



# JOURNAL

DIRECTED TO BROADCAST ENGINEERS AND EXECUTIVES

OFFICIAL ORGAN OF NABET — THE NATIONAL ASSOCIATION OF BROADCAST ENGINEERS AND TECHNICIANS



“We Interrupt This Special Bulletin to Bring You  
Our Regularly Scheduled Program”

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July

*Of, by and for the Broadcast Engineer*

1941

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*Symbol*



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July, 1941

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The ATE Journal is a privately printed monthly publication, issued by the Ass'n of Technical Employees Publications, Inc., a corporation of the State of New Jersey with office at 30 Rockefeller Plaza, N. Y. City. Editor's office: E. Stolzenberger, 116-03 91st Avenue, Richmond Hill, L. I., N. Y. Telephone, Virginia 9-5553.

The A.T.E. Journal is the Official Publication of the N.A.B.E.T. Advertising rates and information supplied on request. Subscription, \$1.50 per year. Single copies, except Christmas Yearbook, 25c; Christmas Yearbook, 50c, subject to availability. All remittances in advance. Foreign: Add postage.

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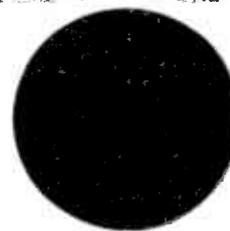
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# Portable Recording Equipment

By W. L. Lyndon

**T**HERE was a time during the growth of broadcasting when practically all programs originated from the studio or from the same building in which the studio and transmitter were located. This condition, however, did not exist for long as it was soon realized that many of the important events which had excellent broadcast value could not be brought into the studio. Such items as sports events, dedicatory programs and religious meetings had considerable broadcast appeal and, therefore, added a new phase to the system of broadcasting. The demand for handling such remote programs ultimately resulted in the development of remote pickup equipment which, in addition to providing quality comparable to that of a studio channel, also had to be reliable, rugged, easy to set up and operate and be portable in nature. Remote facilities have so expanded that today many a so-called remote job involves a technical layout of equipment that exceeds that required for the most elaborate studio pickup.

The art of making instantaneous recordings has gone through the same cycle of progress. It was started purely as a studio adventure in which the recording apparatus was set up in the control room and recordings made of a local studio show or a network program. Such an adjunct to broadcasting was immediately exploited by the advertising

ments. Slippage, "wows" and background rumble are of a mechanical nature and certain basic principles of mechanical design must be followed in order to insure satisfactory performance. If 16" records are to be used for recording or reproducing, this will have a direct bearing on the ultimate overall size of the equipment. This also determines to a great extent the weight of the equipment, as in order to arrive at the overall performance, the turntable platter must have the correct flywheel effect, especially when rim type of drive is employed. Ample driving torque is required, which more or less determines the size of the motor to be used. Reliable means of transmitting power from the motor to the turntable platter must also be used. We must also consider the background noise which may result from the motor, and, therefore, shock mounting and means of acoustically isolating the motor from the turntable platter is necessary. Equipment used to demonstrate recorded programs must have a good frequency characteristic with low distortion and it should be capable of satisfactorily reproducing records made by different manufacturers. Some such type records are lateral cut while others are vertical recordings. Instantaneous recording blanks are coated with a soft material and it is highly advantageous to use a lightweight pickup which considerably increases the playing life of this type of record.

It was with these main considerations in mind that the OR-1 was developed and designed so that good quality in both recording and reproducing might be obtained and still have equipment that could be considered portable.

The RCA Type OR-1 Portable Recording and Reproducing Equipment consists of three basic items; namely, the MI-11211 Portable Turntable and Reproducer, MI-4877-A (Type 72-C) Recorder and the MI-11212 Amplifier and Speaker Assembly.

The equipment is housed in two carrying cases covered in umber gray leatherette with reinforced corners. Handles are provided on each unit so that they may be conveniently carried by two persons when so desired. Provisions have been made for carrying and storing the 72-C Recorder in the portable turntable case. The above three items are the basic units required for recording and to this may be added a number of accessories which are listed later.

