

RADIO, TV and RECORDING

# TECHNICIAN- ENGINEER



DECEMBER 1956



R.W. NICHOLSON

RADIO, TV and RECORDING  
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The INTERNATIONAL BROTHERHOOD of ELECTRICAL WORKERS

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Editor, Technician-Engineer

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. . . the cover

Radio, television, and electronics manufacturers expect this to be the best Christmas ever, saleswise. Small and compact transistor radio receivers will probably lead the pack in sales totals, closely followed by home television sets. Color TV may get its first big boost during Yuletide shopping, and Santa will find himself burdened down with a sleigh-full of electronics gear.

For those technicians who are writing the North Pole for new and up-to-date, non-remote equipment for their station operations, there is this note of encouragement: Manufacturers are predicting a big sales and installation year for 1957.

So . . . unless Santa gets fouled up in a yagi array up on some housetop . . . expect a Merry Christmas and a Happy New Year.

commentary

The spirit of Christmas fills our thoughts this month. There is an uneasy peace in many parts of the world, and the good will of men is shattered by the tyranny of Russia and the war-baiting among nations of the Middle East. In the cradle of Christendom, Israeli soldiers shoulder rifles and watch expectantly. In a cradle of civilization across the Suez Canal, UN soldiers walk an uncertain chalk line.

We would remind you, too, that many Americans have no peace this month because of a disease in our midst. One third of the people of the United States today are infected with live tubercle bacilli, the National Tuberculosis Association tells us. Tuberculosis is still a giant among infectious-disease killers in this country, killing more people than all other infectious diseases combined. It is killing 45 persons a day, causing one death almost every half hour. Approximately 100,000 new cases of tuberculosis are being reported annually, at the rate of one every five minutes.

So the battle against this disease is far from over. The Christmas Seal campaign needs our continued support. We urge you to contribute.

the index . . .

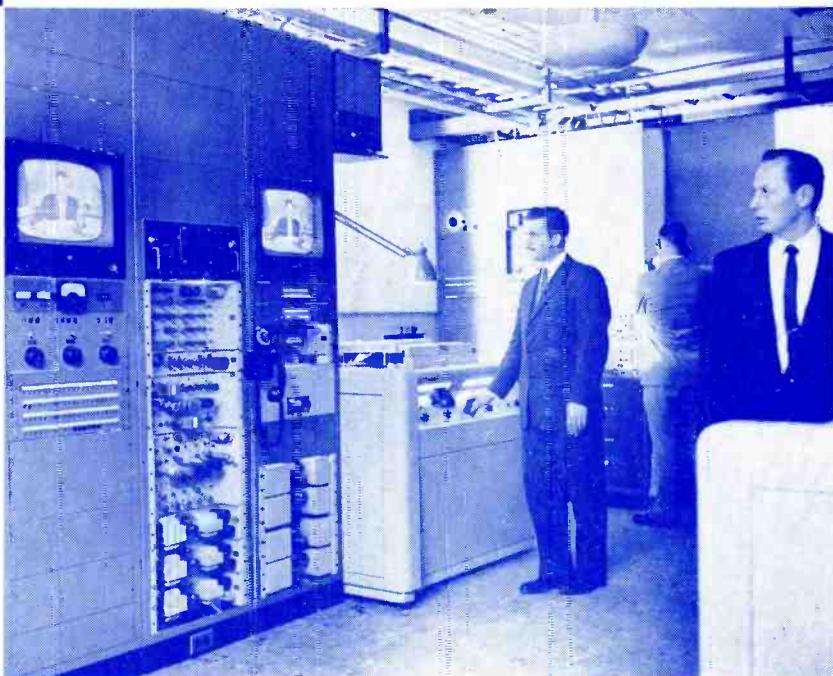
For the benefit of local unions needing such information in negotiations and planning, here are the latest figures for the cost-of-living index, compared with the 1955 figures:

October, 1956—117.7; October, 1955—114.9.



# First Pictures of VIDEO TAPE BROADCASTING

CBS puts  
Ampex recorder  
into regular  
operation  
at Hollywood  
studios



Above: A view of the Ampex equipment in the CBS studios on the West Coast. Left: John Radis and Andrew Briggs watch a test run while Herb Pangborn scrutinizes the monitor.

CBS Television used magnetic tape for the broadcast of a regularly-scheduled program on November 30, when "Douglas Edwards With The News" was played back to Pacific Coast affiliates of CBS. Since that date, all of the Douglas Edwards' news programs have been recorded on tape at Television City, and broadcasts of the programs have been delayed in the fashion which is common to many programs which originate in New York and other Eastern cities.

Several weeks of experiment have proved the feasibility of delayed tape recordings, and further

experiments will undoubtedly contribute to constantly improving quality. In any case, most viewers are of the opinion that the picture quality has been improved over that afforded by the usual kinescope recording—which has been very widespread on the Pacific Coast because of the time differences from East to West.

The installation at Television City consists of two duplicate recorders which were delivered to CBS several weeks ago by the Ampex Corporation. Ampex engineers are participating in the experimental work, as are many CBS engineers and technicians. A regular schedule of shifts has been worked out in the Company's Technical

Operations Department, and many IBEW members are gaining valuable practical experience in the initial operation of this extremely complicated equipment.

One of the most interesting features of the equipment is that a 240 cycle square wave is recorded on the bottom of the tape so as to afford an accurate reference for timing in playback. Any program material can thus be played back at precisely the speed of its recording. This feature, however, is only one of a number of less complicated ones. In the record mode, only one 7-inch rack unit is external to the recorder cabinet—the bulk of the equipment in external racks is actually essential only to playback.

A total of more than 190 tubes are involved in the recorder's operation. It may be of interest to note that the tubes driving the heads in the record position are a pair of 815's—just loafing along. Four separate channels in the playback chain—one for each of the rotating heads—can be individually adjusted so that the output of each head is accurately matched to that of its neighbors. The basic signal is frequency modulated, with a carrier near 5 megacycles—thus, the playback amplifiers are very similar to separate FM receivers. Cascaded limiters remove the last vestige of amplitude modulation, and the following discriminator output is then amplified to produce a useable level of video signal.

