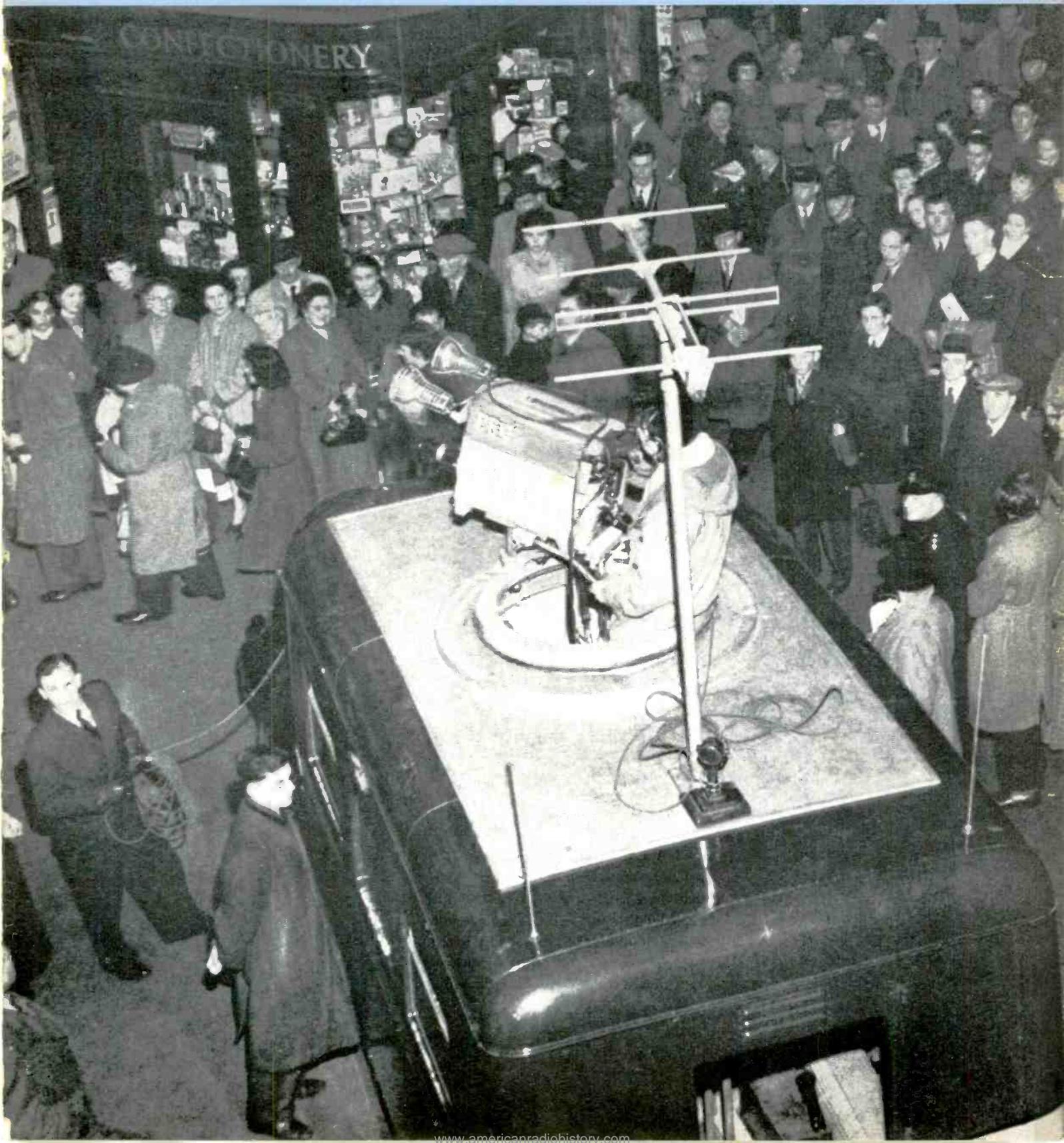


RADIO, TV and RECORDING



APRIL, 1955

TECHNICIAN-ENGINEER



RADIO, TV and RECORDING

TECHNICIAN-ENGINEER

VOLUME 4 17 NUMBER 4

PRINTED ON UNION MADE PAPER

The INTERNATIONAL BROTHERHOOD of ELECTRICAL WORKERS

J. SCOTT MILNE International President
 JOSEPH D. KEENAN International Secretary
 W. A. HOGAN International Treasurer
 ALBERT O. HARDY Editor, Technician-Engineer

. . . in this issue

*IBEW President Emeritus
Daniel W. Tracy Dies* . . . 3

*Continental Television—
a chicken-and-egg problem* . . 4

*How to Present an
Arbitration Case Effectively* . 7

*X-Ray Televising
the Inside of an Engine* . . 10

*WGN Engineers
Cover Two Exhibitions* . . . 12

*Opinion Award Issued
in Film Camera Case* . . . 14

Technical Notes 15

Station Breaks 16

. . . the cover

Waterloo Station, one of London's oldest and most famous railroad stations, is caught at rush hour by the cameras of a BBC "Roving Eye," a small truck equipped with a television camera and sound and vision transmitters. The rig works as a self-contained unit, with no wires connecting it to the mother TV station.

Signals are sent from the mobile unit to a near-by pick-up point over a directional aerial, lined up at the start of a transmission and kept on a constant bearing, regardless of which way the truck turns. This is accomplished by means of a gyro compass.

commentary

The NABET agreements with NBC and ABC have been ratified by the membership involved and the main source of tension in those owned-and-operated stations has been removed. In the sense that even the general public is relieved when a strike is averted, this is good news. According to the trade press, the votes for ratification of the two agreements totaled 1,087, those opposed to ratification registered 853 votes.

On the basis of our present understanding, the contracts are substandard in comparison to IBEW agreements. While some will take the attitude that this whole matter is none of the IBEW's business, it is pretty obvious that IBEW members everywhere have an interest in any agreement written in the industry. More important, in the light of the general feeling that amalgamation plans should be under way, the actions of NABET, its officers and its members are matters of very direct and vital concern. The three-year firm agreement with two of the nation's largest networks cannot be said to be a welcome development.

In an industry so much in the public eye, so permeated with problems of jurisdiction, competition and maneuvers for position, what has been done by one union can be fraught with danger for all unions. Whether the members of one union differ in philosophy and general opinion with members of another is really immaterial—all have a common goal and seek the same ideals and ends. A disservice by one is a disservice to all.

It is the belief of the IBEW that NABET members are quite misinformed about the IBEW. Our policies, administration and service to the membership are matters of record. Most NABET members appear to know little about that record—which some persons have distorted, misinterpreted and generally embroidered to suit their own selfish purposes. Since membership in a union is, in many ways, an investment—an investment of time, money and effort—each individual should investigate what the "market" has to offer. His job security and the welfare of his family are inextricably bound up in the investment of his choice. Now that NABET's crisis has come to a conclusion, let's hope that the members of both organizations in each local area will again turn their attention to unity talks and to recognition of the common interests of all.

