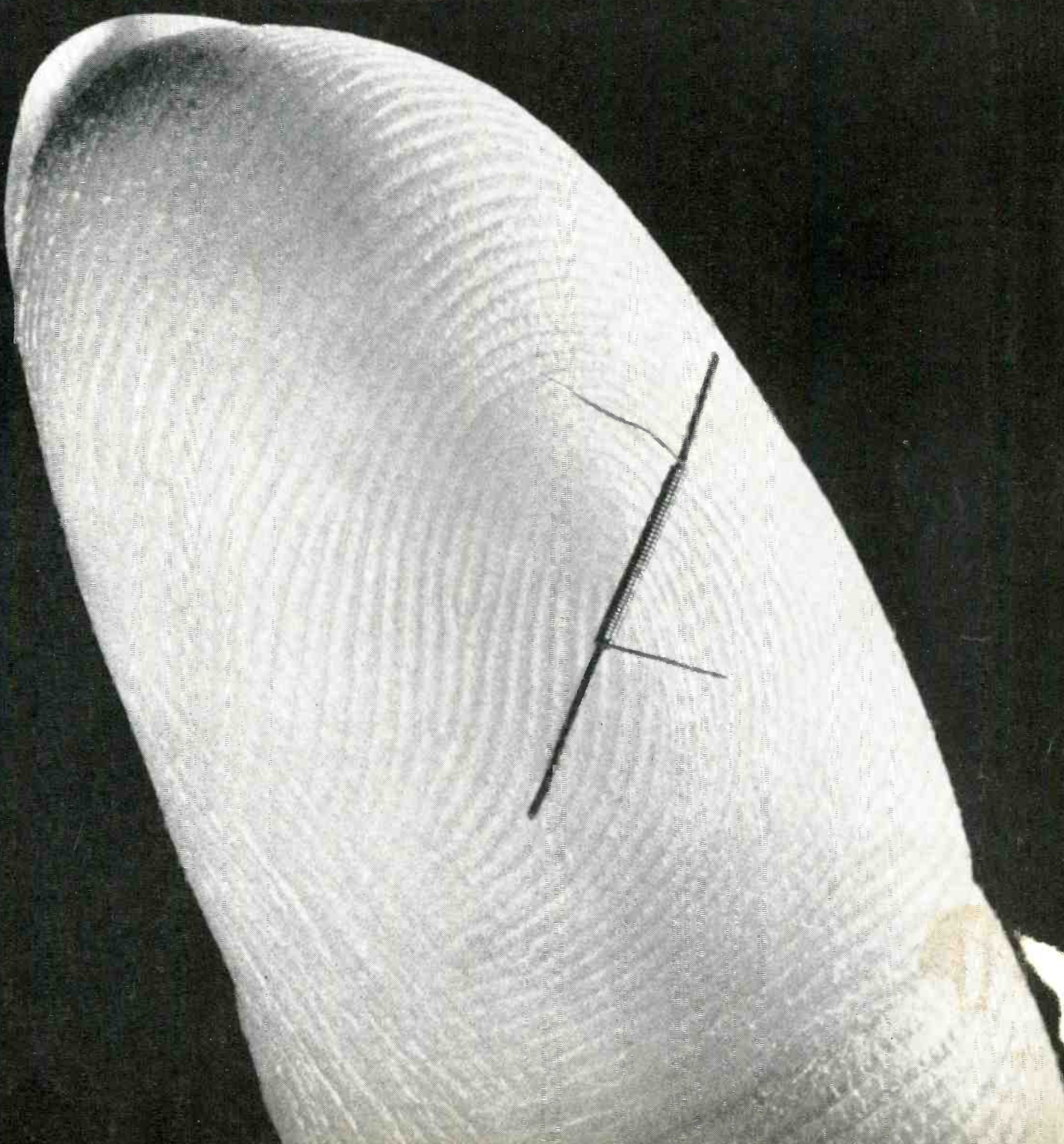


RADIO, TV and RECORDING



TECHNICIAN-ENGINEER

SEPTEMBER, 1957



RADIO, TV and RECORDING
TECHNICIAN-ENGINEER



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The INTERNATIONAL BROTHERHOOD of ELECTRICAL WORKERS

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JEREMIAH P. SULLIVAN International Treasurer

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... the cover

A single cryotron is dwarfed by a human finger in this magnified view of the latest wonder of the electronic world. The tiny device is a space-saving substitute for the vacuum tube and the transistor in many jobs. It consists of a straight piece of wire about a tenth of an inch long wound with a control wire about the size of a human hair. The cryotron is a superconductor at low temperatures. For more about this revolutionary device turn to Page 12 of this issue.

commentary

A great deal of finger-pointing has been going on recently. Everyone blames "inflation" on everyone else, confusing the general public—which is perhaps the objective, after all—but generally leaving the impression that rising wages are responsible and that "labor" is really to blame. Such an impression is entirely erroneous.

In the first place, there is no such thing as "wage and price" inflation. Inflation is born of only one source—the creation of too much money and credit. The direct consequence is the lessening of the value of money—which brings on a general increase in prices.


Wage increases—upon which factor many industries have based price increases—without a corresponding increase in the money supply will cause deflation. The increase in the money supply can be accomplished only by the government.

Now, we've said it. Let none say we didn't get into the finger-pointing act. But let's put the monkey where it belongs and evaluate the charges and counter-charges on the basis of the principles of economics.

the index . . .

For the benefit of local unions needing such information in negotiations and planning, here are the latest figures for the cost-of-living index, compared with the 1956 figures:

July, 1957—120.8; July, 1956—117.0.



**What happens to an Oklahoma engineer
On transmitter duty when a twister
Comes roaring up the hill?**

TORNADO COMING!

THE news flash had just come in . . . a 21-mile-long swath had been cut through the northwestern suburbs of Dallas, Texas, by a swirling tornado. In the wake of the twister were 10 dead, 200 injured, and 574 buildings destroyed. It was one of the best-documented and most-photographed tornadoes in history. You may recall the unusual newsreel coverage on TV.

The Dallas tornado was only one of a number spawned that tragic spring day. Nearby Oklahoma was badly battered by 15 twisters.

A hundred miles to the north at Ardmore, Oklahoma, KVSQ-TV transmitter technician Chester Rollins had just taken his 4:30 meter readings. Intermittent rain had been pelting the top of the mountain all afternoon, and each time he had to periodically adjust for the dips in line voltage he studied the valley below. Exactly one hour before, a tornado had been sighted at Ringling, thirty miles to the southwest.

