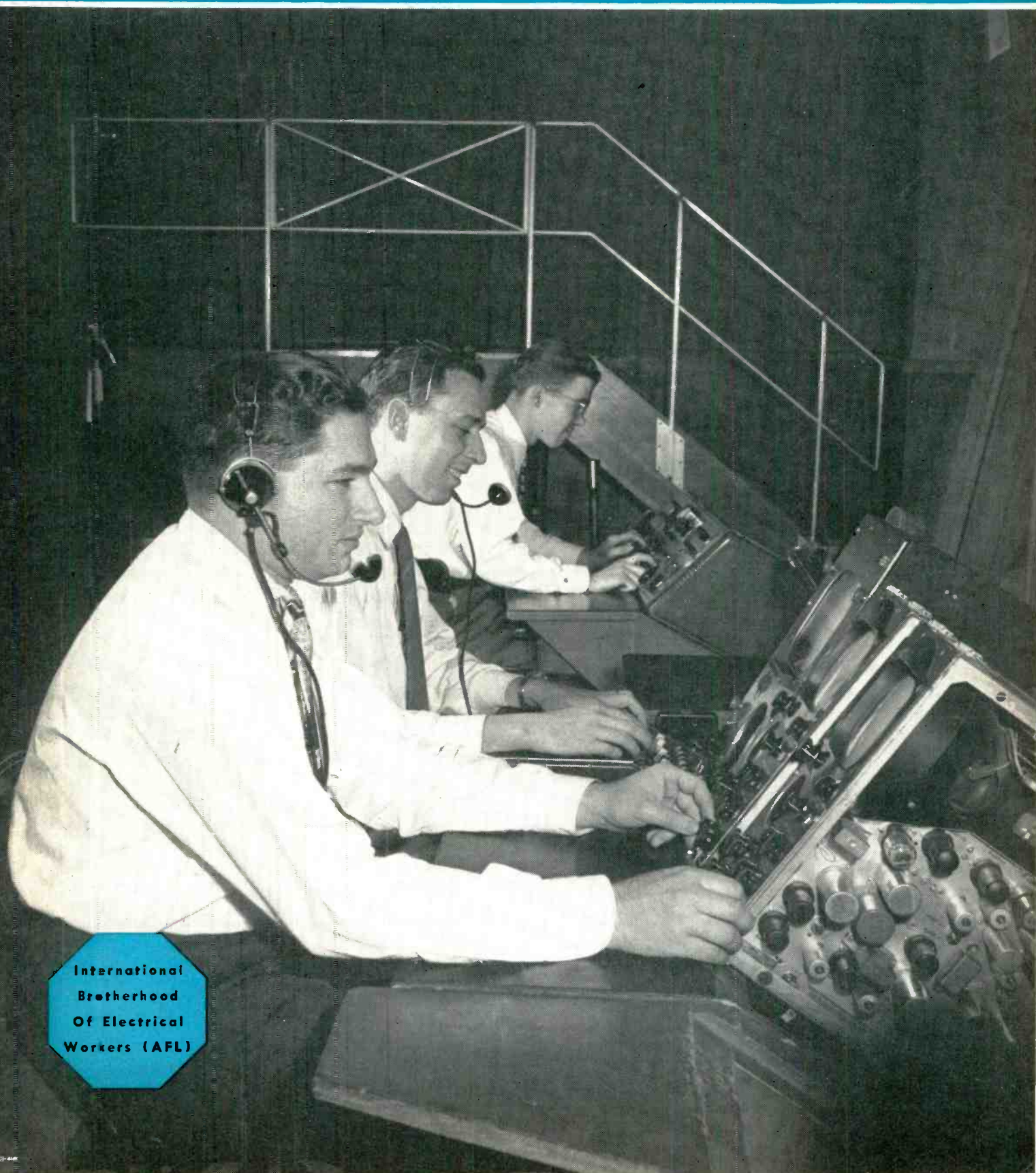


RADIO, TV and RECORDING

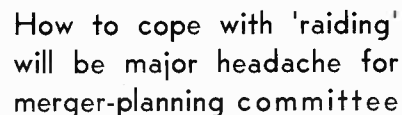


TECHNICIAN-ENGINEER

APRIL, 1953



International
Brotherhood
Of Electrical
Workers (AFL)



WILL the ingredients jell this time?

The following statement was issued, April 7, by the joint meeting of the AFL and CIO Unity Committees:

This month, preliminary studies are continuing at both AFL and CIO offices, in preparation for the resumed discussions in June.

Technician-Engineer



IBEW Charges FCC Refusal To Hold Hearings on Rules Changes Is Arbitrary and Against the Public Interest

Despite a stay action on March 6, following a petition by the IBEW, the Federal Communications Commission permitted the controversial rules changes to take effect by a split decision

D. W. TRACY, President of the International Brotherhood of Electrical Workers, charged, April 10, that the decision of a four-member majority of the Federal Communications Commission violates every American tradition of fair play in ordering, *without hearing*, a drastic revision of the present governmental regulations of engineering standards at AM and FM radio broadcast stations. Mr. Tracy emphasized the statement in the dissenting opinion of the Commission that the majority refusal to hold a hearing "*assumes an unwarranted risk with the public interest.*" The revised regulations became effective April 15.

The FCC's most recent action—or lack of action—permitting the revised operator rules to take effect without further hearings, written or oral, came despite repeated appeals and filings by the IBEW. It appeared for a time, six weeks ago, that the FCC would vindicate its surprise action of February 4, which called for the rules changes to take effect. A petition from the IBEW to stay the rules changes was accepted and the stay action postponed. On March 26 a subsequent petition was denied.

President Tracy's Statement

President Tracy's statement was distributed to press associations and all communication media, as well as to every Senator and Representative in Congress. The full text follows:

"The majority decision of the Commission provides for the regular authorization of remote control operations of unattended transmitters in a manner which impairs the CONELRAD program, a vital part of the civil defense plans of the Government. The majority decision also makes a mockery of the congressional requirement in Section 318 of the Communications Act which specifies that only *licensed* operators shall operate radio station transmitters. The Commission majority has nullified the licensing requirement by authorizing persons holding so-called 'restricted radiotelephone operator permits' to operate radio transmitters. No examination is required for a permit. The applicant for a permit need only mail in an application which certifies that he

can receive and transmit spoken messages in English, that he can keep a 'rough written log' in English or in a foreign language which can be translated into English, and that he is 'familiar' with applicable law and rules.