Published monthly by the International Brotherhood of Electrical Workers, AFL, 1200 Fifteenth St., N.W., Washington, D. C., for the men and women in the recording, radio and television industries. Entered February 20, 1952, as second-class matter at Washington, D. C., under Act of August 24, 1912. Subscription Price: U. S. and Canada, \$2 per year, in advance.

Distinguished service in labor and government marked late leader's career

IBEW President Emeritus Daniel W. Tracy Dies

DAN W. TRACY, president emeritus of the International Brotherhood of Electrical Workers, a man known and respected by more than 650,000 AFL Electrical Workers, died in Washington, Tuesday, March 22, of a cerebral hemorrhage. He collapsed in the lobby of the Sheraton Park Hotel, where he has lived for many years. Death came swiftly to the veteran labor leader. He was rushed to Garfield Hospital, but passed away before the ambulance reached there.

Funeral services were held in the nation's capital, and his body was taken to Bloomington, Ill., for family services and burial.

Our late president emeritus was known to thousands in and out of the ranks of labor. He held office in the Brotherhood for more than 40 years and served as its chief for a total of 14 years, longer than any other head of the union. He retired from the presidency of the IBEW almost a year ago, laying down the reins when, as he said, the IBEW was in an "overall healthy condition" and an able successor was available in J. Scott Milne, now president of the Brotherhood.

BROTHER TRACY was born in Bloomington, Ill., son of a union toolmaker. As a youngster, he became a "boomer" working all over the country. He completed his apprenticeship in Oklahoma and then settled in Houston, Tex., as a journeyman electrician. He joined IBEW Local 716 in Houston on October 2, 1913, and for the next few years worked as a lineman and wireman in the Oklahoma-Texas area.

He was elected business manager for his local and also Local 66, and he became an international vice president for what is now the seventh district on January 1, 1920. Then, on July 10, 1933, he was appointed, by action of the International Executive Council, as International President, succeeding H. H. Broach, who had resigned because of illness.

President Franklin D. Roosevelt, a long-time friend, appointed Brother Tracy as the first U. S. labor delegate to the International Labor Conference at Geneva, Switzerland, in 1935. In 1938, Roosevelt named Tracy as labor advisor to Secretary of State Cordell Hull at the Pan American Conference in Lima, Peru.



DAN W. TRACY

As the clouds of war gathered in 1940, President Roosevelt called upon our late leader to give full-time service to the nation, appointing him Assistant Secretary of Labor. Brother Tracy was reluctant to leave his Brotherhood post, but he felt it his duty to serve his country in that time of urgent need.

In the Labor Department he was a top "troubleshooter." The *Washington Star* said at the time that he was "a key man in the U. S. preparedness program."

At the close of the war, Brother Tracy became labor director of the International Labor Organization. At the San Francisco conference which created the United Nations, he served as an advisor to U. S. delegates.

IN 1946, he was again elected International President of the IBEW, and the following year he was elected a member of the AFL Executive Council, a post he held until his death. He also served as vice president of the AFL Metal Trades Department.

When the Executive Council of the IBEW regretfully accepted his resignation and made him president emeritus, he said:

"I have deeply enjoyed my many years of association with the Brotherhood and with organized labor. I know of no greater cause to which I could have given my time and effort than to the labor movement. My years in this field have given me profound and solid satisfaction."



"Eurovision," Europe's first TV network, was launched last year, as eight beauties, each representing a nation participating in the system, celebrated the event with the traditional champagne.

Continental TELEVISION

European video expansion is often
a chicken-and-egg problem

LITTLE more than a decade after the Allied invasion of Normandy successfully liberated Western Europe, a new, bloodless invasion is underway there. If successful, it promises to fan out into all parts of continental West Europe, Scandinavia and the British Isles.

Microwaves, not men and machines, are the forces of this latest invasion. In short, it is television.

Western Europe's 65 television transmitter locations may look like small potatoes indeed, when stacked against the 443 operating stations in the U. S., where another 130-odd facilities are presently under construction. But to Europe and Europeans, just now fully recovering from the terrible ravages of World War II, those 65 installations represent a gigantic effort.

Television in Europe really got off the ground in 1953, with the televising of the Coronation of Queen Elizabeth II. That one event, more than anything else, seemed to fire the imagination of Europe's viewers.

Following closely on the heels of the Coronation telecasts, was the organization of Europe's first international, six-nation, TV network. Dubbed "Eurovision," the network was sparked by the same French "European" spirit behind the Schuman Coal and Steel Community, the European Assembly and the ill-fated European Defense Community.

A continental network such as Eurovision, however, can be built only on national units and unfortunately, European countries are still a long way from adequate national TV systems.

In order to build strong national TV systems, each Western European nation must have a transmission system covering as much of the country as possible; a schedule of programs sufficient to draw a large audience and home receiving sets priced within reach of the mass of the population.

In the realm of transmission, Britain, where the world's first TV station has been transmitting since 1936, leads the way in European TV. Nine transmitters are presently on the air, with nine more to be added during the next two years. By the end of this year, better than 95 per cent of the British Isles will be within range of a transmitter. All stations are owned and operated by the government's British Broadcasting Corporation.

Across the Channel in France the government-owned Radiodiffusion—Television Francaise has six transmitters. Another four privately-owned transmitters are operating around France's borders in the Saar, Luxembourg and in Monaco.

Still further east, in Germany, a 13-transmitter chain financed by semi-private government firms covers most of the Federal Republic as well as the city of Berlin. An additional six units will be completed and in operation by the end of the year. Thirty transmitters is the ultimate hope of the Bonn government.

Postwar Italy has shown far and away the most spectacular growth in television. Two years ago Italy had no TV. Today, eight transmitters broadcast regularly, reaching approximately 45 per cent of the population. By the end of 1956, the government hopes to have added facilities enabling almost 85 per cent of the people to tune in on Italian TV programs. Thirty stations, to cost 26 million dollars already have been voted approval.

THE SWISS MOVEMENT

To the north, over the Alps, the ultra-conservative Swiss have not as yet decided as to the durability of TV. Hence, only experimental stations are operating in Zurich and Geneva, with more under construction in three other locations in the country. A mobile transmitter is being used, in an attempt to overcome the serious transmission difficulties posed by Switzerland's rugged mountain terrain. Eventually, with the completion of her experimental facilities, Switzerland will bring about half of her five-million population within range.

The Dutch have a single transmitter operating, and are planning six repeater installations.

Neighboring Belgium has transmitters in the principal cities of Liege and Antwerp.