As Rollins searched the sky, two black cumulonimbus clouds seemed to merge high above Caddo

by **BILL KOLB**
Chief Engineer of KVSQ-TV

as told to **C. L. WIDNEY**
Engineering Dept., WLW-TV

Photos by Huckleberry,
Oklahoma Gas and Electric.

September, 1957





A slightly weather-beaten Chester Rollins stands amid the shambles of the transmitter building with his empty coffee cup. The roof in this portion of the building was blown away by the Oklahoma twister.

Creek, eight miles southwest, in the direction of Ringling. The deadly vortex grew and started reaching for the peaceful valley below. Like a fast express train, the funnel bore down inexorably toward the transmitter. Rollins quickly called the studio in Ardmore 15 miles to the south by two-way radiophone, telling technicians there that the tornado, already airborne for some five miles, was rapidly nearing the base of the Arbuckle range and that he was directly in its path.

Although FCC regulations don't specify what to do in such emergencies, Rollins started the portable generator to operate the S-T Radiophone if the power should go off, and hit the main TV circuit breaker, taking the transmitter off the air.

A mile below on State Highway 77 a pickup truck was swept up and dropped into the creek a hundred yards away, killing the driver. . . . The tornado, now fully a hundred yards wide, followed Highway 77, where half way up the mountain the drivers of a large semi-trailer truck and two passenger cars had little choice but to set their brakes and brace for the inevitable, as escape was impossible. The whirlwind picked up the 18,000 pound van as if it were a toy, then hurled, twisted and dragged it crazily across the open field. At the crest of the mountain near the transmitter two more heavy trucks were upset in the middle of the road.

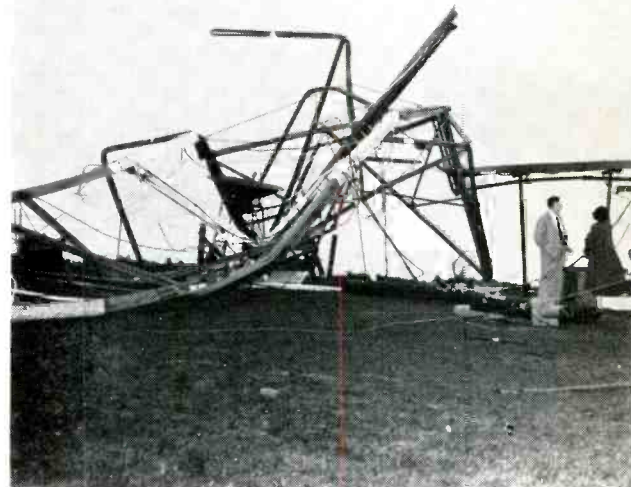
Rollins then grabbed the mattress from a nearby cot and dived for the floor between the wall and the equipment racks, where he wrapped himself and the radiophone unit into a cocoon-like shelter. As the low rumble of the tornado in-

creased in timbre he kept up a running account of what was happening, which if it had been rebroadcast would have been another radio first!

These split seconds must have seemed like years to the concerned technician, as the studio crew listened helplessly. Like an explosion it hit . . . the heavily loaded 355-foot-high self-supporting tower danced indecisively at the top, trembled dizzily in each direction, made a large, twisting, circular swing, bobbed southward and convulsively fell to the north with a thunderous crash! Simultaneously the transmitter roof and tower debris took off in a northeast direction for parts unknown, and a flood of rain poured all over the exposed equipment.

The mattress-shelter protected him from the flying timber and glass, but the two-way radiophone antenna mounted on the tower was no longer aligned with the studio. In spite of this he could still "read" the studio, but they could not hear his modulated signal. The studio technicians were worried and desperately tried to maintain radio contact. A spark of genius was promptly born of necessity: Rollins was instructed to "key his transmitter three times if he could hear." The keying broke the squelch at the studio . . . the hoped-for indication that informed the studio crew that he *had* survived the deafening onslaught!

Miles away at his home, Chief Engineer Bill Kolb had observed the black funnel ominously approach the tower. Almost immediately the studio relayed a plea for help to him by telephone. The 15-mile dash to the transmitter was made in record time.



Technician-Engineer

Oklahoma Gas & Electric Corporation's 66 kv hi-line at the foot of the mountain was clobbered first, causing the high speed substation breakers to "blow" and the Ardmore load dispatcher's lockout alarm-signal to indicate. A few seconds later the fixed-base, two-way relay transceiver that shared KVSQ's TV antenna went dead, a serious loss of communication so vital to the field crews at the very moment it was needed most.

Southern Division line crews arrived at the KVSQ-TV scene about the same time as Bill Kolb was helping his badly shaken transmitter technician secure the equipment. Beads of sweat that seemed the size of marbles soaked Rollins after the disaster.

Although most of the transmitter building was unroofed, the squall-line rains didn't do so much harm as they might have because Rollins had the presence of mind and the high sense of duty to cover the transmitter and rack equipment with blankets and torn sheets of roofing tarpaper. In spite of this, some of the auxiliary test equipment and the spare tube stock suffered water damage. However, the diplexer and dual rigid co-ax transmission lines were ruined as well as the tower. The NBC-TV network microwave relay receiver mounted on the lower part of the tower was severely damaged, but by a quirk of nature, the STL microwave link mounted on the edge of the roof merely had the "dish" nudged upward by the giant wind!

As every experienced broadcaster knows, there is a lot more work to re-establishing a TV signal

than merely hanging a simple fishpole antenna out of the nearest window.

A single bay emergency Channel 12 antenna, diplexer, co-ax, and a 70-foot long, guyed utility power pole were immediately ordered as temporary replacements.

The Augean effort and all the necessary testing required 19 days before regular programs could be resumed. This emergency operation continued nearly four months, until a new high-channel, six-bay radiator was ready for full-power operation the middle of August, almost a year to the day from the time KVSQ-TV first went on the air.



Two Oklahoma Gas and Electric Company service men report damage to the 66 kv line and radio antenna located in the Arbuckle Mountains.



ABOVE: H-structures on the Davis-Ardmore Line were bent and twisted by the roaring tornado. Highway 77 is at left.

LEFT: Forty-five minutes after the big blow, Rollin's wife and brother-in-law were on the scene. Here, they check tornado damage. The microwave dish atop the building faced the sky.