"The IBEW has charged in written communications to the Commission that serious consequences may result from the Commission order in terms of impairment of the national defense, widespread unemployment among licensed radio engineers, and reduction in the efficiency of the radio broadcasting system. The majority decision does not deny this charge but, nevertheless, arbitrarily refuses to give the radio engineers a full opportunity to be heard.

"The majority itself states: 'Granted that serious consequences may result from the Commission's action, the *question still remains* whether further proceedings will serve any useful purpose.' There is absolutely no connection between the premise and the conclusion in this statement of the Commission majority.

"The majority decision of the Commission seeks to justify its refusal of a hearing by stating that 'In summary, our conclusions concerning the amendments were based on *careful consideration* of the *voluminous comments* received. . . .' This is a lame excuse. The majority decision itself characterizes the 'voluminous comments' which it gave such 'careful consideration' as 'contradictory' and states that 'most of the conflicts engendered by these comments are *based on opinion, surmise, or prognostication.*'

Cannot Accept Validity

"Neither the public nor organized labor can accept the validity of the majority's action on the basis of faith or the so-called 'experience' of the Commission. The majority decision contains such damaging admissions as the following: '. . . we cannot at this time forecast whether such steps may be necessary or the nature of steps that may possibly be required.' '. . . cannot now be predicted.' '. . . evaluation of this factor at the present time is impossible. . . .' The ma-

Continued on page 5

DISSENTING OPINION OF COMMISSIONER HENNOCK

I believe that the IBEW Petition for Reconsideration should be granted to the extent that it requests further hearing, including oral argument, before the Commission.

The amendments approved by the Commission radically revise present rules by lowering operator requirements and encouraging remote control operation of a substantial number of this country's radio stations. In doing so, the amendments raise serious questions of such great import to the public interest as to require the Commission to afford the fullest possible hearing prior to their final adoption. This the Commission has not done.

There is a very real possibility that these amendments may prove to have an adverse effect upon our national defense effort, particularly so by impairing the effectiveness of the CONELRAD program. Also involved here is the question of maintaining the prevailing level of efficiency of our entire radio broadcasting system, as well as the reservoir of skilled radio technicians that is required for both ordinary and emergency operations if the total responsibilities of that system are to be met. The Commission admits the vital importance of the issues raised here. Yet its final action is based upon what is, in essence, a "part-way proceeding." And it should be clear that anything less than the most complete Commission consideration assumes an unwarranted risk with the public interest.

In particular view of the current international crisis, a heavy burden of proof should rest upon those who advocate substantial amendments designed to weaken rather than strengthen existing safeguards. This burden is not met until the Commission can upon a full and complete record determine, with a high degree of assurance, that these changes will not impair the public interest. The Commission's admitted "inability to forecast" what future steps may prove to be necessary to protect the CONELRAD program only serves to underscore the need here for the cautious and fully considered approach.

In an ordinary case it may be a defensible position to adopt amendments without the most exhaustive prior study but with a "weather eye" kept open to avert such harmful results as may arise. Yet it is scarcely consistent with the vital nature and the special circumstances of what is here entailed to follow such procedure here. For severe or irreparable harm might occur in the interim before effective counter-measures could be taken. As but one example, these amendments may very well dissipate, beyond practicable repair, the labor force of skilled, radio operators that is now available.

For these reasons the Commission should order further hearings and certainly permit the IBEW and other parties the opportunity for oral arguments before it on this matter.

The dissent to the Federal Communications Commission decision to deny the petition of the IBEW for reconsideration came from Commissioner Frieda Hennock. Two Commissioners (Sterling and Merrill) did not participate in the decision. Hence, the rules are in effect as the result of the vote of four of its seven members (Hyde, Walker, Webster and Bartley).

Continued from page 3

jority members further concede that 'We recognize that in the case of remote control, the expenses involved to effect such a switch may constitute a deterrent to voluntary CONELRAD activity.'

"Notwithstanding these admissions, the Commission has changed the regulations at the request of one side to the controversy and refuses the other side an opportunity to present its views at a hearing.

"The revised regulations have been under consideration by the Commission for a full year but the Commission could not find the time for a hearing open to the public during this lengthy period of time. This is

in decided contrast to the provision of full hearings in other rule-making proceedings, such as chain broadcasting and color television, which have the same status under law as the licensing and remote control regulations.

"The justification offered by the majority of the Commission for refusing a hearing is incoherent, inconsistent and illogical. It is also a repudiation of the Commission's undertaking expressed in its Notice of Proposed Rule Making that 'if any comments are received which, considered with the petition, appear to warrant further proceedings, notice of time and place will be given such interested parties.'"

Other FCC Actions of the Past Month

CONELRAD Begins May 15

The FCC announced April 10, that the "Conelrad" plan for radio station broadcasting during threatened or actual air attacks will go into effect May 15.

The FCC amended its broadcasting rules to permit the previously announced plan to operate.

The "Conelrad" (control of electromagnetic radiation) plan is designed to keep enemy aircraft from using radio beams as navigational guides.

It permits AM radio stations participating in the plan to broadcast civil defense instructions, official information and news during air alerts. They must jumble their frequencies to minimize the use of radio signals as a navigational aid to hostile aircraft.

FCC Warns of Permit Delay

The FCC has warned Congress that it may take five years to wade through applications for television station permits unless it gets more money for extra workers.

FCC Chairman Paul A. Walker told a House appropriations subcommittee that his agency has been swamped with more than 1,000 applications since it ended a three-year freeze on TV station construction last year.

Walker testified before the subcommittee on February 26, behind closed doors. His remarks were made public recently.

Walker said 550 pending applications are contested, with more than one person seeking the same license. That requires a hearing.

FCC Stands Pat on Color

The FCC said, March 31, that it is standing pat on its approval of the CBS "incompatible" color television system until RCA or somebody else proves for sure there is a better system.

FCC Chairman Walker rejected an RCA request that the government authorize RCA's "compatible" color system right away and let the public judge which is better.