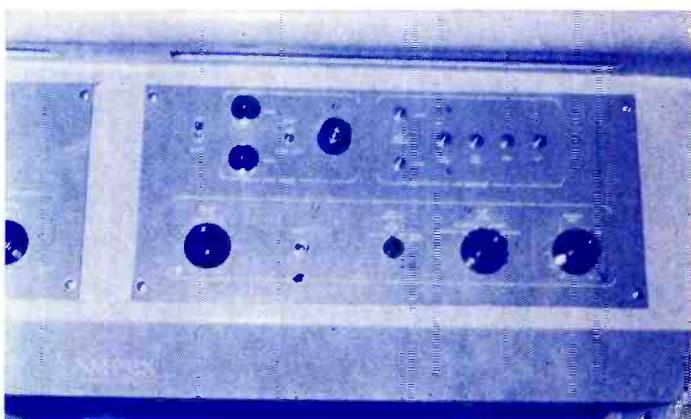
The 14-inch reels of Mylar tape afford an hour of continuous recording (and playback). The two-inch tape runs at 15 inches per second and the extremely high speed of the rotating video head is the primary factor in recording and reproducing pictures which can very favorably be compared to those on a live picture monitor. The accompanying audio, of course, is of the same traditional quality characteristic of a 15-inch of a professional audio recorder. The audio signal is recorded on the top edge of the tape. Thus, the total product of a 320-line (or better) picture and a 15,000 cycle audio range very well satisfies even the most critical viewer.

So far, programs have been recorded in duplicate—for safety—and are also being recorded by the hot kinescope process, but in this series of news programs it has not been found necessary to switch over to the film process.

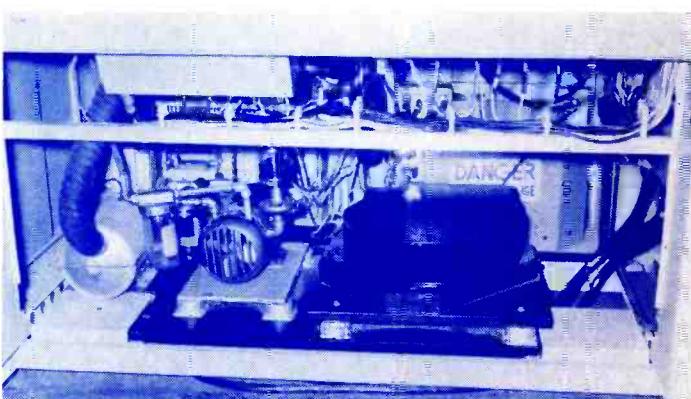
This is only the beginning—Ampex estimates that 15 of their recorders will be completed by the end of 1956—against their backlog of more than five and a half million dollars worth of machines which have already been ordered for use in the broadcasting industry.



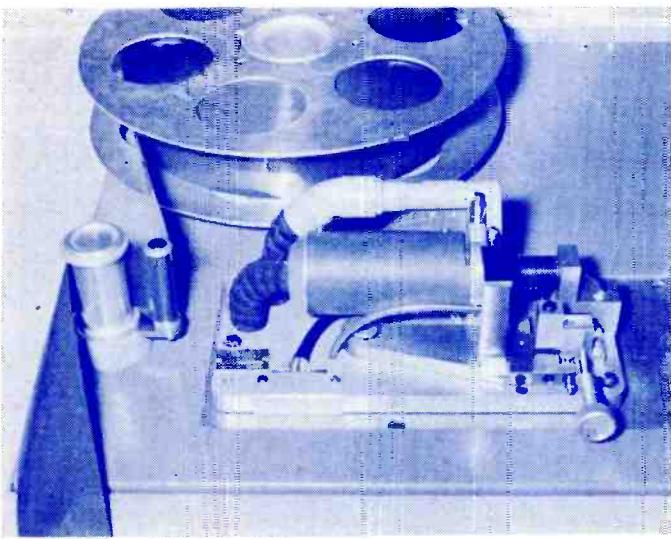
Close up of the transport mechanism; tape runs from left to right, from the reel, around the idler and past the video head—then to the combination eraser and audio recording head, to the idler and the storage reel on the right.



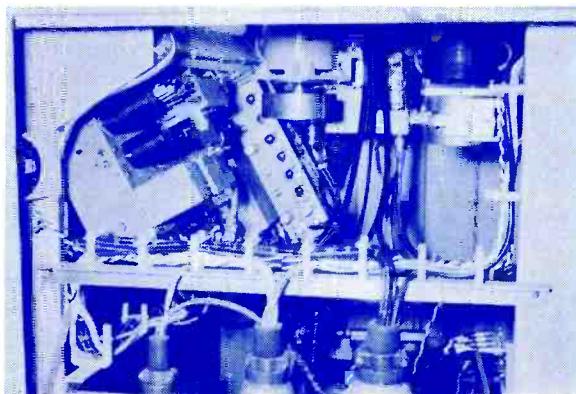
Right-hand control panel. Here are all the essential controls for starting, stopping, recording and playback. The top right portion contains all the controls for tape transport; the gain control in the lower left corner is for setting the recording level, the one in the right-hand corner controls the playback level. The third large knob on the bottom row is the meter switch for checking playback, record, bias and erase levels.



Inside the bottom front, with the vacuum pump on the left and a centrifugal blower on the right.  
(We are especially indebted to Mr. Jay Pennock of CBS and Gabor Rona for some of the pictures shown here and to the CBS staff in Los Angeles for their cooperation in securing all of the pictures, some of which are exclusive to the "Technician-Engineer.")



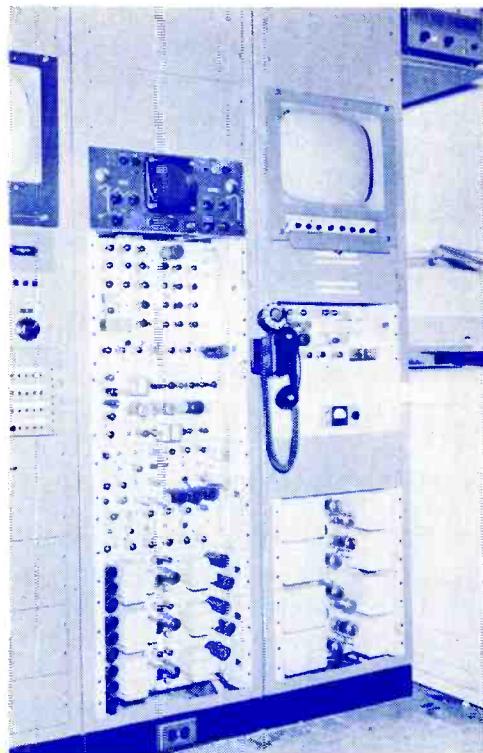
Close up of the video recording head with the tape pulled out of the way. The vacuum line is behind the motor—and at the right end of the motor, the rotating video head can just be seen. Further to the right is the brush area—with one brush connected to each of the four heads.