Designers Have Upgraded
The Minimums For
Antenna Stability

Other Towers Have Tumbled

CAN any man-made antenna structure resist the tremendous forces of tornado winds? Many engineers doubt it. Though some towers have withstood gales and hurricane-force winds, few antenna designers believe that antenna towers can stay rooted and upright in the vortex of a howling twister. Internal wind speeds within the cone of a tornado have never been measured, but horizontal wind speeds in the paths of tornadoes have been studied, and Weather Bureau officials believe the cone winds may reach as high as 500 miles per hour.

The KVSO-TV tower was the first antenna structure to be hit directly by a twister, though high winds have damaged and destroyed several others.

Hurricane Carol tore down the WBZ-TV tower in Boston, Mass., in 1954. The destroyed 470-foot tower was later replaced by a 1,100-foot structure, having 70 pounds per square foot wind rating.

KOA-TV of Denver, Colo., lost its tower on Lookout Mountain. KELO-TV, Sioux Falls, S. Dak., had an antenna crash down from undetermined causes. (There was a light 10 miles-per-hour wind at the time, the local weather station reported.)

Two other stations whose antennas went kerplunk were WJHL-TV of Johnson City, Tenn., and WALA-TV of Mobile, Ala.

The tower of KDKA-TV, Pittsburgh, Pa., suffered severe wind damage and had to be rebuilt. It was replaced with a new 675-foot tower with a 60-pound per square foot wind rating.

Wind damage during construction caused the WMT-TV tower at Cedar Rapids, Iowa, to come atumblin' down last December. The top guy wires were not yet in place. This tower was later replaced by a duplicate 1,355-foot structure.

WSM-TV at Nashville, Tenn., suffered tower damage during adjustment of guy wires during construction.

Up until 1950 relatively little was known about proper standards for high-tower TV design. The advent of FM and television placed a premium on super-high structures. Tower design recommendations, which were based upon experience in the building construction industry, were re-evaluated and upgraded at that time by an antenna structure committee of the Radio and Television Manufacturers Association.

After the unusually-destructive 1954 hurricane season, when the WBZ-TV tower was blown down, recommendations for East Coast antenna structures were raised to a minimum of 40 pounds per square foot wind loading. This requirement is not made mandatory by the FCC or any other agency, however. Design strength is left up to the station at time of purchase.

Station management sometimes is inclined to save the costs of the supporting tower, because of the heavy expense of the transmitting antennas. The antennas at the top are the vital components, they figure. The tower just keeps them up in the air.

A 40-pound per square foot rating tower is the minimum recommended for TV nowadays, and a heavyweight 110 is the strongest in present use.

It is a matter of conjecture whether or not a 110 or even the standard 50 tower would be able to resist tornado winds. Tornadoes have such a severe damage gradient that a few feet either side of the center of its vortex could make a tremendous difference.

The U. S. Weather Bureau is now making detailed studies of tornadoes in an effort to understand their origins and to be able to predict more accurately their paths. Though twisters are the least extensive, they have the dubious distinction of being the most violent of all storms. In all the world there seems to be no area more favorable for the formation of the big black clouds than the plains east of the Rocky Mountains. Kansas averages 28 a year; Oklahoma, 21, and the big state of Texas, 24.

Meteorologists say that tornadoes occur in association with thunderstorms, especially those from which hailstones fall to the ground. They frequently are found in a series of two or more, in which case there is usually a primary twister and one or more secondary storms.

Transmitter technicians on lonely duty on hill-tops in the danger zones are told to seek shelter if one approaches and stay away from windows.

Citizens are told to keep tuned to their local radio and television stations for latest tornado advisory information.



"The drive against labor has proceeded in every forum."

ions. In the fiscal year ending June 30, 1956, the Board issued 314 complaints against employers and 399 against unions.

It is a source of bitter amusement to see persons who have always attacked the workers when they sought to better themselves and who opposed every measure to protect the rights of men and women to join and assist labor organizations, suddenly bleed for the right of workers to be free of restraints in employment. The same forces in our society that called the Wagner Act an

It's a Part of the Record

Notes During the Tenth Anniversary Year of Taft-Hartley

THE Annual Report of the National Labor Relations Board for the year ending June, 1947, showed that in 75% of the elections which it conducted, unions emerged victorious. At the time, a record percentage of the nation's work force belonged to unions. In the preceding decade, the ranks of organized labor swelled five-fold. The prevailing opinions of the day indicated that labor unions were an integral part of the pattern of American society. Only arch-reactionaries openly proclaimed themselves opposed to unions. Many of the most vicious anti-union employers of the '30's were sitting down with unions and bargaining in good faith. Employers generally had come to realize that unions were here to stay.

Then came August 22, 1947. "D-Day" for the Taft-Hartley Law. Labor recognized Taft-Hartley for what it was—and pointed out that it was riddled with dangers—both hidden and obvious. Let's look at the record—ten years after its passage.

Where unions won 75% of representation elections in 1947, they are winning 65% today. In the decade preceding Taft-Hartley, less than 10% of the work force in the U. S. was unionized. By 1947, 25% were unionized. Since Taft-Hartley, we have seen tremendous efforts exerted by unions to hold their own—but in the past two years, organized labor has been dropping behind. Last year, less than 300,000 employees were in bargaining units where unions won elections. In 1955 there were 378,000; in 1954, 343,000.

According to the Board's own statistics, in the first year following the passage of Taft-Hartley, the Board issued 399 complaints of unfair labor practices against employers and 142 against un-