Walker told the House Commerce Committee that "public choice from among several color systems becomes a snare and a delusion."

He said the public wouldn't have real freedom of choice unless they bought two sets of receivers—one for CBS and one for RCA.

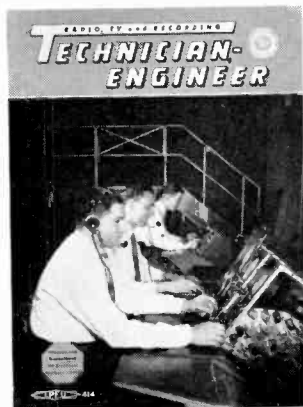
"And finally," Walker testified, "it must lead inevitably to a most inefficient and even wasteful use of the all-too precious radio spectrum."

Educational Television

Some members of the Senate Commerce Committee urged the FCC to extend its June 2, freeze date on 242 television channels now reserved for non-commercial, educational stations.

FCC Chairman Walker told the Committee that the reserved educational channels would not expire automatically on June 2. But beginning on that date, he said, the commission would begin receiving commercial applications for the channels now reserved for educational purposes.

He was met with criticism from Republican and Democratic Senators alike who expressed belief that state governments and educational institutions had not been given adequate time to organize TV station construction projects and raise funds.



THE COVER

Manning the controls at WCAU-TV, Philadelphia, are Dan Falzani, C. V. Mullen and William Ludes, all members of Local 1241.

Brother Mullen is president of the local union, and Brother Ludes is the recording secretary.



DOWNBEAT—Scene from balcony of the Opera House at start of recording session. The orchestra, some members in shirt sleeves, has warmed up, but Conductor Golschmann is guiding the woodwinds and French horns through a passage for testing purposes. Dick Jones, recording director, stands just behind podium; member of sound crew standing at edge of balcony is silhouetted in foreground. A German-made Telefunken microphone, suspended on wire, was used to catch over-all sound. Above it and left is a standby Telefunken microphone. Sectional microphones for violins, for woodwinds, brass and percussion, and for cello and basses are set up. Recording work was done over a strenuous two-day period.



MIXER—Joe Lansky, New York sound engineer, operates the "mixer." His right hand turns knob which controls the over-all sound picked up by a single microphone; machine has one of these knobs for each microphone used on the stage.

St. Louis Recording Session

RECORDING the playing of a symphony orchestra is a long, painstaking and costly operation. Conductor Vladimir Golschmann, the 90 members of the St. Louis Symphony Orchestra and a six-man sound crew, which included IBEW engineers, recently put more than 10 hours of work and worry into recording three compositions. If the three were played without interruption in concert, the time consumed would be only 68 minutes. Total cost of the project was about \$20,000, some \$15,000 of which went to the musicians.

The orchestra played, as in its concerts, from the stage of Kiel Auditorium Opera House. The sound was

picked up by four microphones, carried to a near-by dressing room where the recording equipment was set up. A hushed atmosphere was enforced; idle onlookers were not allowed.

Golschmann acted in the dual role of maestro and critic. After conducting a movement, he went into a huddle with the recording director and listened to the playback. They bent their ears to every note, every pianoissimo. Where they agreed on performance and sound, the music was allowed to stand.

But frequently they were dissatisfied with such things as balance and blend of over-all sound or the ring of

Photos used here are by Jack Gould of the "St. Louis Post-Dispatch" PICTURES staff and were obtained from Black Star Photos. Information for the story was supplied by Charles Menees, "Post-Dispatch" writer.

a particular note. These portions were re-recorded sometimes four or five times, before given final approval.

Golschmann and the orchestra had an added incentive to do a good job on their latest recordings. They were their first for the Capitol Recording Company, with which the orchestra recently signed a five-year contract. The symphony in recent years has recorded for RCA Victor. Capitol, which footed the \$20,000 cost, sent its classical recording director to St. Louis to supervise.

TOP RIGHT—Golschmann and Jones check signals at the podium. While Jones was in recording room, he and Golschmann talked back and forth over the sound system. During the Franck symphony, Golschmann turned the baton over to Assistant Conductor Harry Farbman, went to the recording room and checked the orchestral sound for himself.

SECOND FROM TOP—As the orchestra records, Jones (second from left) follows the score, gives instructions to engineer at his right who is operating mixer, a machine that blends and balances the sound. At left, Frank Abbey, one of two recording engineers brought by Capitol from New York, operates tape-recording machines. Wilson Dalzell (second from right) and A. L. Gerke, IBEW sound engineers from St. Louis were assisting. Two local engineers were always present. Capitol brought 1,700 pounds of equipment from New York; more than 600 feet of microphone cable was used to complete the recording job.

THIRD FROM TOP—The tape-recording machines whir away. One is making a duplicate recording, just in case. Tape is passing, 15 inches per second, from 2,400 foot reels on left of machines to those on right. A total of 18,500 feet of tape was used by both machines. Tape is of iron oxide on a plastic base; musical sounds are impressed magnetically on iron oxide particles. Tape can capture sound frequencies up to 15,000.

BELOW LEFT—Conductor Vladimir Golschmann (seated) is doubtful as he and Dick Jones, recording director, listen to a playback. They agreed the music was out of balance, sailed into retakes after microphones were adjusted and the brass and tuba were instructed to play more softly. Jones is Capitol's "classical A and R (artists and repertory) man." He once dealt in popular music as pianist and arranger for Tommy Dorsey's band.

BOTTOM RIGHT—This time Golschmann and Jones are pleased with the playback they are hearing. After recordings were completed, tape was taken to New York for editing and intercutting. Latter is ticklish process in which retakes down to a single note are inserted, tiny extraneous noises are erased. Once the tape is made as near perfect as possible, it will be sent to Hollywood, where its contents will be processed into long-play recordings.



How the new US Department of Health, Education, and Welfare will serve you . . .



MRS. OVETA CULP HOBBY
New Cabinet Secretary



Public Health Services



Social Security



Federal Aid to Education

THE Senate was ready to renew its heated debates on the tidelands issue. Senator McCarran had just been permitted to insert an editorial from the *Washington Times-Herald* in the *Congressional Record*.