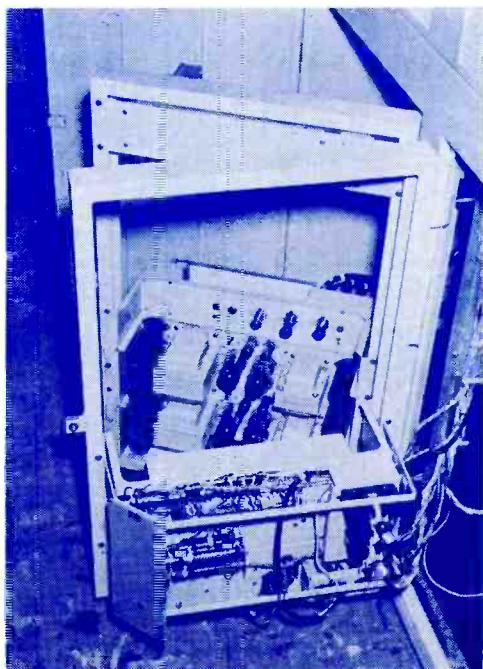
View from the right end of the recorder; audio and control panel components to the immediate left and video playback preamps just beyond. One of the drive motors and its heavy flywheel can be seen just above.



Mr. Roger Hibbard of Ampex makes a test run to check out the operation of the vacuum pump on one of the recorders while John Radis watches the reproduced picture.



Oscilloscope and monitors, playback amplifiers and the multiplicity of equalizing, amplifying, limiting and detecting equipment. Only one of these rack units is involved in the recording process; the remainder of the equipment in the center rack is part of the playback chain.



Some of the equipment is mounted on swing-out hinged panels—these shown are part of the power supply equipment with the voltage regulators, etc. This view is from the rear of the machine.

"By and large, management has pushed more than labor for longer-term agreements," states *The New York Times* in a recent editorial. "But flexibility and built-in periodic gains have been management's 'quid' for the 'quo' of labor's willingness to go along."

A survey by the Bureau of Labor Statistics of 1,400 contracts covering 1,000 or more employees now in effect shows that 65 percent run for two years or more and 21 percent for three years or over.

Some analysts see the "trend" toward longer-term agreements as a good omen—"a reduction in the guaranteed annual hassles of year-to-year agreements."

The AFL-CIO "Collective Bargaining Report" for September takes a more cautious view and warns of some pitfalls. Here are excerpts from that timely article:



## THE DURATION OF AGREEMENTS: **Reopening and Adjustment Provisions Are Necessary**

INCREASING and often misleading publicity has been given to a "trend" to longer-term agreements. While there has indeed been a trend to longer terms, the phrase "long-term agreement" is used too loosely, as though all long-term agreements are somehow directly comparable.

The fact is that there are different types of long-term agreements. The provisions for renegotiation and adjustment during the term of the agreement are as important as its duration.

In considering agreement duration, a union must look not merely to how long the term will run, but to how frequently and under what conditions it will have an opportunity to negotiate and adjust wages and other provisions to meet changed conditions which arise during the life of the agreement.

Long-term agreements which do not contain adequate provision for review and adjustment during their life can be dangerously restrictive.

### **Recent Studies Incomplete**

Two notable surveys of the duration of collective bargaining agreements have been published recently, one by the Bureau of Labor Statistics of the U. S. Department of Labor and one by a private group, the National Industrial Conference Board.

Both surveys fail to tell the whole story. They

do not report what provisions, if any, are made by the agreements for adjustments at some time before their expiration date.

Thus, for example, these surveys consider one 3-year agreement, which may permit annual renegotiation of such subjects as wages and health and welfare plans, to be the same as another 3-year agreement which provides no reopenings and no interim adjustments, even though the first agreement which permits renegotiation is actually much more like a 1-year agreement.

### **Survey By Bureau of Labor Statistics**

The BLS survey examined 1,424 major agreements (each covering 1,000 or more employees) in effect early in 1956. The time span between their date of signing and date of expiration—but making no distinctions on practice on the vital question of whether renegotiation or adjustments are allowed during this time—was reported to be as follows:

Term	Per Cent of Agreements
One year or less .....	25
More than 1, less than 2 years.....	9
Two (and less than 3) years.....	44
Three years .....	13
More than 3 years .....	8
Indefinite duration .....	1

The BLS report does note that "the long-term agreements usually make provision for annual reopenings for wage negotiations or provide for automatic changes such as annual wage increases and wage escalation based on the movement of the BLS Consumer Price Index." But it does not provide any breakdown of the types and frequency of different reopening and adjustment arrangements.

### **Survey By Conference Board**

The study made by the National Industrial Conference Board examined 923 contracts, selected at random, signed between mid-1955 and early 1956. It reported that:

Term	<i>Per Cent of Agreements</i>
One year or less .....	44.0
More than 1, less than 2 years.....	10.5
Two years .....	21.7
More than 2 years .....	23.8

The NICB report nowhere mentions that the longer-than-a-year agreements do provide that during their life there may be negotiations and adjustments on various subjects.

### **Adjustments During Agreement Term**

The recent BLS and NICB surveys and the type of publicity they generate may unfortunately spread an erroneous impression that long-term agreements are closed to further bargaining and do not permit any wage or other adjustments before their expiration date.

Unions and employers recognize that the economic situation cannot be predicted reliably for any significant period in advance. Nor do working conditions remain static.

When agreements are written for a period longer than a year (and often too when the duration is a year or even less), allowance therefore should be and usually is made for revisions before the expiration date, on wages particularly, but on other subjects as well, to take account of changes which may occur in economic or working conditions.