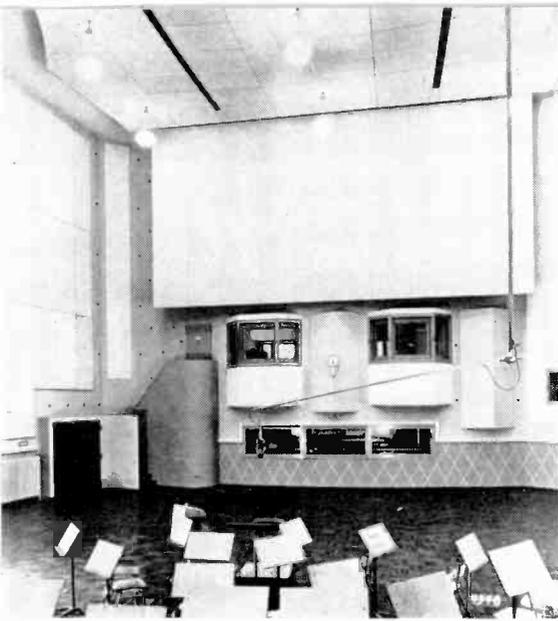
Moving across the Baltic, we find that Sweden has



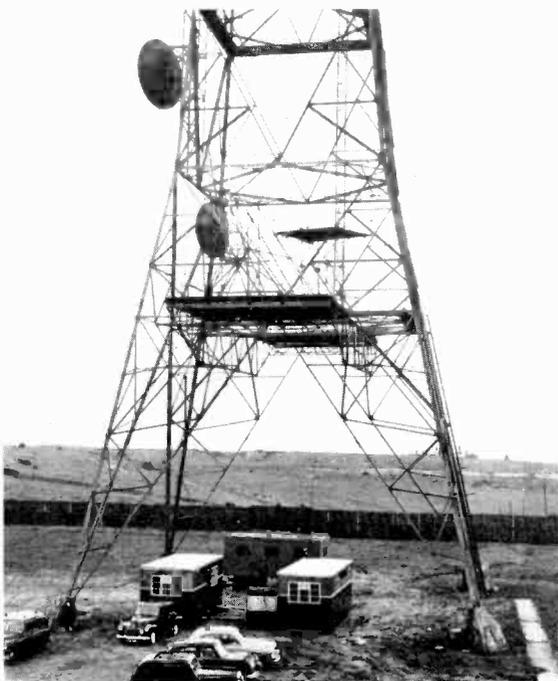
This spaceman's view of the Mediterranean, Continental Europe, the British Isles, and Scandinavia, shows where TV antennae have sprouted since World War II. Greatest concentration of transmitters is clustered in the Franco-German area. (The map is reprinted from the February 19 issue of BUSINESS WEEK magazine, by special permission.)

two transmitters in Stockholm, with more on the way. Norway is confronted with the same obstacles as the Swiss. Rough terrain laced with mountain chains hamper their telecasts. At present a single experimental transmitter is operating in Oslo.

Denmark boasts a transmitter in Copenhagen which is regularly received in Southern Sweden. With the completion of a second transmitter, approximately half of Denmark's four million inhabitants will be brought within range of a TV station.



The camera here registers Hilversum, a studio of AVRO, one of several elements of the Netherlands TV system. Dutch broadcasters participate in eight-nation Eurovision net.



There's more than blue birds over the White Cliffs of Dover these days. Two disc-antennae mounted on this tower at Swingate, near Dover, relay pictures to Cassel, France.

Spain has one station, with plans for more in the next three to five years.

In Austria, that country's first transmitter will go on the air in July in the city of Salzburg, scene of the world-famous Salzburg Music Festival, an annual event which draws music lovers from the world over.

The initial transmission over Salzburg's station will be this year's festival. In November, the country's second transmitter will beam from Vienna, when it takes to the air to open the Vienna State Opera.

When it comes to programing, European programs embody a number of basic concepts that U. S. telecasters do not and apparently cannot accept. In Europe, the

direction of most of the government radio corporations, now guiding TV too, is generously studded with intellectuals dedicated to but one goal—the lifting of the “cultural norm.” Oftentimes, entertainment, the sole and overpowering role of TV and radio as Americans visualize the mediums, is lost in European directors' zeal to educate their viewers.

Notwithstanding the generally high cultural plane of Europe's TV, which seems repugnant to many Americans, the BBC's 40 hours of weekly TV fare includes some of the best children's programs to be seen anywhere.

Financial support, which is the European telecaster's prime problem, is not his only one, however. In addition to the formidable barriers presented by language in such countries as Switzerland and Belgium, there are political problems to be dealt with. As an example, the Netherlands has five broadcasting corporations competing for program time over government-owned facilities, all of which are organized along strong political lines. If an expansion is planned for the present six and one-half hours of Dutch TV a week, dividing the time fairly among the five operating companies would take the wisdom and understanding of a Solomon.

HIGH-PRICED RECEIVERS

The high retail price of home TV receivers has, more than any other single factor, stymied television expansion in Europe. Tied to the high price tags for sets are the generally low wages of Europe's millions of workers. A 17-inch set in France costs the equivalent of two to three months of a worker's pay.

Progress in set price-slashing is reported, however. Recently a Frankfurt mail order house advertised a small table model receiver for \$152.

According to experts close to the scene, programing and the price of receivers may in the long run turn out to be a typical “chicken-and-egg” argument, similar to color TV in our own country. As programs improve, Europe's workers may decide to put a larger percentage of their earnings into a family TV set.

Through the efforts of Eurovision, programming all over the Continent is taking on a more popular bent.

International soccer matches in Geneva, tennis at Wimbledon, ski jumping at Chamonix in Switzerland, the six-day Tour de France bicycle race, a swimming meet in Copenhagen, all of these events immensely popular among the middle classes of any nation, have been served Europe's TV viewers through the facilities of Eurovision. Such other “spectaculars” as Christmas Mass from Notre Dame Cathedral in Paris, the Pope speaking on Easter Sunday from the Vatican and the opening of Parliament in London all have been seen on Eurovision telecasts.

The potential of Eurovision is staggering: an estimated 220 million viewers. The influence such a network could have is obvious.

how to present an arbitration case effectively

REPRINTED FROM THE AFL RESEARCH REPORT

With some 90 per cent of union agreements now providing for arbitration as the means of deciding unsettled grievances, union representatives increasingly have had to become familiar with arbitration processes. The following discussion briefly examines typical arbitration procedures and reviews those basic techniques which have come to be recognized as generally most effective in preparing and presenting an arbitration case.