"Mr. President, there are three important nominations on the Executive Calendar," said Senator Taft from the floor. "I ask unanimous consent that, as in executive session, the nominations be approved. . . . I know of no opposition to these nominations, and that is the only reason why I ask unanimous consent that they be confirmed."

From the chair, Senator Andrew Schoeppel of Kansas, acting president pro tempore in the absence of Senator Styles Bridges, asked that the clerk read the nominations. The Chief Clerk read the nomination of Mrs. Oveta Culp Hobby to be Secretary of Health, Education and Welfare.

Without objection, the 15 Senators present confirmed the nomination.

Native Daughter of Texas

Freshman Senator Price Daniel of Texas then rose to ask that a statement telling the nation how proud Texas was of its native daughter be inserted in the *Record*. The statement was ordered printed, and the Chief Clerk began reading the other nominations of the afternoon.

It was a milestone in American history of tremendous importance but quietly executed.

Thus, on April 10, the Congress completed confirmation of Mrs. Hobby as first Secretary of the new Department of Health, Education and Welfare and tenth member of the President's Cabinet.

The following day her department came into existence.

Department Long Overdue

The uniting of the various offices and units which make up the new department was long overdue. Many were like mushrooms which had sprung up in the fertile social-justice fields of the New Deal. They had grown so broad in scope that they overshadowed many old-time Cabinet departments.

The Social Security Administration, which annually distributes more than a billion dollars, was a particularly large hybrid. The Public Health Service, constantly adding to its National Institutes of Health at Bethesda, Md., was becoming increasingly important.

The new department is really a reorganization and expansion of the Federal Security Agency. Not too much has changed.

The Federal Security Agency, mother hen from which the big and vigorous duckling hatched, was formed

under the big reorganization moves of President Roosevelt in 1939. The New Deal agencies had become so thick that something had to be done. Roosevelt grouped 23 separate agencies and corporations under three large units—the Federal Works Agency, the Federal Loan Agency, and Federal Security. Of the three, FSA has been the sole survivor.

FSA was in direct contact with more Americans than any other department or agency of the Government. It was responsible for the disbursement annually of more than four billion dollars. It had 37,500 employees and more than 800 points of contact with the public.

The new department which emerged this month contains the same line agencies as FSA, so this is what you as a citizen can expect from the Department of Health, Education and Welfare:

Your Social Security Contact

As a wage earner, your primary contact is through your social security card. You're a number in a master file, where your payments to "FSI" or "old age tax" mount up until you're 65, at which time you'll probably retire and receive checks . . . hoping all the time that the dollar will be worth something then.

The Social Security Administration descended from the Social Security Board, which was established under the Social Security Act of 1935. Its Bureau of Old-Age and Survivors Insurance is responsible for the execution of the Federal system of retirement and survivor protection. Retirement benefits go to workers 65 and over, their aged wives or husbands and young children, all depending upon which applies. Survivor benefits are paid to young children of insured workers and their widowed mothers of any age, to aged widows, dependent widowers, and, in some circumstances, to dependent parents.

Since benefits are based on the worker's wages, or self-employment earnings, the Administration maintains individual accounts for all workers under the program. Through regional and field offices located throughout the country, the Bureau helps employers, employees, and the self-employed in establishing earning records. These branch offices help you file claims and assist you with any appeals for earning records or benefit rights.

Public Assistance Activities

The Bureau of Public Assistance, also under the Social Security Administration, is another agency of personal importance to you. Public assistance under the Social Security Act, which provides Federal funds to states for aid to the needy, is administered by this unit. Four groups of needy are served—the aged, the blind, dependent children, and the permanently and totally disabled. All the states, territories and possessions receive Federal funds for old-age assistance. All but one get aid for dependent children and the blind. And 39 receive aid for permanently and totally disabled.

The Bureau, meanwhile, is responsible for determining that the states' plans meet the requirements of the Federal law and that they are administered in conformance with the state's laws. It certifies grants to states and helps states to develop their individual programs.

From the Children's Bureau, still another unit, you may obtain facts and statistics about child care, accidents and disease incidence. Its bulletins for parents, "Parental Care," "Infant Care" and the like are standard texts for thousands of parents. It is a clearing house of information for all matters pertaining to child welfare, both for Congress and the public. This bureau also administers Title V of the Social Security Act, which authorizes grants to states to assist them in developing maternal and child-health services, services for crippled children, and child-welfare services.

Still another valuable service agency of the new department is the Bureau of Federal Credit Unions. Born of the depression of the '30s, this unit furnishes information, charter application forms, and assistance to prospective credit union groups upon request. It grants charters to qualified groups and prescribes the rules and regulations for their administration. It also designs and prescribes standard accounting forms and procedures for operating Federal credit unions, and in other ways helps persons of limited means to obtain credit at reasonable rates.

The Food and Drug Administration protects you from fraudulent merchandise and does other things to insure that your food and drugs reach you uncontaminated and safe to use.

Vocational Rehabilitation

The Office of Vocational Rehabilitation plays an important part in assisting states to set up vocational rehabilitation programs. Disabled workers regain their livelihood through its branch agencies and affiliated groups.

The Office of Education is the guiding unit for the Federal aid to education, a sorely neglected phase of governmental work, always needing funds. Much must be done to obtain better salaries for teachers, better facilities for schools and pupils. The Office of Education is fighting to accomplish these things for your children.

The Public Health Service is one of the oldest Federal agencies, established soon after the founding of the nation. It consists of the National Institutes of Health, which conduct significant research work; the Bureau of Medical Services, which indirectly aids you and your family through medical aid programs; the Bureau of State Services; and Freedman's Hospital, a Negro hospital in Washington, D. C.

These, and other branches of the new department, fulfill a vital function in the growing era of social justice for all.

You've got the floor, brother,

SPEAK UP!

By **RAYMOND A. WOOD**
Editor, Local 1212 News



SO many IBEW brothers have said to me, in effect, "I'd go to meetings, if I only knew what is the proper procedure . . . what my rights are . . . and how to express myself on the floor without getting all fouled up in parliamentary laws . . . What's the use of that stuff, anyway? . . . And, if I *have* to be governed by it, how can I learn enough of it to find my way around without wading through those dry handbooks?"