## MI-11211 Portable Turntable

The MI-11211 Portable Turntable consists of a 16" turntable platter with its associated drive and reproducer mechanism. The turntable is rim driven by a high quality synchronous motor. A unique feature is the use of two simultaneously operated rubber tired driver wheels between the motor and the turntable rim. These two wheels provide a positive means



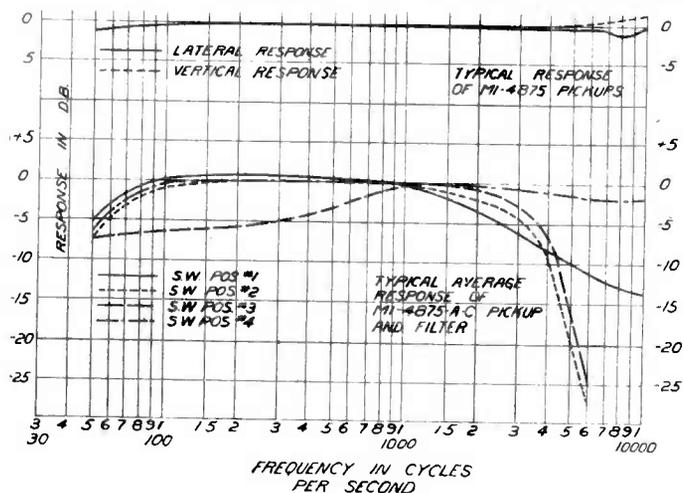
RCA MI-11211 Turntable

and sales departments of many of the stations, which resulted in the demand for equipment that could be brought to the spot to make instantaneous recording, as well as to reproduce transcribed programs to prospective clients.

In recording equipment there are several factors, such as fidelity of recording and playback facilities, slippage, "wow" content, background rumble and scratch level, that do not enter into regular broadcast remote pickup require-

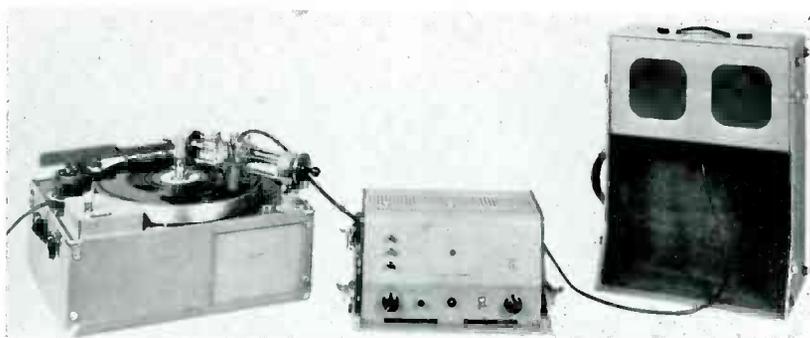
of power transmission and the actual slippage is held to considerably less than 1%. In order to prevent flats from developing on the driving wheels, the "on-off" switch, in addition to disconnecting the power, also releases both drive wheels in the "off" position. The driver wheel employs a special rubber which is capable of providing quiet operation and long service. The motor drive assembly is shock mounted from the turntable platter in order to eliminate motor rumble from being transmitted to the turntable platter. Associated with the "on-off" power switch is a speed change mechanism which allows a rapid and positive change from 33 1/3 to 78 R.P.M. This speed change is made by turning a single knob. The combination of motor and driving method provides a "wow" factor of less than .5 of 1%.

Located on top of the motor board are two pin jacks which provide a terminus for the recording head audio supply. There is also a five conductor receptacle which is used to connect the output of the pickup and the recording head to the amplifier. A ten-foot power cable with plug is provided and is arranged so that it may be stored within the unit when



the equipment is not in use. A power fuse is located near the "on-off" switch and a spare fuse is mounted on the recorder saddle assembly. All equipment is mounted on a common motor board which will permit it to be removed from its cabinet and installed in a recording table if so desired. A compartment is provided in the carrying case for storing the 72-C attachment when it is not in use. An opening is provided in one end of the cabinet over which is located a slide door. This door can only be opened after the turntable lid has been removed. A saddle is provided for holding the 72-C Recorder and sufficient straps are furnished so that when the mechanism is slid into place, there is no danger of its becoming loose and damaged during transit.