This has been done, in the case of wages, by providing for (a) reopening by either party for renegotiation, (b) "deferred" fixed increases to become effective at specified dates during the agreement term, or (c) often in addition to the deferred increase, automatic increases to adjust for any change in cost of living.

### **Reopening Provisions**

The most common means of making allowance for the need for adjustments during a long term

is to provide for reopenings. Many reopening provisions are limited to wages, the part of the agreement usually most readily affected by changing economic factors, but many agreements permit renegotiation of other provisions as well.

About half of agreement reopening provisions schedule the reopening at a specified date. This is usually a year after the effective date of the agreement and at annual intervals after, but is sometimes more frequent.

About a quarter of reopening provisions permit renegotiation to be called for by either party at any time.

The remaining reopening provisions are conditional ones, permitting reopening if specified changes occur—if the cost of living rises, if wages increase elsewhere, or if other specified changes develop.

If a union wishes to retain the right to strike action as a last resort if necessary to decide a renegotiation deadlock, the reopening provision should be phrased carefully. It may be advisable to include a specific statement that the usual no-strike pledge in effect during the term of the agreement would be inapplicable in the event of a reopening deadlock.

Some courts have held, in a stringent interpretation of the Taft-Hartley Act, that strikes are banned by the Act during an agreement reopening unless the entire agreement expires. Many reopening provisions have therefore been written to provide explicitly that the agreement may be terminated in the event of a failure to reach agreement—and is to be reinstated after a settlement is finally worked out.

*Continued on page 8*

### **Don't Put It Off**

#### **TOMORROW COULD BE TOO LATE!**

Those local unions which operate on the basis of their fiscal year ending on December 31, 1956 will want to file a Certificate of Intent with the regional office of the National Labor Relations Board before December 31. If a certificate is filed before the end of the fiscal year, the NLRB will consider the organization to be in compliance with the financial filing requirements of the Taft-Hartley Act for a period of 90 days after the end of the fiscal year. At some time during this 90-day period, of course, the necessary financial report form should be prepared and filed. Keep in compliance—file now!

In some instances, provisions have been made to refer to arbitration any wage reopening disagreement, but unions ordinarily have opposed such provisions and they are rather rare.

### **Deferred Increases**

A sizable number of long-term agreements—probably 25 per cent or more—provide, not for wage reopenings, but for increases of fixed amounts to become effective on specific dates during the agreement's life, usually annually.

These "deferred increases" are really of two general types:

(1) One, often called an "improvement factor" increase, is designed to provide for an increase in standards of living. It is over and above any increases necessary to make up for rises in the cost of living; the increases needed to compensate for rises in the cost of living are ordinarily provided by the agreement automatically through a cost-of-living escalator provision.

The most widely known such arrangement is that of the Auto Workers and the major auto companies. Their 3-year agreements provide for an "improvement factor" increase of  $2\frac{1}{2}$  per cent or 6 cents an hour, whichever is greater, each year on the anniversary date of the agreement. In addition, other adjustments are provided quarterly to match living cost rises.

The agreements of the Steelworkers and leading steel producers, extending for 3 years, also provide for automatic annual deferred increases plus automatic semiannual cost-of-living adjustments. Their deferred increase, to be put into effect at the start of the second and the third year of the agreement, is an average of 9.1 cents (a minimum of 7 cents an hour, plus additional adjustments to maintain differentials between jobs).

(2) The other type of "deferred increase" is provided without specific regard for what may happen to the cost of living. Such increases usually are larger than the deferred increases which are provided in combination with cost-of-living adjustments.

Most typical arrangement of this type, found fairly often in the construction and transportation industries, is an agreement which runs for two years, providing a mid-term increase of, say, 10 or 15 cents, with no provision for automatic living-cost adjustments.

### **Cost-of-Living Adjustments**

Unions generally have not favored automatic cost-of-living escalator clauses except in periods of rapid inflation when such immediate and auto-

matic protection may be particularly necessary. They have been concerned that reliance on cost-of-living clauses might tend too closely to limit wage increases to only those needed to make up for living-cost rises.

However, if there is to be an agreement running for more than one year, and without specific wage reopening provisions, unions have as a matter of basic self-protection, insisted that, in addition to fixed wage increases to improve standards of living, there be provision for automatic cost-of-living increases to assure protection of the buying power of wages during the life of the agreement.

### **Long Term No Guarantee of 'Peace'**

It is true that, if there is no provision for reopening for renegotiation, a long-term agreement does minimize the possibility of strikes. However, such closed long-term agreements are no guarantee of constructive or rewarding labor-management "peace."

If unforeseen conditions arise to make provisions of the closed agreement inadequate or unreasonable long before the scheduled expiration date, and the agreement is not reopened to make suitable adjustments, labor-management relations may be troubled by considerable unrest and deterioration of worker morale even though there may be no work stoppage.

This is why some unions which have accepted such long-term agreements stress that they must be regarded as "living documents" which must be subject to re-examination to meet any practical problems which could not have been foreseen when the agreements were first agreed upon.

The major inducement for different unions which have been willing to sign long-term agreements appears to be the more liberal concessions offered to them in exchange for their acceptance of the longer term desired by management.

Most unions agreeing to a long term have taken steps which they believe can retain adequate flexibility. Some have insisted on provisions for periodic reopening on wages and other provisions so that adjustments might be made to new conditions. Others have adopted provisions for deferred fixed wage increases and cost-of-living adjustments as a means of gaining wage protection and improvement.

The Auto Workers have also maintained the right to strike during the life of their long-term agreements, on such matters as production standards and the setting of rates for new jobs, as the means of keeping the union's hands free to protect the day-to-day interests of its members.

## **Reasons Against Long-Term Agreements**

Opposition to agreement duration longer than a year is rooted largely in the desire for "flexibility"—the opportunity to negotiate reasonably frequently to gain basic objectives and to adjust to changed conditions and new needs.

In the case of a one-year term, there usually is not too long a wait before it is possible to negotiate on any unforeseen circumstances which may have arisen. With a longer term, in which renegotiation is not provided for, one party may be tied down to an unreasonably long wait before it can seek desired adjustments.

Other unions have refused to accept long-term agreements not because of strong opposition in principle, but because concessions held out by management in return for a long term are inadequate. A long-term agreement is a very substantial union concession and must "not be sold cheaply."