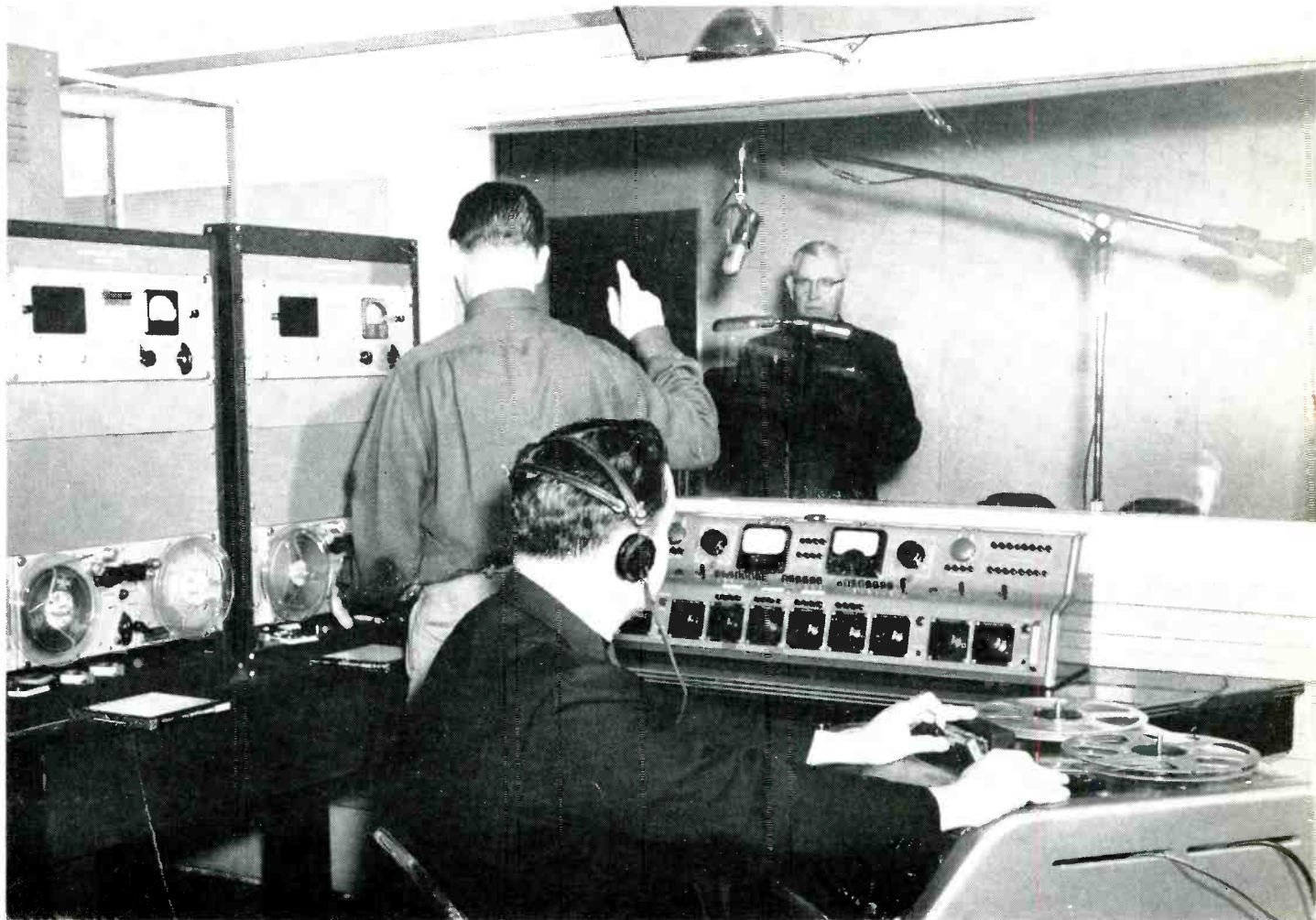
illegal invasion of the system of free enterprise now see "right-to-work" laws as a "necessary protection for the working man."

These so-called right-to-work laws are evil, not only because they interfere with free collective bargaining but because they encourage parasites in the factories and business establishments who benefit from the union but who will not support it.

The drive against labor has proceeded in every forum, from state legislatures to the public press and radio. One or two—or a handful—of union officials are accused of wrongdoing and the cry for drastic action goes up over radio, television and in newspapers and magazines. Have you read in the past year of the 9000 proven violations of the child labor laws by employers?

Dave Beck is accused of embezzling \$300,000 from the Teamsters and there is an immediate demand that unions be subjected to control by the Federal Government. Where are these righteous protestations when corporation after corporation has its accounts pilfered by captains of industry? Where are the cries for wholesale and widespread reform when a cabinet official is shown to be involved in a conflict of interests? The demand is made that unions be made wards of the government if one official has been guilty of misusing his position of trust.

We do not suggest that unions are perfect or that we do not have our own problems which need tending. But labor has made gigantic progress toward setting its own house in order. And organized labor has done much to raise the moral level of the nation—without Federal regulatory legislation.



IN the city where the IBEW was born more than 60 years ago—St. Louis, Mo., they've been pioneering in sound recording for almost three decades. Two recording companies employing IBEW technicians are setting the pace for the industry with quality recordings of all sizes and speeds.

Technisonic Studios, oldest of the two, was founded in October, 1929, at the Central Institute for the Deaf. One of its initial objectives was to make perfect, permanent records of speech defects for the institute. From the beginning, Technisonic has conducted research into recording methods. In 1930 a study was undertaken to determine optimum properties of recording studios, and an experimental studio was designed and built. That same year, some German recording equipment was secured and integrated with Technisonic's custom-built apparatus. Technisonic was one of the first to *engrave* rather than *emboss* a lacquer-coated metal base disc. All of the many problems connected with lateral disc recording were investigated, and many answers obtained which were valuable in later research.

The Central Institute for the Deaf began a series of pure tone measurements of human hearing, and Charles Harrison, head of Technisonic, was put in charge of instrumentation.

These were years of pure academic work in recording. In 1935, the company went commercial when St. Louis radio stations asked Technisonic to take over some of their recording problems. By the following year, the company had constructed a new studio for commercial work, and in the ensuing years (1937-1951) Technisonic recorded over 40,000 16-inch electrical transcriptions for delayed broadcast.

During April, 1940, a Jesuit Father from St. Louis University requested the aid of the company in preparing "The Sacred Heart Radio Program." At that time, the program was carried on one station. With an assist from Technisonic, "The Sacred Heart Program" is now heard on nearly 1,300 stations.

Meanwhile, the company continued experimental work. It developed the first pre-set, pre-selector sound effects machine in 1938, selling it to Station KWK. In 1941 new transcription

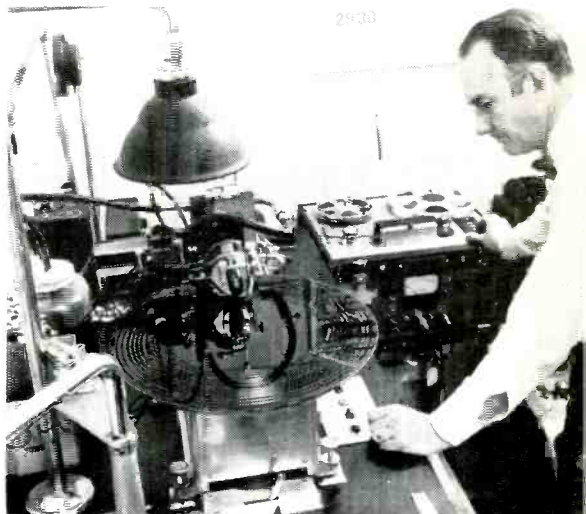
AT LEFT: At Technisonic Studio, the words of Father Eugene Murphy are recorded on tape to be included in the Sacred Heart Program, heard around the world.