Well, you, too, can be a power in the local union meeting.

First, the "why" and then the "how."

Local union business meetings are a method, originating in the practices of democratic society, and born of long and painful experience, for expressing the will of the majority and for shaping the mind of the members in attendance. The majority can arrive at its judgment in respect to problems before it only by the freest possible discussion of all aspects and by encouragement of the expression of differences of opinion and differing view points.

It is the easiest thing in the world to create individual antagonisms, if, in the statement of these differences, members now and then become extreme, discourteous or even violent and abusive. Since in such an atmosphere reason and intelligent solutions do not readily thrive, means are needed to reduce the clash of personalities to the bare minimum and yet protect the antagonism of ideas.

SO THE Rules of Order and Parliamentary Practice are created for the purposes so aptly stated in Robert's Rules of Order:—"American Parliamentary Law is built upon the principle that rights must be respected; rights of the majority, of the minority, of individuals, of absentees, and rights of all of these together."

This principle of the recognition and protection of rights can be discerned in all of the rules and devices of parliamentary law. It applies to the officers and to the meeting itself, for it is not infrequent that the assembled membership needs to be protected from itself, as in the case of undue haste in adopting a course of action without sufficient consideration.

Each society or assembly needs certain specialized rules which expedite the transaction of its own peculiar type of business. For instance, the Congress has rules, in the House of Representatives, which authorize any 15 members to compel the attendance of absentees that limit each member to one hour of debate on any question; that the motion to suspend the rules can only be in order on the first and third Mondays of each month.

WE IN local unions of the IBEW have such specialized rules laid down in the Constitution. You will find them on page 45 of the Green Book. These rules are better adapted to our needs than more strict interpretations as used by large assemblages. Example:—The right of a member to speak twice to a motion, where the more rigid practice is to limit debate to one presentation only.

Bearing in mind that our only legitimate purposes are to find out the will of the majority and to shape the mind of the meeting, within the bounds of reason rather than passion, let us look at the "how" of presenting our propositions to the meeting. For an orderly flow of action in the limited time available to us in a given meeting, we need a control channel. This is the function of the Chair—our Executive Officer. It is the duty of the Chair to do three things—safeguard the rights of each member (preserve order); see that debate is kept to the limits of respect and propriety (preserve decorum); and to handle the business of the meeting smoothly and speedily (procedure).

The Chair insists that each member observe the rules. In electing him to the office, the members have agreed that he shall be the one to administer the law governing meetings. Our familiarity with the rules and procedure will help him accomplish the task.

There are, however, limitations placed upon his power. He may not himself make a motion, nor may he take part in debate while in the Chair, since to do so would be to take an unfair advantage of his position. He must, if he cannot refrain from expressing his opinion, call upon the vice president or some other member to preside in his place while he speaks from the floor like any other member and becomes subject to the same rules. When the question has been decided, he resumes the Chair.

Nothing may properly be discussed by the meeting until it has been presented in the form of a motion or

resolution. A resolution is a motion which has been put in writing and preceded by the reasons for its presentation—the “whereas’s.” It is treated exactly the same as a motion. Its advantage is that the reasons can be stated first, where a motion must be stated orally, then seconded, before you can present your arguments for it.

The proper method of presenting a resolution is to offer it for reading by the secretary. By so doing, you do not yield the floor, and, then, when it has been read, you may then immediately move that it be adopted.

EDITOR'S NOTE: More information regarding parliamentary rules for local union meetings will appear in a subsequent issue of THE TECHNICIAN-ENGINEER.

Reading Time

Your TECHNICIAN-ENGINEER begins this issue a regular feature—“Reading Time”—which will bring you brief summaries of current books in electronics and labor relations . . . books which may be valuable to you in your job. If you, the reader, would like to call the attention of your brother engineers to certain books send us the necessary data about the book and a few paragraphs of comment, and we shall be happy to use it in a future issue.

Servomechanisms and Regulated Systems Design by Harold Chestnut and Robert W. Mayer. 505 pages, 250 illustrations, New York: John Wiley & Sons, Inc. \$7.75

Two men from the Aeronautics and Ordnance Systems Divisions of the General Electric Company, the authors of this book, have produced what might be considered a thorough grounding in the principles of feedback control, which should be valuable as a text for advanced engineering courses.

The book presents the feedback control problem with the objective of training design and application engineers. It starts from the basic mathematics, describes the physical problems involved, and proceeds to the solution of advanced designs.

It emphasizes the feedback control concept for regulators and servomechanisms, and the attenuation concept for use in regulators as well as servomechanisms.

In conclusion, it prepares the way for advanced design work which will be contained in Volume II, scheduled for later publication.

Management Strategy in Collective Bargaining Negotiations. 198 pages. National Foremen's Institute, New London, Conn. \$5.50

With this handbook, a well-known publishing house devoted primarily to management's publications offers “the inside information needed to deal successfully with labor and unions.”

The publisher asks employers: “When a union knocks at the gate . . . when your new labor contract is again ready for renewal, will you know what to do in order

to come out of the negotiations with the certainty that you have conducted your collective bargaining as wisely as possible?”

The answer National Foremen's Institute hopes for is “no.” The solution for the boss: Buy this book.

Even though the book is produced as a tool for management, it may be of some value to a union negotiator for the insight into management views which it presents. On the management side of the fence, it might help some employers to understand many problems of negotiations, which they often leave to their attorneys or personnel officials to solve.

The book has an index to specimen contract clauses. It has a section called “Why Unions Act As They Do” and explains conduct at the bargaining table.

Vacuum-Tube Oscillators by William A. Edson. 268 illustrations, 476 pages. New York: John Wiley & Sons, Inc. \$7.50

A full-length treatment on the subject of vacuum-tube oscillators has been published in America for the first time with this volume. The publication contains excerpts from scattered books, journals and bulletins, which are brought together and systematized for easy reference. The publishers point out that each of the book's 18 chapters are self-sufficient, which makes the volume useful as a handbook.

Two facts are stressed throughout the book: (1) the behavior of oscillators is predictable, and (2) circuits *can* and *should* be designed to meet specific needs—to replace cut-and-try methods.