There is also a strong view, on the part of some union leaders, that a long-term agreement may, even though it permits adequate wage and other economic adjustments, undermine "noneconomic" provisions and encourage by-passing of the union.

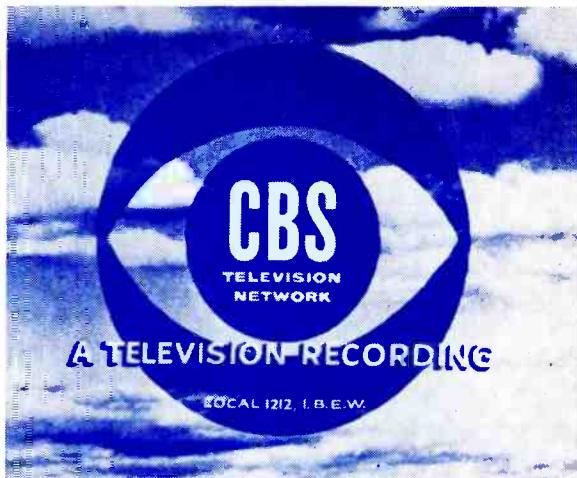
Thus, a union bound by a long-term agreement may be severely handicapped in efforts to adjust, for example, seniority or job classification provisions even though radical or accumulated technological changes may require alteration of such provisions.

Another objection: Some union representatives think that better relationships may be maintained where mutual problems and interests are reviewed at reasonably short intervals.

To put off negotiations for some years may make solutions more difficult, not only because of built-up pressures but because the adjustments required by then may have grown so large that it may no longer be possible to accomplish them comfortably all at one time.

Finally, another viewpoint common among some smaller unions particularly was reflected strongly in a recent action of the Newspaper Guild, which voted to limit the duration of its agreements.

In taking this action, the union's report stated: "The trend toward contracts covering periods of more than a year is alarming . . . this trend must be reversed. Great caution must be exercised in the entertaining of any management proposals for contracts for longer than a year. To negotiate a contract every year may be tough. But not to negotiate every year may mean gradual death by hardening of the union arteries."



## **Without Batting an Eyelash**

To give due IBEW credit to television recordings on the Columbia Broadcasting System, the network recently gave the Brotherhood the go-ahead on a slide and card to be used during station breaks, which would show "A Television Recording—Local So-and-So, IBEW."

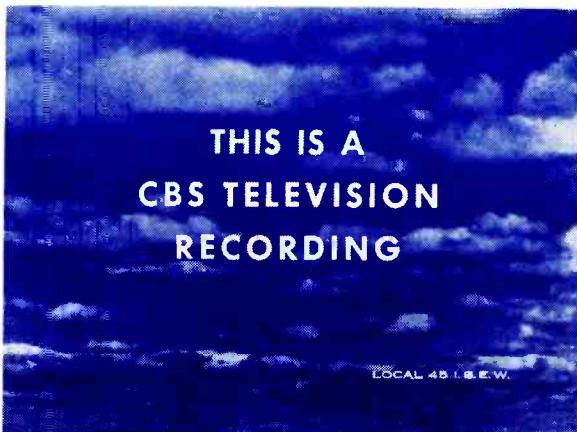
Faithful to the cause, designers incorporated what comedians have referred to as "the blood-shot eye" of CBS in the center of the design, as you see in the picture above.

Copies were produced for Local 45, Hollywood, and Local 1212, New York City—the only places where TV recording is now being done—and the identification cards and slides went on the air—for several days.

Then came a pronouncement from somewhere in the CBS administration maze to remove the eye!

What? Close the ever-seeing eye of CBS? The Brotherhood was startled.

Nevertheless, it accepted the idea, and a new version came down from the mill. It is reproduced below. This item will now appear with kinescopes and video tape recordings from network studios on both coasts.



# NARTB Files Final Pleading

Argument Presumed to Be Closed, Subject to Further Commission Action

SOMEWHERE in the history books of broadcasting, the Year 1956 should be indicated as the year in which station technicians and engineers fought to prevent premature remote control operation of transmitters. Since February 15, when the National Association of Radio and Television Broadcasters filed a petition with the FCC for further rule relaxation, the IBEW and other em-

ployee organizations have waged a determined fight to protect their interests and those of the stations which they serve. Month by month, in the TECHNICIAN-ENGINEER we have followed the progress of this work. Below we present what should be the final pleading of the employer organization, the NARTB:

BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON 25, D. C.

DOCKET NO. 11677

*In the Matter of Amendment of Sections 3.66, 3.274 and 3.572 of the Commission's Rules and Regulations Relating to Remote Control Operation of Certain Standard FM and Non-Commercial Educational FM Broadcast Stations.*

## Opposition to Motion to Strike Reply Comments of the National Association of Radio and Television Broadcasters

Comes now, the National Association of Radio and Television Broadcasters, by its attorneys, and opposes the Motion to Strike Reply Comments filed by the International Brotherhood of Electrical Workers (IBEW). In support thereof, the Association states as follows:

1. The reply comments filed by the Association are entirely proper and contain only information that is relevant to the issues in this proceeding and rebuts the objections raised by the IBEW, NABET and ACA. The change in the proposal for high power stations is permissible since it is not a counter-proposal but merely a suggestion of a different method by which the objective set out in the Commission's notice of rule-making can be achieved. The point in issue is how high power stations should be authorized to operate by remote control. The Association's reply comments are relevant to this point.

2. The IBEW's interpretation of the scope of reply comments would deprive the Commission of basic information it needs in a rule making proceeding. Such a proceeding is in the nature of a legislative hearing and it is necessary that all facts pertinent to the issues and comments be presented to the Commission. In many cases, it is only after

the comments have been filed that it is determined that additional facts are required to fully inform the Commission of the merits of a proposal. The sole limitation is that the evidence must be relevant to the points raised in the comments. This requirement is fully met by the Association's reply comments.

3. The IBEW has alleged that the acceptance of the NARTB reply comments would deprive it of due process guaranteed by the Constitution and the law of the land. Again, the IBEW forgets that this is a rule making proceeding and not a comparative hearing before the Commission in which private rights only are concerned. Section 4 of the Administrative Procedure Act provides only that all interested parties shall have notice of the proposal and be given an opportunity to present their views in a rule-making proceeding. This, the Commission has done.