One outstanding feature of this turntable is the fact that it employs the new RCA MI-4875-B High Fidelity Combination Pickup Head with tone arm. This pickup is equipped with a permanent polished diamond stylus, has a very flexible armature and is capable of reproducing from either vertical or lateral cut records. It has a frequency range of from 30 to 10,000 cycles and the weight of the head on the record is

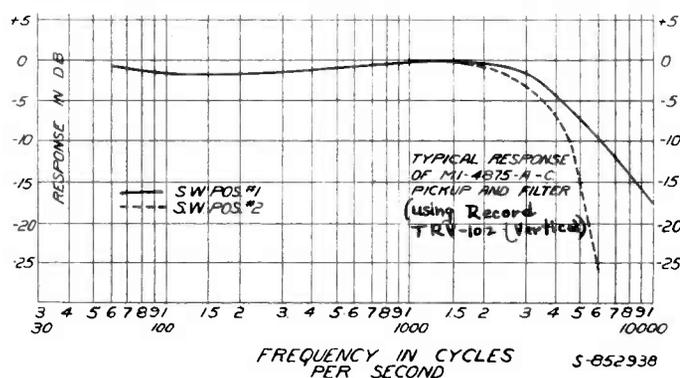


### RCA Type OR-1 Portable Recording Equipment

only one ounce. Special compensating filters are provided for the pickup and are selected by means of a rotary switch mounted on the motorboard. Four lateral positions permit properly reproducing all standard home and lateral transcription records. Two vertical positions provide the correct response for new and used vertical transcriptions.

#### Technical Data on MI-11211

<b>Power Required</b>	<b>Pickup Frequency Response</b>
105-125 volts	50 to 10,000 cycles, within ±3 db. for both vertical & lateral reproduction.
60 cycles (MI-11211)	<b>Pickup Filter</b>
50 cycles (MI-11217)	<b>Load Impedance</b>
45 watts	Output of pickup filter should be connected to the unloaded input transformer of an amplifier (flat response) designed for operation from a 250 ohm source.
<b>Turntable Diameter</b>	<b>Physical Specifications</b>
16 inches	Width 24"
<b>Turntable Speeds</b>	Depth 21"
33 1/3 and 78 r.p.m.	Height 12 3/8"
<b>Controls Provided</b>	Weight approximately 56 lbs.
(a) Motor Switch	
(b) Speed Change Control	
<b>Slippage</b>	
Less than 1%	
<b>Regulation</b>	
0.5% or better	
<b>Pickup Output Level</b>	
-64 db., below .001 milliwatt	



### MI-11212 Portable Amplifier and Speakers

The MI-11212 Portable Amplifier and Speaker Assembly is the companion unit for the MI-11211 Portable Turntable. Its carrying case divides into two sections, one of which contains the amplifier and cables and the other two "accordion edged" loudspeakers enclosed in a sealed compartment. The carrying case is finished to match the MI-11211 Portable Turntable.

The amplifier utilizes five stages of amplification having

an overall gain of 110 db. as measured from a 250 ohm source to a 15 ohm load. It has a rated power output of 12 watts with less than 3% rms distortion at any frequency between 50 and 7,000 cycles. The frequency response is well within  $\pm 2$  db. from 30 to 15,000 cycles, using 1,000 cycles as a reference level, and for normal gain setting with input terminated, the noise level is -60 db. below a 2 watt output rating. The high quality performance, from the viewpoint of frequency response, distortion and background noise, is on a par with the excellent reproduction obtainable from the two-way combination reproducer head as employed on the MI-11211 Portable Turntable.