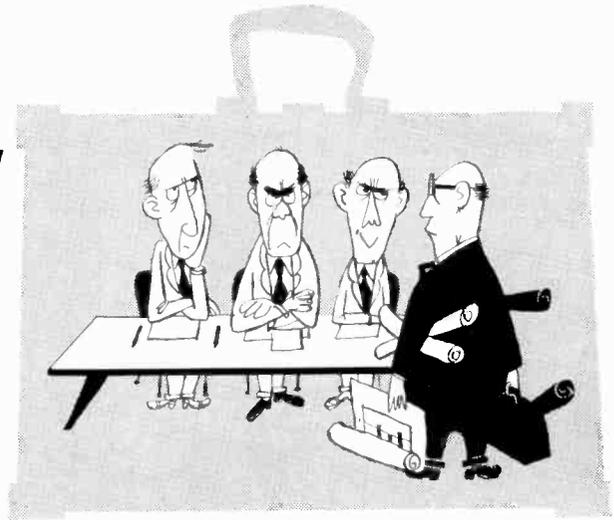
THE typical union agreement provides that if the union and management are not able to reach a satisfactory settlement of a grievance, either party can request arbitration—the use of a third person or persons to decide the dispute. The agreement also usually spells out the method for selecting an arbitrator or arbitration board.

The union request to the company for arbitration under the contract should provide in a few paragraphs the basic background on the case. It should state briefly the complaint, the ruling sought, and if money is claimed, the amount or how it should be figured. It should identify the names of the workers involved, their jobs, the pertinent dates, and the contract clauses concerned.

Management normally will answer, stating its position and adding any facts it believes should also be noted. The union request and management reply serve to tell the arbitrator what the issue is.

In some parts of the country—it is required by law in several states—the union and company prepare a joint submission or stipulation of the exact question the arbitrator is to decide. This frequently involves considerable wrangling as to just how the question is to be worded. There is also a real danger that, if the stipulation is drawn too narrowly, the arbitrator's jurisdiction may be so restricted that he cannot decide the dispute equitably.

For example, take the case of a worker discharged on the ground that he smoked in a no-smoking area. The question should be "should John Doe, who was discharged by the company, be reinstated with full pay for time lost?" It should not be "was John Doe guilty of smoking in a no-smoking area?"



Under the latter submission, the arbitrator may consider himself limited to deciding whether or not the worker violated the no-smoking rule, even though that might not actually be the entire basis of dispute. Under the first submission, however, he clearly would have some discretion if it were established that, for instance, the worker was smoking but it had not been made clear to all workers that the spot in which he was smoking was a no-smoking zone.

Advance Preparation

The arbitrator will hold a hearing, or several if necessary, to get the facts in the case and the views of the parties. Unless the parties have agreed on special formal rules, procedure at the hearing will be determined by the arbitrator (or chairman of the arbitration board). Normally it will be quite informal.

Some of the elementary rules of preparation for the hearing are almost self-evident, but they are worth noting as a handy checklist.

(1) **Reexamine the basic facts** of the grievance. Decide which ones may be in dispute, for they will have to be proved through witnesses, documents or other evidence. Check the union agreement clauses which may be applicable. Go over the discussions and records of the case in the grievance procedure. Gather any material which will have to be given or shown to the arbitrator.

(2) **Get all the facts.** Do not skip over unfavorable facts in preparing your case. By recognizing them in advance you will be in a sounder position to evaluate their effect on the case and to check on their accuracy and limitations, instead of being surprised and unprepared when they are suddenly raised before the arbitrator.

Review past practice, what has been done in similar situations at the company before. Check on any back-

ground which may provide helpful perspective for the arbitrator.

If the case hinges on duties of a job or the physical surroundings of a work place, examine them so that you may be personally familiar with them.

(3) Arrange for witnesses to verify the facts at the hearing. The arbitrator is not familiar with the cases and will have to be informed of all the details. In most cases it is best to do so with the aid of witnesses. This is discussed in greater detail later.

(4) Review your reasoning—how the union interprets the facts and their significance. Decide what you will emphasize and how you can present it most effectively to persuade the arbitrator to accept the union's view.

(5) Prepare an outline of the evidence you will offer and the points you will make. In addition, put in writing, for your own use, all aspects of the case to help get the picture straight. This will help assure that no significant point is overlooked in the preparation or forgotten during the hearing.

(6) Anticipate management's points. Allow for the views which will be advanced by the company so that you can deal with and counteract them as necessary before the arbitrator. The discussions during the efforts to settle the grievance will help show what management is likely to contend. Judge what are likely to be the weak spots in the union's presentation. Figure out how the company will answer or criticize the union's views, so that you can be ready to defend and substantiate them.

(7) Check other arbitration rulings on similar grievance cases. If possible, examine also the decisions which have been made by your arbitrator in other cases. Some of the factors to keep in mind in using other arbitration awards are noted on page 3.

(8) Consult other representatives of the union. Use the written outline noted in point (5) above as a basis for getting their thoughts. Talking the case over with them will normally turn up some valuable viewpoints and suggestions on items which may have been overlooked or covered inadequately. The cross-exchange in such consultation often provides a helpful preview of the questions which will arise in the arbitration hearing.

If another representative of the union is to take a major part in the presentation of the case to the arbitrator, be sure that he is briefed thoroughly on all aspects of the case. Make sure that no one who will participate in the presentation is only half-prepared.

Even if there are others present to whom the union representative can turn for information and advice, missteps are possible if he is not fully prepared. Any indications that he may be unfamiliar with basic elements of the dispute can be detrimental to the union's case.



Selecting Witnesses

It is common to establish many of the facts in a case through the testimony of witnesses. Where you have a choice, select your witnesses carefully and try to avoid using any whose manner may prejudice your case. Try to choose those who can speak from direct observation or experience so that their testimony may stand as more than only hearsay.

Should you use only one or a few rather than many witnesses on a particular point? It is true that a long array of witnesses may help emphasize and reinforce the point, but it is also true that if you use many witnesses they may negate the value of each other's testimony. If you have a choice, it is usually best to keep down their number, but make sure that those you select are best qualified to testify on the point in dispute.

Preparing Witnesses

Interview the union's witnesses in advance. Let them become familiar with the questions they will be asked. It is a good idea to jot down some summary of what they will say so that you may know just what their testimony will be.

Don't make the advance discussions a formal rehearsal, however, and don't try to get witnesses to memorize statements. All you ordinarily need to do is run through approximately what they have to say.

Make sure that your witnesses are not withholding from you information which they think may be detrimental to the case. A sudden disclosure through cross-examination in the hearing may turn a case upside down. It is best that the union representatives be fully prepared with knowledge of all aspects of the case, good and bad, to make the evaluation necessary for the soundest result.

To help put at ease those witnesses who may not have participated in other arbitrations, tell them what the hearing will be like. They should understand in advance that they will be subject to questioning by management representatives at the hearing.