4. It is interesting to note that the IBEW cites no authority for its unique contention, nor does it point out how the reply comments are not relevant to issues and comments of the other parties. As a matter of fact, it only spends two paragraphs on page three pressing the motion to strike. From page three to page nine, the motion deals with the merits of the reply comments and, thus, is in reality a surreply. The Association has no objection to the Commission considering these comments insofar as they may relate to the merits of the proceeding.

WHEREFORE, THE PREMISES CONSIDERED, It is respectfully requested that the Motion to Strike Reply Comments of NARTB be denied.

Respectfully submitted,  
NATIONAL ASSOCIATION OF RADIO  
AND TELEVISION BROADCASTERS  
By ROBERT L. HEALD  
By WALTER R. POWELL, JR.

**Technician-Engineer**

# New Audio Controls For IBEW Engineers

Custom equipment installed  
in Atlanta TV station

RECENT delivery to Station WSB-TV, Atlanta, Georgia, of a new audio control console, together with accompanying rack containing all necessary equipment, provides this Southern broadcasting outlet with equipment boasting several innovations in design and engineering.

WSB-TV, an NBC affiliate, is owned by the Atlanta Newspapers. Its technicians are members of Local 1193.

In November, 1954, officials of the Atlanta station asked engineering department of Altec Service Corporation to provide them with a custom-built console which would incorporate special facilities and operating features.

A basic design was submitted, and following several weeks of consultation between WSB-TV engineers and members of Altec's New York engineering staff a custom job was assembled.

The console features two microphone mixer nets with 9 inputs, each of these mixer nets has



JOHN KLUTTS, Graybar Atlanta representative, watches as John Granberry, WSB-TV audio engineer checks the simplified facilities of the new control console panel, achieved by color-coding of knobs and switches.

its own mixer coupled into either of two mixing channels.

For the purpose of permitting selection of 10 line inputs, 5 line attendant positions were installed. All of the line inputs are coupled through repeat coils in order to assure isolation.

The announcer's booth is provided with separate controls and talkback microphones. Facilities for record override, previewing any line input, cue channel or either of two main channels are other unusual features. Both main channels as well as the remote channels are metered. Two utility lines and sound effects filter switching on

*Continued on Page 13*



JOHN GRANBERRY, WSB-TV audio engineer, rides gain controls of the custom-designed console fabricated for the use of the NBC affiliate, Atlanta, Ga.



CHARLES ADAMS, audio engineer, handling a radio news program at the Atlanta station, uses the new color-coded knobs and switches.

# READING TIME

## **Vacuum-Tube Circuits and Transistors** by

*Lawrence Baker Arguimbau and Richard Brooks Adler, 646 pp., John Wiley and Sons, Inc., 440 Fourth Avenue, New York City 16, \$10.25.*

Here is a fully modern extension of Mr. Arguimbau's earlier best-seller, "Vacuum Tube Circuits," the book includes the latest essentials on color television, diode detectors, oscillator equilibrium, inverse feedback, and other factors more prominent in the field today. The author works with communications as an illustration of the broader field of electronic circuitry, so that much of the material is useful for those in non-communication electronic fields.

Chapter headings include: radio communications; diodes and rectifiers; triodes, pentodes, and linear amplifiers; transistors (principles); transistors (linear amplifiers); transient response of video amplifiers; amplitude modulation and tuned amplifiers; power amplifiers; oscillators; inverse feedback; amplitude modulation; frequency modulation; television; transit time; and noise.

Mr. Arguimbau has to his credit over thirty years of experience in laboratory work, during which time he has been closely associated with production, development, and research. He was a practicing engineer with leading firms. He was on the staff of the Massachusetts Institute of Technology for fifteen years before going into private research two years ago.

Dr. Adler is associate professor of electrical communications at the Massachusetts Institute of Technology and is affiliated with M.I.T.'s Research Laboratory of Electronics as well as the Lincoln Laboratory.

## **Transistors in Radio and Television**, by *Milton S. Kiver, 302 pp. McGraw-Hill Book Co., Inc., \$5.00*

This is a completely descriptive, nonmathematical book for the radio and television technician and all other technical workers in the electronics field who need a working knowledge of transistors and transistor circuits. Only a knowledge of basic electronics is required for complete comprehension.

The text starts with modern electron theory and then progresses step-by-step to the operation of point-contact, junction, and other transistors. This

is followed by a discussion of transistor circuits as they appear in radio receivers and television sets. A set of questions accompanies each chapter.

Emphasis is placed on the practical aspects of transistors and transistor operation.

All significant advances in the field up to the time of writing are covered. This is most important in the field where progress is so rapid. Of special interest is the material on transistor use in commercial radio receivers and television sets and servicing transistor circuits, and the chapter of transistor experiments. Recent transistor developments of importance are analyzed, and there is a discussion of the various precautions to observe when servicing transistor circuits and devices.

Chapter 10 consists of experiments which give the student the opportunity of learning firsthand the operational characteristics of transistors. The experiments can be performed using readily available parts; supervision by an instructor is not necessary. The text guides the student to the correct conclusions so that he always knows what to look for.

This is a very thorough treatise on a fast-developing subject. Beginning with modern electron theory and electronic behavior in atoms, the author blazes a path through point-contact and junction transistors, amplifiers, oscillators, receivers and automobile radio applications. Eighteen pages are devoted to the application of transistors to television receiver design.

A little-known use of special transistors occupies several pages—photosensitive transistors. Similarly, this book is the first (to the reviewer's knowledge) to cover the IBM transistor, only recently being used to replace thyratron tubes.

The book closes with a description of many miniaturized components which have been developed for transistor applications. The usual precautions are emphasized—care in soldering component connections and mountings, transistor terminals and the like. Several experiments are out-



## **The 1957 Progress Meeting**

The annual progress meeting of the Radio, Television and Recording Division of the IBEW will be held at the Roosevelt Hotel in New Orleans, La., June 14, 15, and 16. Your local union should be represented at all sessions.

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lined; the reader is urged to perform them, for his own edification.

A quite complete bibliography and a very complete set of tables is included; seventeen manufacturers are credited with current production of transistors.