TOP RIGHT: Announcer Bob Anthony delivers a radio commercial which is being recorded on equipment in the background. Technician Arthur Wolf, a member of Local 1217, is in the control booth of Premier studios.

CENTER RIGHT: Wilson Delzell of Premier watches as the taped commercial is transferred from the recorder to the master record.

BOTTOM RIGHT: Premier Tape Editor Ben Gottschalk edits various renditions of Anthony's commercial.

All are St. Louis Post Dispatch photos, used with permission.



Saint Louis Studios Score Many Recording Industry Firsts

equipment was installed by the Technisonic developed "balanced vector" method of reducing mechanical distortion.

Now in well-arranged facilities at 1201 Brentwood Boulevard, in St. Louis, the company employs five full-time IBEW technicians. Since December, 1954, films for television have borne the IBEW Local 1217 union label.

The Premier Film and Recording Co., another veteran St. Louis recording firm, furthers the city's reputation for good recordings. It handles "The Lutheran Hour," now heard over 1200 stations and in eight different languages. When Wilson Delzell, manager of the studios, started in the business in the early Thirties, all recording was done on thick wax discs imported from Germany. They were two inches thick and 18 inches in diameter. When someone flubbed after 14½ minutes of a 15-minute recording, they had to shave the disc and start all over again.

Premier does a land office business during political campaigns, recording candidates speeches. It handles several radio shows and some commercials. Like Technisonic it, too, is growing with the industry.

September, 1957

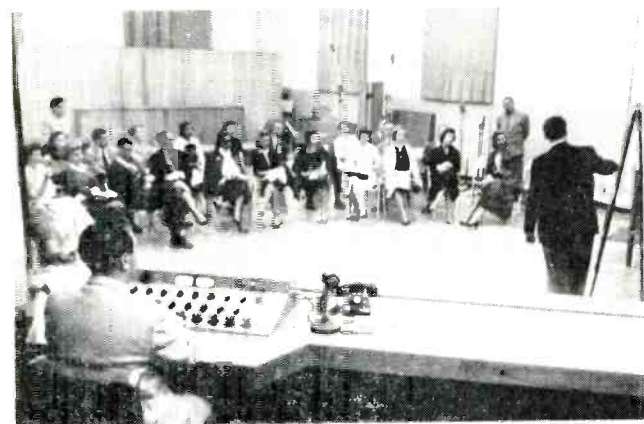
Men of Local 45 work in CAPITOL RECORDS TOWER



Looking like so many stacked records on a turntable spindle, the headquarters of Capitol Records in Hollywood is the latest in ultra recording facilities in the thriving industry.



William D. Abbott of IBEW Local 45 at the mixing console of a Capitol Records studio, as he presents a high fidelity demonstration of a passing locomotive for some studio visitors.



Looking over Bill Abbott's shoulder, we see the members of a conducted tour of the building seated in a first-floor studio as they listen to a guide's explanation of hi-fi work.



A member of the Building Service Employees International Union brushes down the walls of a studio as Peter Dent of Local 45 prepares to make a duplicate master recording.

JUST off the famous intersection of Hollywood and Vine in the nation's film capital are the ultra-modern studios and recording facilities of Capitol Records, Inc. There among the deep rugs and acoustical baffles work members of IBEW Local 45.

They toil in a building planned from the ground—and even underground—up for the production of high fidelity records. Designed by Architect Welton Becket, it was Hollywood's first completely air conditioned office building.

Michael Rettinger, acoustics consultant, designed the studios to achieve "controlled acoustics." The general reverberation as well as the localized reverberation (or ratio of reflected to direct sound energy) is made variable by the general use of movable panels which are reflective on one side and sound-absorbent on the other. Ample use is made of wood in the studios to obtain "effective tonal reinforcement." Rettinger explains the reason for the use of wood as follows: "Unlike a sheet of metal or plastic, a wood panel is able to vibrate over a wide range of musical pitch, thereby supporting all tones without selective emphasis."

The studios themselves, three in number, occupy nearly all of the first level of the 13 story (height limit in the Los Angeles-Hollywood area) reinforced concrete structure. The balance of the first floor houses tape and disc facilities.

Only the studio floor is rectangular in shape. All the others are full 360-degree circles, the first such shaped office building to be constructed in the world.

The floors of the studios are "floating floors"—which means that they rest on resilient material known as asphalt-impregnated cork which prevents the transmission of undesirable noises or vibrations into the studios from outside sources.



WHAT TYPE OF UNION MAN ARE YOU?



UNION members are of seven types, two sociologists recently suggested in an article in the *American Journal of Sociology*.

The types can be identified by their attitude toward the union, say Joel Seidman, associate professor of social sciences at the University of Chicago, and Daisy L. Tagliacozzo of Wright Junior College.

Under the auspices of the University of Chicago's Industrial Relations Center, the two researchers studied the memberships of a local union of farm-equipment workers in Chicago, a plumbers' local in a large Midwestern city, and a coal miners' local in central Illinois.

These are the types of union members they found:

1. The "ideological unionist," who is the extreme case of enthusiasm and devotion. He thinks union activity will achieve a different social order; sees union-management relationships as one aspect of the class struggle; tends to know something of the history of labor, and rejects any suggestion that he be appointed to a foreman's rank. These are few in number, the sociologists found, and are mainly in metropolitan areas "where the radical political groups have strength."

2. The "good' union man," who accepts the union's goals fully and supports all its objectives. He, unlike the "ideological unionist," lacks any desire to change the social order. Most active unionists, the study showed, such as men who

serve as stewards, are "good" union men. This group, together with a sprinkling of ideological unionists, makes up the leaders and the active groups within the union.

3. The "loyal but critical" members, who make up the dissident faction and, although believing in unionism in principle, often quit because they are at odds with the local leadership.

