telelessons. The program director is Mrs. Mary Anne Franklin, who formerly served as television consultant for the Richmond Public Schools. Other educational administrators are A. Edward Ooghe, Television Coordinator, and Grover C. Hailey, Studio Artist.

Standards for qualifying studio teachers are exceptionally high. The present teaching staff of WCVE represents the very best of the 71 classroom teachers recommended by school superintendents throughout Central Virginia and who formally auditioned for the various TV teaching positions last Spring.

Program Content and Evaluation

Each studio teacher on the staff receives regular assistance and guidance in the selection and evaluation of program material. This is provided by "steering" and "curriculum" committees each comprising from six to twelve members—principals, supervisors, classroom teachers—selected to represent the various participating areas. In addition, TV programs are evaluated by the classroom teachers who return evaluation forms covering lessons or series of lessons.

According to Mrs. Franklin, WCVE is one of the few ETV stations requiring the teacher to watch every telelesson in a classroom in order to document student reactions and to evaluate lesson effectiveness.

Teacher's Manuals

The classroom teacher whose students are to view the TV lesson is provided in advance with a Teacher's Manual to familiarize her with the upcoming telelesson. This manual, which is prepared by the

PROFESSIONAL TEACHING STAFF (clockwise around table): Mr. A. Edward Ooghe, Jr. (standing) TV Coordinator; Mrs. Marriott Maynard, Math.; Mrs. Dorothy Bowles, Language Arts; Mr. Seaton B. Fulghum, Science; Mrs. Mary Anne Franklin, Program Director; Mr. Vaughan H. Howard, Science; Mrs. Kathleen Hancock, American History; Mrs. Hope Mitchell, Language Arts; and Mr. Grover C. Hailey, Studio Artist.

STUDIO ARTISTS PREPARE VISUALS for television class in language arts. Form and content, visual aids, and teaching manuals are either under the supervision of local committees or prepared by the studio teachers themselves. The Teacher's Manual, (for example) is prepared by the WCVE staff for distribution to subscribing schools.

studio teacher and printed in quantity for distribution to subscribing schools, contains an outline of the program content, purpose and objective of the lesson, description of the telecast and suggested related activities for the class. In some cases, bibliographies for teacher and students are included, as well as references to related subjects in standard textbooks. The manual also contains the form which the classroom teacher completes in evaluating the students' reactions and the effectiveness of the lesson.

The recent installation of new Multilith printing and processing equipment has made it possible for all manuals to be produced at the WCVE station.

Nighttime Programming

On April 1, 1965, WCVE became the 93rd affiliate of the National Educational Television Network (NET), which provides two hours of taped and filmed cultural and public affairs programs each week night.

Some of these programs explore subjects in considerable depth. There is, for example, an hour long program on what Japan is doing to solve its population problem, a 30 minute program on recent scientific discoveries in the Antarctic, and a 30 minute program on the birth of jazz in New Orleans. Scheduled also is a 13-week series on communism produced by WCVE.

WCVE And The Future

The State of Virginia is committed to the development of a statewide educational television network. WCVE is one of three ETV production centers currently operating in the State of Virginia. Because of its geographical location and because of its outstanding facilities and programs, WCVE is expected to play an integral part in the development of the network.

TYPICAL PROGRAM CLASSES PRODUCED AND TAPED BY WCVE

Grades	*Subject Series*	*Title*	*Length (in minutes)*	*Length of Series (in weeks)*
1	Language Arts	Language Corner	15	30
2	Language Arts	Word Magic	15	15
2, 3, 4	Music	Let's Make Music	27½	26
2	Art	Art—Let's Look	15	15
3	Language Arts	Language Lane	20	30
2	Math	Know Numbers	15	30
3	Math	Why Numbers?	20	30
4, 5, 6	Language Arts	Highways to Communication	25	15
4	Art	Our World of Art	27½	13
5	Art	Art Is All Around Us	27½	13
5	Science	Adventures in Science	27½	26
5	Music	Patterns in Music	25	30
6	Science	The World of Science	27½	26
7	Science	New Dimensions in Science	27½	26
8	Science	Basic Biology—1st Sem. Concepts in Chemistry—2nd Sem.	30	15
9	Science	Physical Science—1st Sem. Earth-Space Science—2nd Sem.	30	30
11	American History	Issues and Ideas	30	30
11, 12	Humanities, Guidance, Economics	Focus	45	30

TEACHERS REHEARSE PROGRAMS in advance of going "on-air" in order to present a smoothly flowing lesson to the unseen class. This devoted attention to perfection in detail is characteristic of the genuine professional.

Putting orientation programs for teachers on television tape, for workshop use. These programs utilize various grade levels. This view shows the class actually using a scheduled TV lesson, with recommended preparation and follow through by the classroom teacher.

For More Information on Television Applications, See Your Nearest RCA Representative

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