**Musical Acoustics, Fourth Edition, by Charles A. Culver, McGraw-Hill Book Co., Inc. \$4.25.**

Written in a concise, logical, and easy-to-follow style by a scientist long recognized as a leading authority in the field of musical acoustics, this book will provide an authoritative but nonmathematical treatise for the use of professional musicians, college music majors, and others interested in the field of music.

Beginning with the underlying physical concepts involved, the book deals with certain relevant acoustical phenomena. This is followed by a treatment of the physical basis of musical intervals and temperament.

Subsequent chapters are devoted to a discussion of the distinguishing characteristics of the tones emitted by the various musical instruments, including the human voice. This section of the book is profusely illustrated by original waveform recordings and sound spectra diagrams. The final chapters are devoted to a treatment of electronic musical instruments, recording and reproduction of musical sounds, and the effects of room acoustics on the audition of musical compositions.

Incorporated in this fourth edition are the latest findings of research workers in the field, including certain recent results secured by the author. To make the book more suitable for music majors, two new chapters have been added, dealing with certain fundamental terms and concepts from the realm of physics, including an elementary discussion of simply harmonic motion. Another addition is the inclusion of a list of questions and problems at the end of many chapters. A number of additional illustrations have been included, and many older ones replaced by new ones.

**Color Television Standards, by Donald G. Fink, 514 pp., McGraw-Hill Book Co., Inc., New York. \$8.50**

The book begins by recounting the development of color television, with reference to the CBS, CTI and RCA systems and with excerpts from the FCC records during its 1949-50 deliberations.

From psychophysical tests through colorimetric

equations, from the color camera through color film reproduction and the final chapter with its Glossary of Terms, Mr. Fink has contributed another volume to the "must library" of the industry. This book is a fitting companion to *Television Engineering* (Fink) and *Television Broadcasting* (Chinn), along with *Color Television Fundamentals* (Kiver).

Here is an authoritative statement of underlying factors relating to the choice of color television standards and the effect of the standards on practical broadcasting and receiving equipment. Based on the eighteen mimeographed volumes recording the work of the National Television System Committee, the book is concerned with new advances in the field of television, and the technical methods needed for nationwide color television service.

The author served as vice-chairman of the NTSC during the period, 1950-1952, and was chairman of the NTSC Panel 12 and the NTSC Editorial Committee. He also performed valuable services when standards for monochrome television were formulated. Here he has put in digest form the practical engineering information upon which are based the compatible color television standard adopted by the FCC.

The book covers the development of color television, the NTSC color television standards, subjective aspects of color, the color video and synchronization signals, field tests of compatibility, color performance, networks, transmitters, color films, processes, transmission equipment, and definitions of color television terms. An appendix contains the FCC rules and regulations concerning monochrome and color broadcasting.

## New Audio Controls

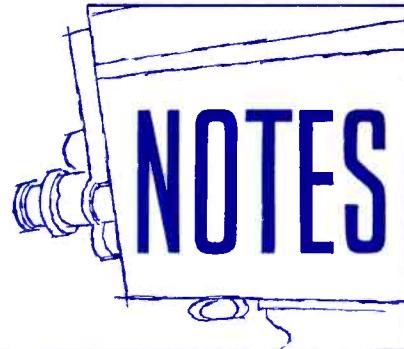
*Continued from Page 11*

console. Monitor can be switched to either channel and volume controlled on console. Input to transmitter can be transferred to another control room by a switch on the console. "On Air" and "Rehearse" lights operate automatically.

Altec designed and manufactured rack contains all amplifiers, power supply, and relays.

Each microphone has its own Altec 428 plug-in preamplifier. Four A-820B's are used as boosters. Three A-429B amplifiers are used as line amplifiers and two A-429B's as power amplifiers. Five A-532B's used as power supplies. All amplifier inputs and outputs on jack panel. All relay racks wired, operated by controls on console. Each power supply has its own fuse, switch and pilot light.

# Technical



## Another 110-Degree Tube

Sylvania Electric Products Inc. will start commercial production of light-weight line of television picture tubes with 110-degree magnetic deflection before the end of 1956, W. Herbert Lamb, general manager of the Television Picture Tube Division, has announced.

The new tube is 20 per cent lighter than, and "represents major advances over presently popular 90-degree deflection type tubes using conventional face plates," Mr. Lamb stated.

In announcing Sylvania's production plans for the new tubes, Mr. Lamb said that the new light-weight designs, "should not be confused with recently announced tubes which utilize a conventional and heavier type of face plate with a 110-degree glass funnel." Mr. Lamb explained, "Although Sylvania will also begin commercial manufacture of the tubes with a heavier face plate before the end of this year, such tubes do not offer the ultimate in weight savings." (We reported RCA's 110° tube, last month.)

## Low-Energy Electrons

It has been known since 1926 that when electrons of relatively low energy (less than 150 kev) strike a solid surface, some of the scattered electrons lose energy in small amounts that are characteristic of the solid. The same result, a kind of line spectrum of energy loss distribution, is obtained when the electrons are scattered by passage through thin layers of solid. Although a number of investigations of the effect have been reported in the last quarter century, considerable uncertainty remains in regard to both the experimental findings and their theoretical interpretation. Much greater attention, in fact, has been directed to the scattering of high-energy electrons, with interest centered on interactions with nuclei.

Seeking a better understanding of low-energy scattering, the National Bureau of Standards has

been conducting a systematic exploration of this phenomenon. The program, now in its fifth year, has been directed by L. Marton, chief of the Bureau's electron physics laboratory. L. B. Leder, T. F. McGraw, H. Mendlowitz, and J. A. Simpson have conducted much of the research; and, more recently, U. Fano, chief of the nuclear physics laboratory, has contributed theoretical analyses. The program is supported by the Office of Naval Research, the Atomic Energy Commission, and the Bureau.

## Stepped-Up Research

The National Bureau of Standards is increasing its studies of radio phenomena, with one new personnel addition and one staff change. Dr. William Culshaw, an English physicist who has successfully applied optical methods to the study of millimeter radio waves, has joined the Boulder Laboratories of NBS to continue this work. He'll be trying to make a precise determination of electromagnetic wave velocity by studying millimeter waves.