4. The "crisis activist," the man who is relatively inactive and content to let the officers run the union. He does man the picket line and attend meetings, however. These men do not join unions as an aggressive step against management, but rather to defend themselves against management's abuses, whether actual or potential.

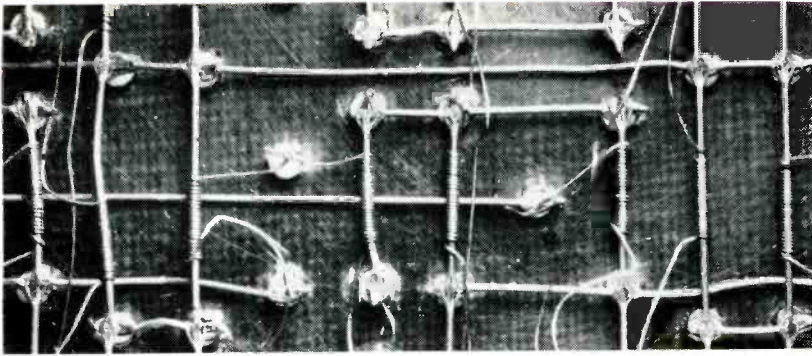
5. The "dually oriented union member" is so-called because he completely supports the union, but views production and efficiency from the management point of view.

6. The "card carrier," who is completely disinterested in the union.

7. The "unwilling unionist," which speaks for itself.

Of the last, the Chicago researchers explain that some dislike the union because they have been hampered in their progress by seniority regulations, or because they feel their skills entitle them to promotion on their own merits.

Needless to say, there are also some anti-unionists. But the researchers found these to be in the minority.



The maze at left is a cryotron woven memory, greatly magnified. It is a simplified circuitry made possible by the revolutionary device shown on our front cover. For more of this electronic development read the story below.

The Coldly Efficient Cryotron

A NEW low temperature device called the "Cryotron" could conceivably revolutionize the design and operation of electronic computers. Consisting essentially of just two wires, one wound in a coil around the other, and operated at the temperature of liquid helium, it can take the place of complex vacuum tubes and transistors now used in these calculating machines.

The study and development of such practical application of the Cryotron is now being carried out at Arthur D. Little, Inc., a Cambridge, Mass., consulting research company. The device itself was invented by Dudley A. Buck, a graduate student and instructor at the Massachusetts Institute of Technology. Mr. Buck is also serving as a consultant to Arthur D. Little in the Cryotron work. This development work is being carried out under the direction of Albert E. Slade in ADL's Advanced Scientific Laboratory which is under the supervision of Dr. Howard O. McMahon, ADL Scientific Director.

In addition to its small size and simplicity of construction, the Cryotron has certain other technical advantages over vacuum tubes and transistors

that will enable a Cryotron computer to do things which could never even be considered for circuits using conventional elements.

Thus, for example, Mr. Slade says it will be possible to build a computer with a large enough memory to contain multiplication tables for ten digit numbers. Ordinary computers multiply two given numbers by running through a complex series of additions and subtractions each time such a multiplication is desired. A Cryotron computer, on the other hand, could have the answer already built into its memory in the form of multiplication tables so that it would simply look up the answer when desired. This, Mr. Slade explains, would revolutionize computer operations for it would free the machine of the need to work out for itself standard problems such as multiplication and leave it free to go on to higher type mathematical and logical operations. It would be prohibitive to try to design a computer to do this with tubes or transistors. But such a Cryotron computer could be built into the space occupied by a standard desk.

The Cryotron makes use of the phenomenon of superconductivity. At very low temperatures near absolute zero (minus 459.69 degrees Fahrenheit), many metals and alloys suddenly lose all of their electrical resistance. An electrical current once started in a superconducting circuit will continue flowing indefinitely even after the voltage source has been removed.

However, if a superconducting wire is placed in a sufficiently strong magnetic field, its resistance suddenly reappears. The strength of the magnetic field needed to re-establish the resistance is determined by the material of the wire and the temperature at which it is operated.

The Cryotron consists of a wire (called the "gate" wire) which has been made superconduct-

SPECIFICATIONS

Length: 0.2, 0.3 or 0.6 inches

Control coils and gate: Coils of bare annealed 0.003" Niobium wire, in series, doped with cellulose acetate and insulated from the gate by 1/2" mylar ribbon; wound on the bare annealed 0.009" Tantalum gate.

Current gain:

$$\frac{\text{Max. gate current without self-quenching}}{\text{Min. coil current to quench gate}} = \frac{1.2a}{0.4a} = 3$$

Normal operating current: $I_{\text{coil}} = I_{\text{gate}} = 0.6 \text{ amp.}$
Resistance: 5 milliohms/inch of gate