Give some thought to questions which may be put to them by management and ask the witnesses these ques-



tions in advance. You can talk over their answers with them but don't try to put words in their mouths. Don't do too much coaching, for if the questions take a somewhat different form than anticipated, your witnesses may become nervous and hesitant.

Caution them that they should (a) stick to the facts, (b) tell only the truth, (c) make sure they understand and if necessary ask for a clarification of a question before they answer it, (d) be reasonably brief and avoid answering questions they are really not equipped to answer, and (e) not lose their temper or take personal affront to any question put to them.

Checking Other Awards

Several companies sell reporting services which publish the texts of many arbitration awards. These services are fairly expensive and generally not worthwhile unless the local union uses arbitration several times a year. If you think you need such information, write to the AFofL Research Department for suggested sources. You may have access to a reporting service through a library or some other union in the area which may subscribe to it.

Arbitration rulings in other cases are not binding on your arbitrator, so don't put too much reliance on them in building your case. However, by examining arbitration awards in similar cases elsewhere, you can determine the positions taken by other unions and companies and obtain an indication of the weight given by arbitrators to various arguments. The awards may suggest considerations and approaches you have not taken into account.

Also, it may be a good idea to check the awards your particular arbitrator has made in the past. They may provide a clue to how he may react to different contentions.

If other arbitrators have upheld the union in similar circumstances in other cases, you may want to cite their awards to your arbitrator to show how others have reasoned. But limit the number of citations and make sure that they are clearly in point.

If the facts of the other case differ materially, you may become entangled in debate as to whether or not it has

any bearing on your situation and your reference to it may hurt rather than help your case.

In the same way, if management refers to another ruling, examine it to point out the extent to which the underlying facts differ from your situation.

Use of Briefs

A written statement or brief may be filed with the arbitrator before the hearing if the parties so decide or if the arbitrator so requests. The same is true of post-hearing briefs which generally summarize and focus on major aspects of the case after the hearings are completed.

Whether you agree with management to present such briefs depends largely on the complexity of the case, your judgment as to how helpful or desirable they might be, and any wishes expressed by the arbitrator.

If you do file formal briefs, be reasonably brief. State your case accurately and fairly. Don't wander far afield or drag in material or arguments which have little relation to the case. If you present too much, or paint an inaccurate picture, you may lose more than you gain, for the arbitrator may believe that you are unable to justify your case on its merits.

A fancy professional-looking brief generally is not necessary. Simple language and short words will do and they are often best. A good arbitrator is interested in the basic things you have to say and not in how impressively you say them.

Other Aspects

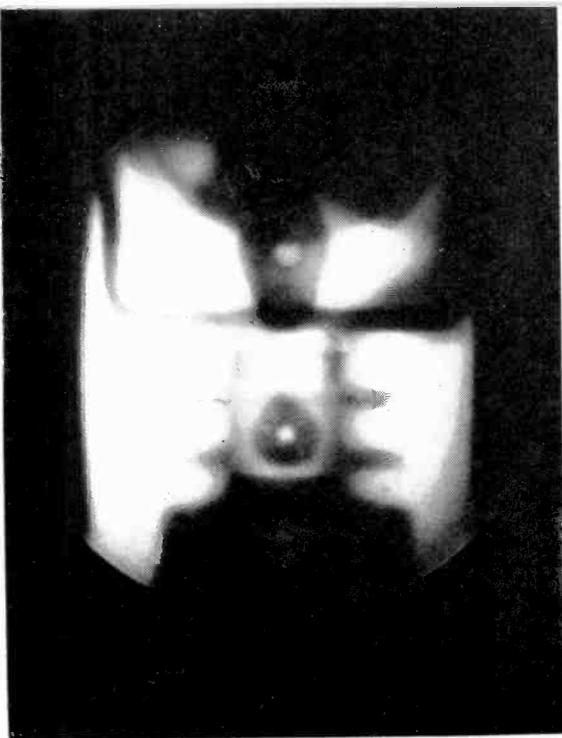
There are several other broad points to note.

In some cases a stenographic record is kept of the hearing. It should be decided beforehand whether to do so. It is expensive to keep a complete record. It may be worthwhile if the case is complicated and there is likely to be controversy over just what was said. On the other hand, the recording of all statements may tend to make a hearing more formal and to limit expression somewhat.

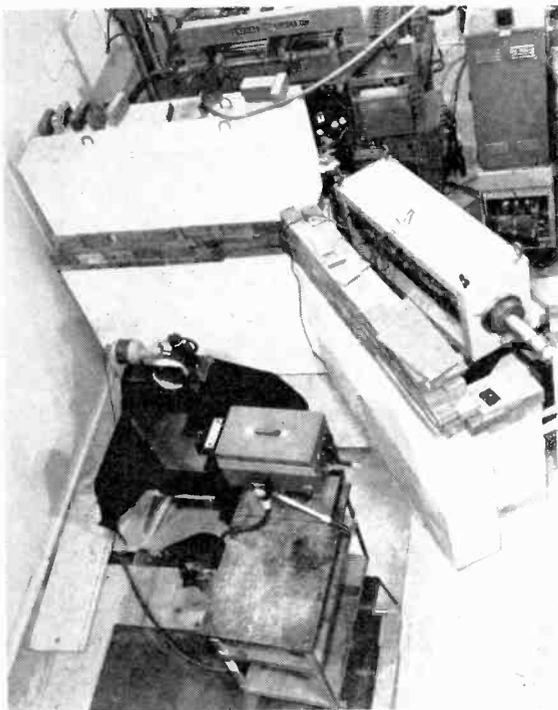
Much will often depend on the arbitrator's judgment of who is telling the truth about what actually happened in a particular instance. He will judge testimony according to his impression of the witnesses' truthfulness. If you exaggerate or distort the facts, or if it is shown that you are stretching the truth on one point, the arbitrator will be justified in questioning your truthfulness on other matters and may discount anything you say.

A lawyer ordinarily is not necessary, but if it appears that you may become involved in legal complexities, get a good one. If you are not a lawyer, don't try to act as one. It is dangerous for non-lawyers to play with or rely on legal technicalities.

Remember that the arbitration hearing is not a bargaining session. It is not a process of give-and-take. It is not enough that the union's position is right. The job is to prove it, to persuade and convince the arbitrator.



X-RAY IMAGE of a single-cylinder compressor as seen on a television screen by visitors to the National Bureau of Standards Open House. The "X-ray televising" demonstration made use of a technique recently developed at the Bureau for converting high-energy X-rays into visual images.