Meanwhile, Mr. Alan Shapley, a radio physicist, has been named to head a new section on sun-earth relationships. He'll direct a study of the sun and its effects on radio communication, the use of solar and geophysical data to forecast short-wave radio communication conditions, and the scientific coordination of the Bureau's many field stations making radar-type observations of the upper atmosphere.

## World's Highest Tower

Belgium is planning to build the highest tower in the world as the main attraction for the Brussels World's Fair in 1958. The proposed "vertical city" will be about 400 feet higher than the Empire State Building. The plan, which has been approved in principle by the Belgian Cabinet, provides for a 1,639 conical skyscraper carrying a

442-foot television mast, bringing the tower's total height to 2,081 feet.

The main trunk building, rising to 1,475 feet with a diameter of 262 feet at the top, would contain 30 floors housing radio and television studios, exhibition halls, and a telecommunication school.

A smaller 163-foot-high section on top would contain another 10 floors. Eight of these would be used for the technical services of radio and television, an observatory, a meteorological office, and other observation stations, while the last two would be used as a restaurant and a terrace capable of holding 1,500 persons at a time.

The television mast topping the giant tower would allow television programs to reach all parts of Belgium without the use of relay stations.

Part of the mast would contain a powerful radar aerial which would make the building a watch tower for the country's military security.

A storm of controversy has arisen around this Tower of Babel, and time will tell whether this TV spectacular will become a reality.

### Switchboard Eye

Science has now developed an electronic eye device which permits blind persons to operate telephone switchboards. Weighing less than an ounce, the device fits the index finger's tip and is the only additional equipment a blind operator needs.

When the signal for an incoming call sounds, the blind operator finds the light indicating the correct line by using the electronic eye attached to the index finger. On reaching the lighted lamp, the transistor device is activated, and the operator hears a signal through the headset. It is so tiny, the cord connection can be held in the same hand.

The light-sensitive unit was developed by Bell Laboratories in New York.

### Prediction for 1975

The only thing that today's television viewer might recognize in the television of 1975 is its name, according to Don G. Mitchell, Chairman-President of Sylvania Electric Products Inc.

In a recent statement Mitchell said: "The small picture and bulky cabinets of 1946 are a far cry from the big, beautifully designed and highly dependable sets that are coming off our assembly lines today. And by 1975, we probably will look back on these magnificent 1957 sets as model T's.

"I see television 1975, as a built-in entertainment system, much the same as our heating systems are built into today's homes."

"Today the idea of television in one room is

pretty well dispelled by the growing number of portable television sets.

"But in 1975, portable TV probably will be used almost exclusively as a portable radio is used today, that is, outdoors on picnics, at the beach and in boats," the Sylvania executive said.

"In the home, we'll have flat, picture-frame type television on the wall in every room. The TV signal, from every available channel, will be picked up by one central receiving unit and the viewer can select any channel for any room."

### Color TV Mail Course

A complete correspondence course on color TV is being offered independent radio and TV servicemen by Sylvania Electric Products Inc. Prepared by the Radio Training Association, the material on color TV is designed to keep independent servicemen abreast of this new outgrowth in the television industry. Totaling 14 lessons, the material has been written from the viewpoint of the serviceman. It covers all aspects of convergence, purity, circuitry and associated fields.

Each lesson will have an examination sheet attached. Examination papers will receive individual attention. The complete course will be available to servicemen through the purchase of receiving and picture tubes from Sylvania distributors.

### Muffled Teletype



The news staff of WTTM, IBEW-contract station in Trenton, N. J., has its teletype near without the accompanying clatter. A plywood box, lined with acoustical tile muffles the noise. A slot in the rear lets the news flow.

# Station Breaks

## New WBZ-TV Tower

WBZ-TV, Boston, which employs IBEW engineers, hopes to have its new 1200-foot tower completed by New Years Eve. The tower, which stands 1,349 feet above sea level, is being made available to all vhf stations in the Boston area.

The mast will be topped by a custom-built 6-bay superstile antenna. It replaces an antenna set-up which was destroyed by Hurricane Carol in August, 1954.

## Station Aid in Duluth

KDAL, Duluth, Minnesota, came to the assistance of a rival operation November 2, after fire swept the building occupied by WBEC. K DAL, manned by IBEW technicians, offered WBEC the space from which it customarily originates its remote programs, and WBEC went on the air with a loss of only 10 minutes of broadcasting.

## Plans for Conelrad

The Conelrad operation—whereby clusters of stations operate intermittently on either 640 or 1240 kc during an air raid alert—has been under recent attack from Civil Defense authorities and other groups. One complaint is that Conelrad signals do not reach out far enough to be useful in relaying information to evacuees and other persons seeking shelter outside metropolitan areas.

So now FCC is studying plans for widening the coverage—particularly for Civil Defense warnings on fall-out.

## Announcement Killed

The FCC announced, last month that it is now all right to drop the old far-too-familiar, "This is a recorded announcement"—except where the time element is significant.

In a final-rule-making decision, effective November 7, the Commission agreed that only one such announcement will henceforth be necessary during the broadcast day when delayed broadcasts,

common during daylight saving time, are used. This may come at the beginning or the end of the day, at the option of the broadcaster. The new rule applies to AM, FM, and TV.

An appropriate announcement, either at the beginning or end of a program will still be required for recorded programs or material where the absence of such an announcement may lead listeners or viewers to believe that the program is a live, instantaneous broadcast.

## Local Office Moves

Radio and Television Technicians Local 202, San Francisco, has announced the removal of its office to 2450 Seventeenth Street, San Francisco 10. The telephone number is Market 1-7786.

## Birmingham Settlement

A prolonged strike of IBEW Local 253, against WAPI-AM-FM, and the affiliated WABT (TV), Birmingham, Ala., began drawing to a close this month. The strike had been in progress 70 weeks, and it had been marked by various forms of intimidation.

Joe S. Harmon, local business manager, and Henry P. Johnston, president of the three Alabama Broadcasting System stations, jointly announced that an amiable settlement had been reached, which was satisfactory to both sides.

Among the issues in dispute were work by supervisors and control board operations.

The strikers drew strong support from the public and from organized labor in the area. A full-page advertisement in the local Sunday newspaper sponsored by the United Auto Workers gave a boost to the cause.

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