Whether you're concerned with the oscillators in radio and television transmitters and receivers, whether you design vacuum tube oscillators for radar sets, whether you work with test apparatus or control devices employing vacuum tube oscillators, or, if you're just interested in knowing something about oscillators, this book has something for you.

Some sample chapter headings: Transient Behavior of Linear Systems, Negative Resistance Oscillators, Non Linear Oscillations, Feedback Systems and Stability Criteria, Automatic Frequency Control, etc.

Electronics of Solids

A vast new field for scientific development opened with the discovery of the transistor and its accompanying electronics of solids.

DURING recent years scientists of the Western World have been realizing in the laboratory the fulfillment of dreams which began centuries ago in the ancient land of Greece.

Since ancient times it has been known that a certain mineral called lodestone possessed the remarkable power of attracting and holding metals. Man later discovered that by rubbing a bar of steel against lodestone he could make the steel magnetic, too.

But what was the use of such a metal? To pick up inaccessible objects, yes. But what else?

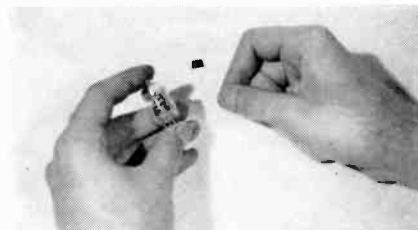
The knowledge of magnetism languished through the centuries. The alchemists of Medieval times studied it as a possible avenue of producing man-made gold. Faraday began to scientifically define the strange properties of certain solids. Galileo and later astronomers gave substance to the magnetic principle with the compass. Curie discovered the radio activity of radium, and other solids were found to have electronic properties.

Through the fates of research, science hit upon the principles of radio, and from the crystal detector man moved swiftly into the amazing possibilities of the vacuum tube.

The study of the electronics of solids almost vanished



• With this apparatus at Bell Telephone Laboratories, some of the first investigations leading to the discovery of the transistor were made. Seated is Dr. William Shockley, who initiated and directed the Laboratories' Transistor research program. Standing are Dr. John Bardeen, left, and Dr. Walter H. Brattain, key scientists in bring the invention to reality.



• The small black object shown above is a transistor, a tiny amplifier which threatens to completely change electronic design. For size comparison, it is shown with a miniature commercial vacuum tube which does about the same job. Transistors have been called the first serious rival of the vacuum tube. Requiring a millionth of the power of miniature vacuum tubes, they will amplify electrical signals about 100,000 times.

into academic theory for many years, until just a few years ago. Meanwhile, vacuum tube development flourished.

Two things raised it swiftly from oblivion—"the atomic age" and the development of the transistor.

Atomic research brought man the increased ability to change molecular structure. Metals can be made radioactive; they can be neutralized; they can be changed to other elements.

Men at Bell Laboratories found that a small specialized form of germanium, a grayish-white, brittle, metallic element, had the same electronic properties as the complex vacuum tube. They began feverish research with the transistor, as the germanium unit was called, and soon developed junction-type transistors and point-contact-type transistors. Other laboratories took up the research, and men in the electronics field hailed the new development as the greatest thing since the vacuum tube . . . greater than the development of television.

Says David Sarnoff of RCA: "In recent years a vast new field for exploration and development called 'electronics of solids' has opened in the scientific world. So impressive are the developments, and so important the potentialities for the future, that scientists are acknowledging electronics of solids as one of the most dramatic steps in technical progress."

A more conservative, but still optimistic, view is voiced by Hugo Gernsbeck, editor of *Radio-Electronics*. Says he: "With the recent advent of the transistor, the vacuum tubes will in the foreseeable future be in eclipse, although they will always be with us. Transistors will never completely supplant the ubiquitous electron tube. The time will soon arrive when the transistor will begin to revolutionize the radio-electronic industry."

His prediction seems to be coming true sooner than many have expected. Shortly after the advent of the transistor, hand-made specimens sold for around \$18 apiece. Recently the price was down to \$8 each. This, of course, is only the beginning. Once a satisfactory

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Measuring

TRANSMISSION LINE ATTENUATION

**Summary Technical Report #1699,
National Bureau of Standards**

• Sliding probe used in the new NBS method for measuring the attenuation of balanced transmission lines. The probe is made of polystyrene foam and is designed to hold a small pick-up loop at a constant distance from the line. A rectifier and filter circuit, composed of 500-ohm resistors and 500 uuf capacitors, is built into the probe. The d-c output of this circuit is connected to a galvanometer that indicates magnitude of the standing waves along the line.

A NEW method for measuring the attenuation of balanced, unshielded transmission lines, such as those used in television and FM receivers, has been developed by R. C. Powell of the National Bureau of Standards.

The new procedure is simple and rapid, and requires only easily obtainable laboratory equipment. By using a grid-dip meter and a microammeter, for example, results reproducible to better than 10 per cent can be obtained. With more elaborate apparatus, reproducibilities of better than one-tenth of 1 per cent and attenuation values to an estimated accuracy of 1 per cent are possible for uniform sections of line.

The apparent attenuation of unshielded, balanced, parallel-conductor transmission lines is sensitive to the amount of radiation that occurs along the line. In determinations of attenuation at frequencies between 30 and 300 Mc, external effects arising from the test apparatus, connectors, terminations, and bends often cause variations in the measured attenuation. Thus a suitable measuring method must account for these inconsistencies by either reducing the external effects or by evaluating them and including the information in extensive calculations.

Standing Wave Ratio Greater

The NBS method for measuring unshielded lines is based on the fact that if a section of line a number of half-wavelengths long is resonated when both ends are shorted, the standing wave ratio at the receiving end will be greater than at the input end. Furthermore, the change in SWR is due only to the attenuation in the line. This fact makes it possible to determine the attenuation merely as a function of the standing wave ratio, that is, the ratio of the maximum to the minimum current in the line.

To avoid errors introduced by improper terminations, the test transmission line is rigidly fastened and held

in tension by clamps of low-resistance materials that also act as good short circuits to the electric field. A coupling loop built into the input-end terminal loosely couples the output of a conventional power source to the line. A similar loop is part of the receiving-end termination, and its output is connected to a crystal rectifier and filter circuit. The minimum and maximum currents (the standing waves) are detected by a sliding probe made of polystyrene foam or a similar material. The probe is designed to hold a small pick-up loop at a constant distance from the line. In this way, irregularities in the line are compensated and, at the same time, the loop interferes as little as possible with the fields of the line. An additional rectifier and filter circuit is also built into the probe.