EXPERIMENTAL SET-UP used for X-ray televising the internal parts of an operating mechanism at the National Bureau of Standards Open House. A small single-cylinder compressor is shown on the black cloth in position for X-ray examination. High-energy X-rays from the Bureau's betatron (background) fall on the compressor after passing through a slot in the heavy radiation shield made of concrete slabs and lead bricks. The sodium iodide crystal mounted just in front of the compressor converts the resulting X-ray image into a visual image, which is reflected by a mirror to a camera placed outside the direct X-ray beam.

Technique devised to transform X-ray images into visual images. Betatron radiation demonstrated at Open House.

X-Ray Televising

ANNOUNCEMENT of a system for "X-ray televising" the internal parts of an operating engine, the demonstration of a radiation monitor for atomic blasts, and recent developments in the science of measurement were among the highlights of an open house recently held at the National Bureau of Standards in Washington.

The program—attended by several hundred leaders in the fields of science, industry, government, and education—stressed the significance of physical measurement standards to scientific and industrial progress and featured the first showing of two new radiation facilities: the NBS Betatron and Gamma Ray Laboratories.

The new Gamma Ray Laboratory will permit the Bureau to meet increasing scientific and technical demands growing out of advances in the use of atomic energy. Before radioactive materials and instruments for their detection can be used safely and effectively, they must be calibrated against the radioactive standards maintained by the Bureau. In recent years, the isotope cobalt 60 has been increasingly used in place of radium for industrial X-ray photography, medical treatment, and instrument calibration. The Gamma Ray Laboratory was built to accommodate the growing demand for cobalt 60 calibration.

Guests of the Bureau enjoyed a lecture-demonstration by Dr. Allen V. Astin, director of the Bureau; Dr. Astin used the electro-magnetic spectrum to illustrate the relationship between the Bureau's activities and the technological economy of the Nation. He illustrated his remarks with operating apparatus and discussed the Bureau's work in developing the precise standards of measurement required by modern science and industry.

Dr. Astin illustrated NBS work in the X-ray range of the spectrum with demonstrations of the radiation monitor and the system for X-ray televising the interior of an engine. The radiation monitor is a remote-control system which automatically measures radiation intensities in the vicinity of an atomic explosion and transmits the data by radio to a centrally located headquarters. The system was developed at the request of the Division of Biology and Medicine of the Atomic Energy Commission for use in nuclear tests. Its over-all design was worked out by L. Costrell and associates of the Bureau's nucleonic instrumentation laboratory. As Dr. Astin explained the operation of the monitor, it received and recorded the

the Inside of an Engine

background radioactivity level at a remote station near Reno, Nev.

The X-ray televising demonstration used highly penetrating radiation from the betatron in combination with a technique recently developed at the Bureau for converting high-energy X-rays into visual images. The audience saw clearly the moving piston, piston rod, and other parts in the televised X-ray image of a small one-cylinder engine. By means of this technique it should be possible to televise the internal operation of a wide range of mechanisms, such as automotive and aircraft engines, pumps, and other devices.

Because of their greater penetrating power and lower scattering, high-energy X-rays from betatrons and synchrotrons produce sharper images than do lower-energy X-rays, allowing the observation of greater detail and the detection of more minute flaws in metallic equipment. However, until now their use in studying the internal operation of heavy machinery has been confined largely to X-ray photographs. Suitable methods for observing the interior of a mechanism while it operates have been lacking.

The Bureau's system, developed by Dr. J. S. Pruitt of the NBS Betatron Laboratory, makes use of an instrument called a pattern amplifier, which acts as an X-ray intensifier, continuously detecting, amplifying, and displaying low-intensity X-ray images. The major component of the pattern amplifier is the converter—a large, cylindrical, thallium-activated sodium iodide crystal, which converts X-ray images into optical images. When bombarded with an X-ray beam, the crystal emits visible light. If the flat faces of the crystal are perpendicular to the X-ray beam, a visible replica of the X-ray image may be observed along the beam axis. When the pattern amplifier is used in conjunction with a high-intensity, high-energy X-ray source such as the NBS synchrotron, it can continuously display images of parts hidden by as much as 18 inches of steel or $7\frac{1}{2}$ feet of concrete. The visual image may be detected in several ways. It may be observed directly by eye, photographed with an ordinary camera, or observed with a remotely controlled television camera.

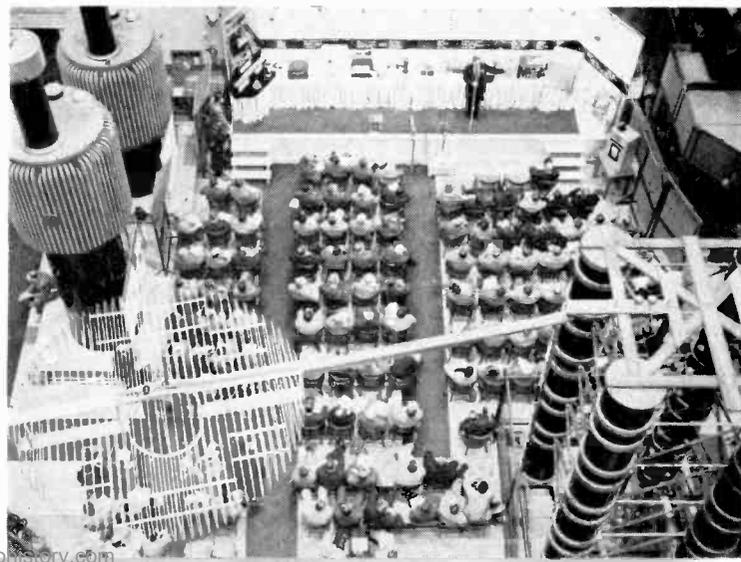
In discussing the work in the radio range, Dr. Astin announced that the Bureau is working with the Air

Force and the Navy Bureau of Aeronautics in setting up a recalibration center to insure the reliability and efficiency of electronic equipment in military aircraft. About half the cost of a modern fighter airplane now goes into electronic devices for navigation, communication, fire control, and other purposes. In order for this equipment to work together as a unit, each of the separate components must be specified, constructed, and evaluated according to certain reference standards. The recalibration center will periodically calibrate the working standards used in maintaining such equipment.

One of the demonstrations in the visible range of the spectrum concerned three-color brightness standards now under development at NBS for the television industry. Color television tubes contain red, green, and blue fluorescent materials, which in combination produce all the required colors in the image. The Bureau's standards are for use in measuring the brightness of the three components. The visitors saw the television standards in the form of squares of transparent colored glass, lighted from behind. The colors match closely those used in color television tubes.

In addition to the Gamma Ray and Betatron Laboratories, the guests saw demonstrations by NBS laboratories concerned with precision measurement of length, measurement problems at supersonic speeds, standards and measurement at very high temperatures, fatigue of metals, properties of matter at very low temperatures, high-speed electronic computers, color and its measurement, electrical standards and measurement, precise analysis of metals and alloys, properties of heat insulating materials, measurement of forces up to 10 million pounds, radio propagation research, atomic structure of crystalline materials, and high-speed impact properties of fibrous materials.