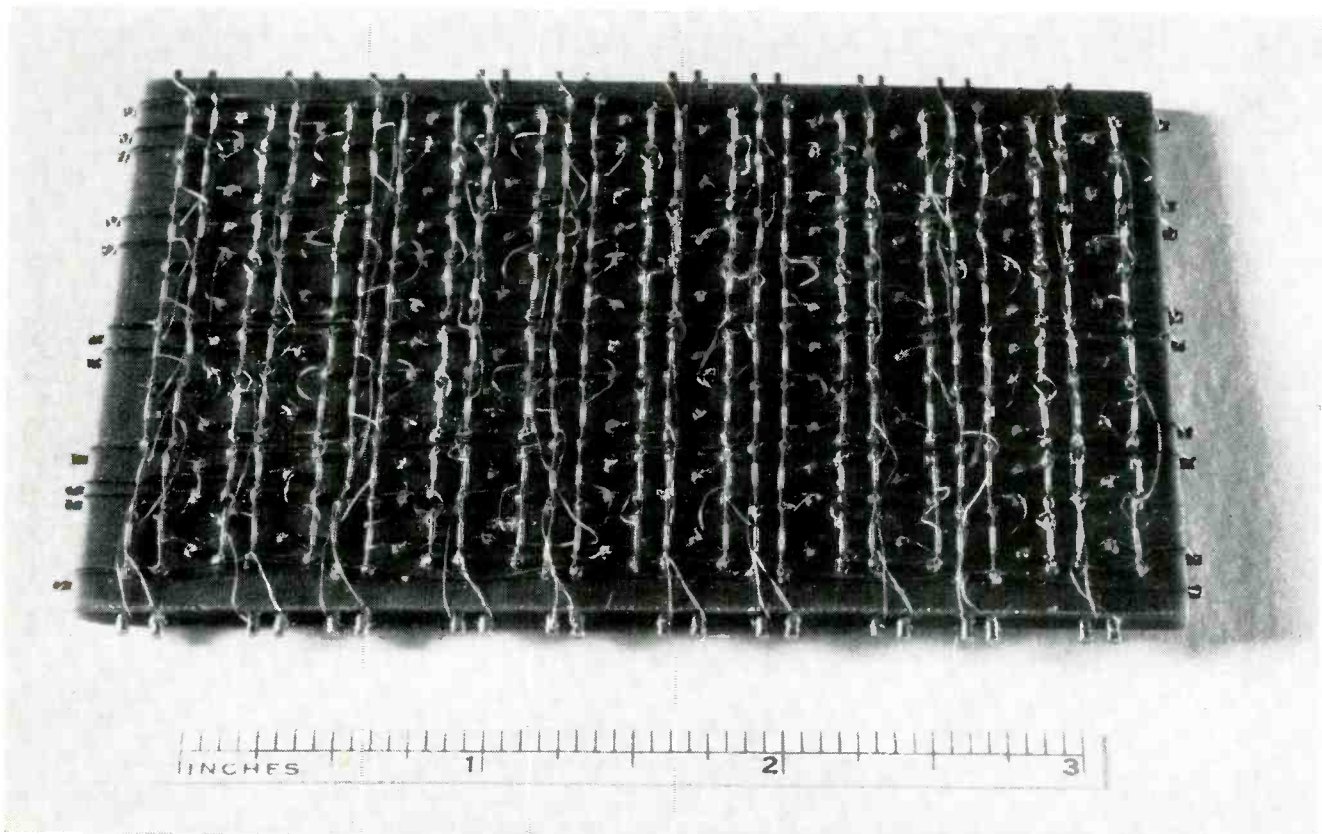
ing by immersing it in liquid helium. Current flowing through this gate wire is controlled by a second wire which is wound in a coil around the gate. When a small current is sent through this coil it sets up a magnetic field that is strong enough to restore the resistance in the gate wire and make it non-superconducting again, thus effectively shutting off current that had been flowing in the gate wire.

An individual Cryotron consists simply of a gate wire and its control coil. This is the basic device that Mr. Buck incorporated in his invention. Its commercial development in practical computer applications, as they are being developed at Arthur D. Little, Inc., envisions using these individual Cryotrons in various arrangements that will perform all the functions now filled by vacuum tubes or transistors.

As described by Mr. Slade, these applications could revolutionize the computing art. The built-in multiplication table is only one example. In another memory application, he says, it is now possible to build memories, using Cryotrons, that will "read out" information almost instantaneously when required rather than causing delay while an item is found by the searching techniques used today.

In ordinary computers, a specific item stored in a memory can only be found by scanning a recording tape or drum or by searching among thousands of tubes, transistors, or magnetic memory elements one by one. In a Cryotron memory, on the other hand, all memory elements can be searched simultaneously while only those containing the desired information will respond. This is an enormous improvement in efficiency and speed of access in computer memory design.

However, Mr. Slade emphasizes that applications such as these are still in the research and development stages. There is still a great deal of research left to do on the Cryotron circuit development and on the techniques for building and for connecting these tiny elements in circuits. Then also there is the problem of the relative slowness of Cryotron operation. The units used today take several hundred microseconds to perform a given operation. This is very slow as computer operations are usually considered, slower than vacuum tubes or transistors. However, there is no fundamental reason why Cryotron operations cannot be speeded up greatly, and Mr. Slade says that several techniques for doing this already are being explored.



The size of a typical cryotron woven memory is indicated by the three-inch ruler above.

Picture Tube Heater

A new 450 ma, 6.3 volt television picture tube heater which incorporates control of both warm-up time and current, has been developed by the Television Picture Tube Division of Sylvania Electric Products Inc.

Wound from a straight piece of tungsten, the new 450 ma Sylvania heater is a double helical coil which makes possible the same cathode coating temperature achieved in 600 ma, 6.3 volt television picture tubes.

Unlike conventional 450 ma heaters whose coils are wound from a spiral section of tungsten wire, the Sylvania heater boasts a rigid mechanical structure with little tendency to "sag away" from the cathode cap. Heater "sag" can result in a prematurely slow heater and low emission.

Particularly suited for portable television receiver applications where reduction of heat is an objective, the new 450 ma, 6.3 volt heater features control of heater warm-up time to approximately eleven seconds. Heater current is regulated to a tolerance of $\pm 5\%$, which experience has proved of vital importance in series string receivers.

TV Into Reactor

No longer will the operator of an atomic power plant have to proceed without seeing clearly what is going on inside the reactor. For a closed circuit television camera is being groomed by General Electric engineers at the Hanford atomic plant for the ticklish task of patrolling the rear face of an atomic reactor. Designed to move automatically along a monorail near the wall of the reactor, the camera will transmit a picture of reactor components to an operator seated at a console behind thick radiation shielding.

Television already has been tried successfully in a Hanford building where the nuclear fuel plutonium is extracted from fissioned uranium, but this current test marks the first attempt to use television at a reactor site.

Picture on the Wall



Sylvania is pushing "gimmicks" in its current TV set promotion. Recently it came out with a "bonnet" to shade the picture of a portable set used on the patio. Now it offers a drop shelf for hanging a portable unit on the wall. The base which fits normal wall studs is shown at left above as a wall picture. At right it drops down to form a shelf for Sylvania's "Slim Jim" 17-incher.

Zenith PictureTube

Zenith Radio Corporation announced June 4 a new television picture tube "that challenges all comparisons for sparkling, fine-grain pictures high in contrast, detail and resolution."

The improvement in picture quality is the result of using the new "Sunshine" picture tube in combination with a new horizontal chassis designed by Zenith.

Combination of the two, allows up to 350,000 more cycles of picture information to reach the TV screen, the company reports.

Zenith Vice President G. E. Gustafson de-

scribed the new tube as a short, aluminized straight gun picture tube that requires no troublesome ion trap magnet. "Its novel gun," he said, "delivers two times the beam current for the same modulating voltage, with more than 100 per cent higher efficiency than electron guns used up to now. The significance of higher beam current in a picture tube is that highlight brightness and picture contrast are increased accordingly. Observers uniformly comment on the increased depth and sparkle of the picture on the new tube."