Leads Connect to Shunt Controls

The d-c leads from the probe and the receiving-end terminal networks are connected to a switching arrangement that controls a shunt on a sensitive galvanometer. The shunt is designed to permit maximum deflection for both maximum and minimum readings, to give critical damping to the galvanometer, and to provide a constant-output resistance for the filter networks.

In making a measurement, the galvanometer is first connected to the receiving-end terminal, and the generator frequency is adjusted to the resonant frequency of the line, as indicated by a maximum deflection on the meter. (If the measurement is to be made at a particular frequency, the line may be cut to a length equal to some multiple of the wavelength). The power source is then adjusted so that the amplitude of the detected radiation is at some convenient level, and the value of the galvanometer deflection is noted. The galvanometer is then switched to the probe circuit through the shunt, and the probe is moved along the line, near the input terminals, until a maximum current is indicated by the galvanometer. The generator frequency and the output power are readjusted to the original resonance and current values to compensate for the probe movement. The deflection of the galvanometer and the position along the line of the probe at the point of maximum current are then noted. The same pro-

cedure is repeated for the minimum current position. The standing wave ratio is obtained from the values of the minimum and maximum currents, and from the SWR the attenuation is derived.

In order to accurately obtain the standing wave ratio, the probe-filter circuits-galvanometer system must be calibrated at the operating frequency. The probe is set at a convenient position near the input end of the transmission line—a point of maximum current. The input signal is then varied by known amounts of power, voltage, or current so as to effectively reproduce the standing wave conditions normally experienced by the probe as it is moved along the line. The input signal is measured by conventional laboratory apparatus (calibrated attenuator or voltmeter), and the resulting galvanometer deflections are then calibrated in terms of the standing wave ratio introduced into the system. The attenuation of the line is approximately equal to the arc hyperbolic cotangent of the standing wave ratio, a value that is obtainable directly from most handbooks of mathematical tables.

Acceptable Results Obtained

Although galvanometers and extensive generating equipment are used for these measurements by the National Bureau of Standards, very acceptable results can still be obtained by using a low-power generator, such as a grid-dip meter, as the signal source to be coupled into the line. Likewise, the standing waves along the line, detected by the probe, can be measured by a sensitive microammeter.

Other methods previously developed for this type of transmission-line attenuation measurement attack the problem from various directions. Some resort to the use of extensive equipment and require lengthy calculations. Others use substitution methods in which known attenuations are inserted in series with the line and the output power is adjusted to the same value for both conditions. Still others depend upon the change in the resonant frequency of a system containing the line to be measured; such techniques require accurate evaluation of the operating frequency in order to obtain accurate values of attenuation.

Circuit Matching Unnecessary

When the NBS method is used to measure the attenuation of the transmission line, matching of the line to a measuring or monitoring circuit is unnecessary because the line is terminated in short circuits. The necessity of changing the lines during a measurement and using connectors of any kind is also eliminated. With the shorted input, balanced conditions are easily obtained. If the generator is capable of supplying sufficient power, the effect of the probe and coupling loops is negligible. The greatest advantage of this system, however, is its simplicity and speed and the fact that only easily obtainable apparatus is needed.

Will Your Local Union Be Represented at Kansas City?

Plans for the second Annual Progress Meeting of the IBEW Radio, TV and Recording Division are progressing steadily. Hotel registrations are flowing steadily into Kansas City. Will your local union be represented?

The meeting will be held June 18, 19, and 20 at the Hotel Bellerive at Armour Street and Warwick Boulevard in Kansas City, Mo. The necessary blanks for registration and hotel reservations have gone out to all local unions with broadcasting or recording members. Reservations should be made as soon as possible, with requests being addressed directly to the Hotel Bellerive reservations clerk, with duplicate copies going to the International Office in Washington and to the local union.

Electronics of Solids

Continued from page 12

method to mass-produce the elements can be achieved, the price will be lower than present vacuum tubes.

Delaying mass production is the elemental quality of germanium. The element, germanium, contains certain impurities. These impurities must be controlled to a ratio of less than one atom to every 10 million germanium atoms, some scientists feel, if the mass-produced transistors are to become uniform in temperature range, longevity and electronic functions.

Several companies have jumped into the race toward mass production—RCA, GE, Kemtron, Raytheon, Sylvania, Western Electric, and others.

RCA, especially, has launched into solids. Early this year it began a lecture series on the transistor for 350 engineers employed at its Camden, N. J., plant. RCA engineers have taken transistors made from specks of germanium crystal and produced experimental models of a portable television receiver, radio sets, loudspeaker systems, a miniature radio transmitter, parts of electronic computers, and other experimental devices. These are all lab models, of course, and it may be many months before the first transistor model of anything hits the open market. The military is absorbing much of the present limited production.

One thing is certain: the transistor or its more-refined descendent is here to stay. It has too many advantages—because of its small size, it can whittle transmitter and receiver sizes more than half; because there is nothing to wear out, each transistor should last for a long time, and there'll be fewer replacements; and combined with applied (printed) circuits, the costs of manufacture will go way down.

Technical NOTES

Pacific Coast TV Clinic

To make its television technical training program readily available to western broadcast engineers, the RCA Engineering Products Department will conduct its next clinic on the Pacific Coast immediately following the 1953 convention of the National Association of Radio and Television Broadcasters.

The training clinic, sixteenth in the series to acquaint broadcasters with latest developments in uhf and other advances in television equipment and techniques, will be held at the Ambassador Hotel in Los Angeles from May 4 through May 7.

RCA Victor engineers and equipment designers will present the same comprehensive course that has previously been given in Camden, N. J. In lieu of tours through the manufacturing and laboratory facilities in Camden, RCA announced that plans are being made to enable those attending the clinic to visit broadcasting studios and television manufacturing plants in the Los Angeles area, where latest equipment will be demonstrated.