GENERAL VIEW of the lecture-demonstration at the National Bureau of Standards Open House. Dr. A. V. Astin, Director of the Bureau, is speaking to the guests assembled in the NBS High Voltage Laboratory. On the stage behind him is the scientific apparatus he used to illustrate the Bureau's work in developing standards of measurement for science and industry. At the extreme left of the stage are the national standards of length and mass—the meter bar and kilogram. In the right foreground is a 2-million-volt surge generator used in studying short-duration voltages of high intensity. The basket-like device in the left foreground aids in maintaining a uniform high-intensity electric field with this equipment. To the left of the audience are two 350,000-volt cascade transformers used in studying methods of measuring extremely high voltages at 60 cycles.





NEW CHRYSLERS get the once-over, as a WGN-TV announcer interviews the manufacturer's representative. Behind the WGN camera is Bud White of Local 1220.

WGN Engineers

Many engineering problems solved by members of Local 1220, so that Windy City viewers may preview shows



CAMERAMAN Wilmer Butler covers Dave Garroway at the advanced-designed auto, while station staffer holds cards.



ON THE STAIRS: the show promoter, Jack Brickhouse, announcer; and Frank Schreiber, station manager. Cameraman: Jack Jacobson using one of seven cameras on duty.

THEY'VE been doing things big out in Chicago for a long time—televising national political conventions, covering golf tourneys, picking up the grunts and groans from the canvas for grappling and boxing events, scanning the zoo cages, and much more. Recently the members of IBEW Local 1220, employed at WGN-TV, went true to form and covered an auto show and a boat show in Windy City style.

A television preview of the 1955 Chicago Automobile Show was "one of the most intricate engineering setups ever attempted in television," it is reported. Cameras were operated on two floors of the International Amphitheatre and in the building's arena, as well.

Scheduled for two hours originally, the coverage of the auto show actually went 2½ hours. WGN-TV used two complete mobile units, three camera crews, seven cameras and four microphone hookups, over 8,000 feet of coaxial cable and 16,000 feet of microphone cable.

It was the 47th annual auto show for Chicago. There were 22 auto and truck exhibits, and each was to be approximately five minutes on camera. A special General Motors exhibit ran a half hour.

Passenger car manufacturers displayed their models in colorful exhibits, using many spot and floodlights. Consequently lighting for the 2½-hour show presented many complex quick-change problems.

The 1955 coverage marked the fourth consecutive year that WGN-TV televised the mammoth exhibition on an exclusive basis.

On Saturday, February 5, the camera crews and equipment returned to the International Amphitheatre to originate an exclusive coverage of the 1955 Chicago National Boat Show, largest such show in the world. It was an hour-long show and a WGN "first."

Cover Two Exhibitions

Channel 9 viewers got a look at "the largest nautical fleet ever assembled under one roof." On exhibit were sailboats, canoes, row boats, racing hulls, dinghies, prams, outboard-powered runabouts, large cabin cruisers, outboard and inboard cruisers. The armada ranged from \$75 kid-size metal rowboats to a dreamboat cabin cruiser, a luxury home for eight, that could be had at around \$25,000.

Camera crews covered exhibits of small boat trailers, marine fuels and oils, outboard and inboard motors and engines, and other utility exhibits. Camera crews were more than busy moving around the amphitheatre during the show.

The equipment used to cover this show matched that of the auto show—two complete mobile units, three cam-



PUSHING A CAMERA along the line of show visitors is Frank Hollick. The WGN-TV remote trucks and station wagon are parked beneath a portion of the 8,000 feet of coaxial cable used in the amphitheatre work.

era crews, seven cameras, and four microphone hookups, plus over 8,000 feet of coaxial cable and 16,000 feet of microphone cable.

The exhibition included the entire first floor of the building, plus space offered by a new wing addition.



ON THE MAIN FLOOR of the amphitheatre are, from left, Robert Gilf, cameraman; Bud White, cameraman (in distance), and Val Reynolds, supervisor of the remote crew which covered the show. Boating is becoming major U. S. hobby.

Opinion Award Issued in

FILM CAMERA CASE

Arbitrator rules on problem involving still photos used directly as a 'telop'

THE collective bargaining agreement between Local Union 1215 and WTOP Inc. was recently examined very carefully by a Board of Arbitration to answer the question: "When the company wants an ordinary still photograph taken for the purpose of televising same directly as a 'telop,' does the agreement require that the picture be taken by a union technician?" According to the decision handed down by the Chairman of the Arbitration Board, the answer is an unqualified "yes."

Section 1.04 of the agreement states (in part):

"The work covered by this agreement shall include all work in connection with the installation . . . operation and maintenance of radio broadcast, television, facsimile and audio equipment, and apparatus by means of which electricity is applied in the . . . reproduction . . . of . . . vision . . . including all types of recording."

A following sub-section states:

"The word television as used in paragraph (a) of this Section shall be deemed to include all work . . . associated with the lighting and illumination of all television program material.

"It shall include the developing and processing of film and the taking, developing and mounting of slides when WTOP facilities and equipment are available. It shall also include the installation, operation and maintenance of film cameras, film and slide projectors, kinescope recorders, video cameras, video controls, video tape recording and other equipment by means of which electricity is applied in the transmission or transference, production or reproduction of sound and/or vision."

The reasoning of the Arbitrator will be only partially reported here but in such form as to point up the views of the Local Union and the Company and the reaction to those views of the Chairman of the Board of Arbitration. For example, the Union's principal reliance in the case was upon the clause in the Agreement which states that it has exclusive jurisdiction over the "operation and maintenance of *film cameras*." The Union also emphasized that the agreement states that Technicians must make "all types of recording(s)" and a still picture is obviously a visual recording.

The Arbitrator found that the parties used the term "film camera" as an expression of their agreement as to work jurisdiction. Further, the Arbitrator stated, "We

must conclude that the parties intended the literal or dictionary sense of the term 'film camera', which would include, among other things, still cameras and movie cameras . . .". "Clearly, then," he continued, "The term 'film camera' is reasonably susceptible to a definite construction which would confer on the Union the jurisdiction sought."

The Company conceded that in the literal or dictionary sense the term "film camera" would include both still cameras which use film and moving picture cameras which use film. However, the Arbitrator said, ". . . the Company seeks to establish that the term 'film camera' was used in a technical or trade sense. If the term 'film camera' were used in some special technical or trade sense and if there is clear evidence of such usage, of course it must be given effect . . .". On the basis of the evidence, the Arbitrator concluded that the Company did not show that the term 'film camera' was used in the Agreement in some special technical or trade sense different from its literal or dictionary sense nor is there any persuasive evidence . . . to remedy the insufficiency of the evidence as to any trade or technical meaning different from the literal or dictionary meaning.