Gustafson said that because of its construction the low drive gun permits the increase in picture detail "without going into expensive and involved video circuitry."

Zenith's engineering executive said he considered elimination of the ion trap magnet "a significant advantage." The magnet is a source of trouble to set manufacturers, servicemen and set owners, he said, since it is subject to misadjustment and being "knocked out of place" during shipment and other types of receiver handling.

Vidicon Camera Tube

A new 1-inch vidicon camera tube, similar to existing RCA types 6326-A and 6198-A, but having much higher effective sensitivity, is being developed by the RCA Electron Tube Division. L. F. Holleran, General Marketing Manager, announced this month.

"The new developmental tube," Mr. Holleran said, "can be operated at signal-electrode voltages higher than those for the 6326-A and 6198-A, thus providing a substantial increase in effective sensitivity. Operation at high-signal electrode voltages is made possible by the tube's uniform photosurface and its extremely uniform dark current. Tests have shown that the new tube can be operated to produce a picture having a good signal-to-noise ratio and fast response to moving objects with as little as one foot-candle of highlight illumination on its optically flat faceplate.

"In order to achieve maximum sensitivity with this new developmental vidicon, the camera video amplifiers must be designed to handle high values of dark-current signal in addition to the video-signal current. Scanning linearity of the deflecting circuits must also be precise to produce a uniform black-level signal.

"Because the spectral response of the tube covers the entire visual spectrum, it can translate color accurately when operated in a color camera with appropriate color filters and optical sys-

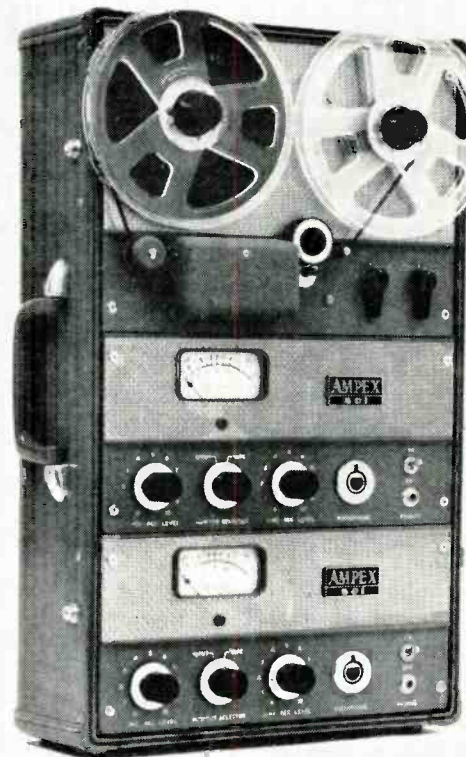
tem. The tube has a resolution capability of about 600 lines.

"The developmental tube is intended for both broadcast and industrial use in compact black-and-white and color television cameras.

"Like the 6326-A and 6198-A, the new vidicon is designed without a side tip. In comparison with vidicon types having a side tip, the tipless design permits use of deflection and focus components that reduce the power required for deflection, and at the same time improve the center-to-edge focus."

The tube, Mr. Holleran said, is now being sampled to equipment manufacturers.

New Two-Track Recorder



The Ampex Corp. has just announced production of its Model 601-2 portable two-track stereophonic recorder. It uses precision in-line heads for recording and reproducing. Inter-channel crosstalk is below the inherent noise level. Separate microphone and line inputs and level controls on each channel permit stereophonic mixing. The unit records both stereo and single-channel tapes and plays back stereo, full or half track tapes. Convenient plug-in transformers are available for low impedance microphone operation.

Performance of the Model 601-2 is indistinguishable from that of Ampex Models 300-2 and 350-2 at the 7½ ips tape speed.

Price, in Samsonite carrying case, is \$995.

Station

Breaks

Columbia Records Settles

IBEW employees of the Columbia Records Division of CBS, Inc. went on strike in New York and Chicago on Monday, July 1, and returned to work on Monday, July 15. Picketing of 485 Madison Avenue, New York, the executive headquarters of the parent company, caused CBS Radio some inconvenience but, on the whole, the broadcasting operations in radio and TV were relatively unaffected.

Negotiations for a renewal agreement had been in progress for some weeks, but no substantial progress was made until the strike had been in effect for more than ten days. Chief issues were work jurisdiction, the (straight) eight-hour day, the regulation of experimental work and the geographical area to be covered by engineers from the company's New York and Chicago studios.

Business Representative Robert Pantell of Local Union 1212 and International Representative Russell Lighty represented the IBEW and Vice President Herbert M. Greenspon and Secretary Kenneth E. Raine represented the company, at the final negotiations. Representatives of both sides of the controversy expressed themselves as being satisfied with the terms of settlement and praised the efforts of Miss Eva Robbins, who represented the New York State Board of Mediation during the final stages of negotiation.

Radio Passes TV

Disc jockeys take heart:

For the weeks of July 6, 13, 20, and 27, recently passed, more Americans listened to radio than watched television, Sindlinger and Co., market analysts of Ridley Park, Pa., reported last month.

This means that for the first time in three years radio has surpassed TV as a popular summertime entertainment medium. The average radio listening time recorded by the Sindlinger organization was 18 hours a week, compared to 15 hours of TV watching per week.

Sindlinger credited the summer heat plus increased auto travel for the rise in radio listening.

People You Should Know



Gemuetlichkeit is enjoyed at the Miller Brewing Co. by members of the Wisconsin Broadcast Engineers' Local Union 715. Left to right: President James A. Wilkerson, Milwaukee; Robert J. Schaack, Wauwatosa, financial secretary; Will Simonsen, Milwaukee, vice president, and Martin Johnson, Milwaukee, a member of the Executive Board of the Local Union.

Heart Surgery Telecast

Members of Local 347 employed at Station KRNT-TV, Des Moines, Iowa, recently handled the engineering problems resulting from the telecast of a heart operation from the Iowa Methodist Hospital.

It was the station's first live telecast of an operation. In preparation for the show, the station arranged for its camera crew and production staff to be briefed beforehand by watching a similar operation two weeks before the one the station carried.

The program was presented in cooperation with the Iowa State Medical Society. A team of heart specialists participated in the special telecast.

The station was on the air from 1:30 to 3:00, pre-empting all regularly scheduled shows to carry the special program. KRNT-TV used two cameras to cover the operation.

Technician-Engineer