Complete UHF Station Shipped

A fully equipped uhf television broadcast station, including studio and film programming facilities, was shipped across the continent from the Camden, N. J., plant of RCA to the Biltmore Hotel in Los Angeles for the 1953 annual convention of the National Association of Radio and Television Broadcasters, which opens at the Biltmore, April 28.

The complete TV station, one of the most comprehensive exhibits ever presented to the nation's broadcast industry, provides RCA with the means of displaying effectively new items of uhf equipment, including high-level modulation, air-cooled transmitters and slotted pylon broadcast antennas, as well as complete audio equipment, TV cameras, and other products.

Among the new products appearing in this year's exposition is a 10-kw uhf television transmitter providing broadcasters with more than twice the power of commercial TV transmitters now in use. It is expected to supplant current 5-kw models as new standard equipment for the industry. RCA's 1-kw uhf transmitter,

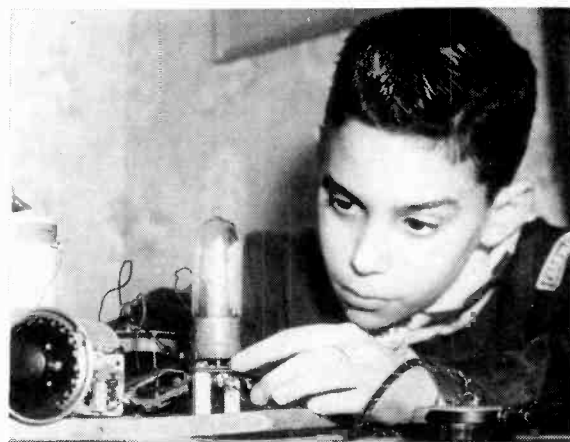
which has been successfully installed in a number of post-freeze TV stations already on the air, will also be shown.

Television station planning, the theme of the RCA display this year, is further illustrated by four model TV stations, complete in every detail and scaled to size.

For radio broadcasters, the company is displaying its 5-kw AM transmitter, audio input mixing and switching equipment, a console tape recorder, new fine-groove transcription turntables, and an extensive line of loudspeakers, microphones, and amplifiers.

Smaller television equipment items to be shown for the first time include a newly developed studio monitoring device known as the RCA Monitran; a dual disc slide projector; a new miniature RCA Vidicon camera designed especially for broadcast use; and a new special effects amplifier with versatile wipe amplifier for achieving dramatic effects on TV.

Son Builds Set With Famous Tube



Nine-year-old Richard Saunders, of Cornwall-on-Hudson, N. Y., is repeating family history as he builds his first home-made radio set with the same tube his father used to build a one-knob, one-tube set over 30 years ago. The tube, a Westinghouse WD-11, has the added distinction of having been the type used in the first commercial radio receiver produced in America. It was also the first dry battery type tube made. Richard's father, Professor Frederick Saunders, head of the foreign language department of New York Military Academy, has kept the tube all these years, largely out of sentiment, remembering the thrills in the Twenties of hearing voices from as far away from New York as KGO, Oakland, Calif., and from Denver, Colo.—and this with a home-made ear-phone type set having only one tube.

Station Breaks



Remote Control for TV?

With the FCC actions of the past month, which revised operator rules and affected the jobs of many technicians and engineers (see story on page 3), has come consideration of possible consequences of the action elsewhere.

Broadcasting-Telecasting, industry publication, has this to say in its April 20 edition:

"Now that remote control operation of radio transmitters has passed muster, attention shortly will be given to same relief in low-power small-market TV. Nearly all new TV equipment is automatic and time lost because of transmitter failures is practically nil—comparable to AM operation. Hence, one such station shortly will ask FCC for authority to operate transmitter remotely."

Management's attempts to cut down on personnel through remote operations continues. We must be alert to further actions with the Federal Communications Commission on this matter.

NABET Signed a Pact

A few weeks ago a CIO NABET spokesman announced that CIO radio and television engineers had ratified new nationwide wage contracts with the American and National Broadcasting Companies.

The story of CIO's "success," as reported by a wire service, was as follows:

Cliff Rothery, chairman of the San Francisco chapter of the National Association of Broadcast Engineers and Technicians said ABC workers approved the two-year pact 408 to 163 and NBC engineers by a vote of 756 to 558.

The agreement—reached just before a strike deadline January 31—called for wage raises of from \$5 to \$20 a week then and similar increases February 1. Previous pay ranged from \$72 to \$143 a week.

The new contract also called for shortening of wage step-ups, with engineers now reaching top scale after four-and-a-half years instead of five, Mr. Rothery said.

(No comments are necessary for IBEW engineers.)

Frisco Area Strike Continues

Local 202's (San Francisco) strike continues against Station KMBY, Monterey, despite the station's recent TV grant. KMBY is sharing time on Channel 8, Salinas-

Monterey, with another company that consists principally of KSPW, Salinas. KMBY and KSBW will have separate studio facilities but a common transmitter, the *202 Radio-Television News* reports.

The combined operation makes station relations somewhat complex for Local 202 engineers, since, heretofore, they did not have a "beef" with KSBW. Recently, however, KSBW fired an IBEW engineer, reportedly for his union activity, and an unfair labor practice charge was leveled against the broadcasting station.

Big Show in the Twin Cities

Broadcasting engineers of IBEW Local 1216, Minneapolis-St. Paul, will spread the good word about union broadcasting skill and service at the big seventh annual AFL Union Industries Show in the Twin Cities, April 18-25.

Word from Minneapolis has it that engineers of WCCO will set up a broadcasting booth at the show. Bernard Rank, business manager of 1216 has requested banners, posters, etc., from the International Brotherhood.

Meeting a UHF Situation

A young UHF low-power station in Mobile, Ala., WKAB-TV, Channel 48, discovered that its film cameras had fizzled one Thursday evening at 6. The staff immediately jumped in to program the remaining five hours live.

A telecast plea for local talent to come into a telethon for the March of Dimes. Phone contributions drew \$1,100 from 408 callers and supplied map plottings to show the new station what its coverage was.

Coronation Films

British jet bombers will fly films of the coronation of Queen Elizabeth II across the Atlantic, June 2, so that they can be telecast in the United States only a few hours after the big event takes place. NBC and CBS said that they hoped to be able to telecast the first films by 5:00 p. m. (EST).

Technician-Engineer