THE Union contended that a still camera was part of the equipment "by means of which electricity is applied in the reproduction of vision" and pointed to the fact that it may sometimes be supplemented by a battery-powered flash attachment. The Chairman said that, ". . . as here applicable, the Union makes too literal and fine-spun an interpretation of the contract language." This, he found "To be simply too labored a construction."

The decision goes on to say that even assuming that in the most technical sense a photograph is a "recording" it probably was not contemplated by either party that *that* clause would confer jurisdiction in such a case as the present one. Supplementary points, particularly with reference to slide jurisdiction and the use of a balopticon, which were raised on behalf of the Company after the hearings were concluded to be insufficient to affect the conclusions reached.

Continued on Page 16

Technical NOTES

Color Video Tape

Bing Crosby Enterprises, Hollywood, Calif., gave its first demonstration—to the trade press—of its color video tape recording system recently. A four-minute segment of an NBC-TV telecast of "The Women" served as the demonstration strip. Viewers of the demonstration said that BCE had achieved 65 to 75 per cent color fidelity with its new tape development.

Since this demonstration, February 7, Crosby Enterprises reports that it is perfecting a new system of recording color on tape, which it will demonstrate soon.

John T. Mullen, BCE chief engineer, told viewers that mechanical difficulties of color VTR have largely been solved.

Frank C. Healey, BCE executive director, said that the foot-per-second use rate problem has also been largely solved, with Crosby Enterprises shortly to introduce equipment to record 16 minutes of a program on a 15-inch reel.

Mr. Healey also indicated savings with color VTR. Raw color film stock sufficient to produce one hour of programming presently costs approximately \$4,000, while similar raw VTR stock will cost only from \$300 to \$400.

Further, Mr. Healey predicted that Bing Crosby Enterprises will have color VTR equipment on the commercial market in 1½ years.

More on Flat Tube

In the February issue of THE TECHNICIAN ENGINEER we reported the development of flat-tube viewing screens for combat planes—television picture tubes which would monitor instruments and scan terrain. Here are some details of this dramatic new development:

The new flat tube consists of a phosphor screen sandwiched between glass plates. It functions by electronically exciting selected areas or spots on the phosphor screen.

An electronic beam is injected along a horizontal edge of the tube. This beam flows in a field-free region along said edge of the phosphor screen and adjacent to a row of transverse deflection plates. Through control of the

voltages on these deflection plates, the beam is bent vertically at any desired place along the edge of the tube. The beam then flows vertically in a second field-free region between a series of transparent deflection plates and the electrically charged phosphor screen.

Deflection of the beam into the screen at any desired vertical level is made possible by controlling the voltages on the transparent deflection plates.

Voltages may be changed on horizontal or vertical deflection plates in a sequential manner.

The deflection system has a very powerful focusing ability which makes possible a very small spot on the phosphor screen, resulting in high definition and brightness.

Diaper Frequency

Midwest Sound Systems of Chicago has on the market a unit which puts your home radio to work as a baby-sitter. It's a low power transmitter that can be plugged into a nursery outlet and broadcasts on a frequency that won't interfere with normal radio operation. There aren't any intermediate units or connecting wires. The transmitter has a range of about 300 feet, and it broadcasts a steady muted ticking to show you it's working.

Three Brochures

Three new brochures in the electronics field, now ready for distribution, have been announced by Sylvania Electric Products Inc.

The first is a wall chart brochure which lists Sylvania's complete line of 600 ma tubes for series string television, which presents complete information about Sylvania's series string tubes.

The second is a brochure listing Sylvania's gas tubes for use in control mechanisms by industrial customers.

The third is a new folder listing complete information about Sylvania crystal diodes.

Copies are available upon request to Sylvania Electric Products Inc., Central Advertising Distribution, 1100 Main Street, Buffalo 9, N. Y.

Station Breaks



FM Piped Again

On March 22 the FCC ruled that commercial FM radio stations can again supply background music in stores, factories, restaurants, buses and trolleys, starting May 2.

The FCC authorized the new service to help FM broadcasters attain additional revenue.

At the same time, the FCC reduced from 42 to 36 hours a week the minimum which FM stations must broadcast regular programs. This, too, will take effect May 2.

An FCC spokesman said about a dozen FM stations now are providing a background or "functional" music service without commission authority. They, and all other stations that want to supply such service, must obtain a special "subsidiary communications authorization," the FCC said.

Protests were registered that background music on trolleys and buses would result in "forced listening" by the passengers. The FCC said local agencies which regulate transportation systems could decide whether to permit such broadcasts. It said the local agencies are "more closely attuned to the local situation" and could better decide that question.

Telefilm Comment

Filming of his television show is not for him, says Horace Heidt, well-known band leader and master of ceremonies. His opinion is that when a program is produced with an audience, it should be done live.

Canned laughs and applause tracks are for the birds, says he. He feels that a performer loses his impetus when he has to stop repeatedly for camera takes.

Technicians Underground

Technicians of Radio Free Europe at Munich monitoring a broadcast speech of Czechoslovak Premier Viliam Siroky were startled by the voice of a Czech woman shouting "You scoundrel!"

Siroky's speech was recorded in the town square of Kosice, where the Czechs celebrated the 10th anniversary of their liberation from the Germans.

Radio Free Europe technicians said the clearly spoken interruption of the speech apparently was spliced into the recording tape by an unknown technician at radio Bratislava, over which the broadcast was heard. A later broadcast of the same speech over radio Prague did not include the interruption.

Siroky was speaking of the "prosperity" of the Czech people and the increase in agricultural cooperatives. He had paused for breath when the woman's voice cut in.

To Hull and Back

Television editor of the *Boston, Mass., Herald*, William Buchanan tells this one: "The funniest radio-TV story over the weekend has WBZ looking for an all-night disc jockey. The gimmick is that platter spinner will pick up his recordings at the WBZ studios in Allston, then drive down to the transmitter in Hull and do the show from there. He'll return the records in the morning. We can see the ad in *Broadcasting* now, "Must have new type car, willing to travel." Or, "To Hull and Back."

Film Camera Case *Cont'd from Page 14*

The Chairman of the Arbitration Board concluded his decision by saying: "Our primary guide to the intention of the parties must be the Agreement. And where, as here, the language of the Agreement is clear and its literal or dictionary meaning plain . . . and it was not shown by the Company that such meaning is either absurd or inconsistent with or repugnant to other

parts of the contract that meaning must be accepted in the absence of a showing of a technical or trade meaning which is different. The Company did not establish such a different technical or trade meaning and, therefore, it is necessary only to read and apply the language of the Agreement to the issue before us."