A complete single stage preamplifier with input and output transformers is included as part of this amplifier. This provides a 600 ohm link circuit after the preamplifier for the insertion of equalizers when desired. All recording equalizers have a certain insertion loss. Therefore, in order to compensate for large variations in gain, a fixed pad is connected into the circuit. When an equalizer is employed, this pad is removed and the equalizer connected into the circuit. This arrangement provides substantially the same overall gain from the amplifier.

All the amplifier components are mounted on a simple type of chassis construction and all components are arranged so that electrostatic and electromagnetic couplings will not be a factor to contend with in obtaining a low background noise level. The tubes and components are protected by an overall metal housing. The front part of this housing acts as a front panel for the amplifier on which is located three binding posts for bridging input circuit, cut-out for a vu meter, head phone monitor jack, power switch, fuse, playback-record switch, step-by-step volume control and a "bridge-match" input switch. In the match position of the latter switch, the output of the microphone receptacle and the output of the pickup may be fed directly to the 250 ohm input of the amplifier. In the bridging position the three binding posts are connected to the 250 ohm input of the amplifier through a 20,000 to 250 ohm fixed "H" pad. This arrangement makes it possible to record or monitor programs from a zero level bus.

The microphone receptacle is located on the left end of the cabinet. It requires an MI-4630-B (Cannon) Plug which is not furnished as part of this equipment.

Careful consideration has been given to providing a means for easy servicing of this amplifier. The lid of the amplifier shield is readily removable to permit changing of tubes. The complete amplifier may be removed from the case for servicing the components located on the underside of the chassis by removing five thumb screws. The chassis frame and the housing shields are perforated to provide adequate ventilation. The amplifier is mounted approximately one-half inch from the bottom of the case to insure an ample flow of air around the component parts.

A terminal board is located along the back of the amplifier. Associated with this board are three cables, each equipped with plugs. One of these is the connecting cable

between the turntable and amplifier, another the AC power cable and the third the speaker cable. Sufficient space is available between the back of the amplifier and the cabinet to house the cables when the equipment is not in use. Terminals are available to permit either the MI-4894 Automatic Equalizer or the MI-4916 Fixed Orthacoustic Filter to be connected into the circuit.

The two loudspeakers provided with this unit are mounted in a closed compartment in one-half of the amplifier case. These speakers are of the permanent magnet type, employing accordion edged cones. The use of two speakers permits a wide angle of distribution and mounting them in a closed cabinet provides proper loading for the speaker cones. The resultant overall acoustical response is essentially uniform from 60 to 7,000 cycles. For those who wish to obtain higher quality of reproduction the amplifier has sufficient undistorted power output to satisfactorily drive the RCA Type 64-B Monitoring Loudspeaker.

#### Technical Data on MI-11211 Amplifier and Speakers

<i>Power Required</i>	<i>Noise Level</i>
105-125 volts	-61 db. below 1 watt output.
50/60 cycles	with normal gain settings.
120 watts	<i>Frequency Response</i>
<i>Tubes</i>	of Amplifier:
5 RCA-1620	$\pm 2$ db. (1,000 cycle refer-
2 RCA-1622	ence) from 30 to 15,000
1 RCA-5U4G	cycles with 250 ohm source
<i>Source Impedances —</i>	and 15 ohm load.
250 and 20,000 ohms	<i>Power Output</i>
<i>Gain</i>	12 watt with less than 3%
250 ohm source to 15 ohm	total rms distortion 50 to
load—110 db.	7,500 cycles.
20,000 (bridging 600 ohms)	<i>Physical Specifications</i>
to 15 ohm load—30 db.	Width 18½"
<i>Load Impedance</i>	Depth 23½"
7 5/15 ohms	Height 14"
	Weight 63 lbs.

#### 72-C Recording Attachment

The 72-C Recording Attachment has been designed for use with the 70-C Studio Turntable and MI-11211 Portable Turntable.

Almost every known device for assisting operators in producing highly satisfactory recordings has been included in the design of the 72-C. The efficient cutting head has a uniform response between 60 and 6,000 cycles. An inertia type float stabilizer is employed which prevents flutter and vertical modulation on recordings.

A swivel mount casting is provided on the OR-1 which has a knurled thumb nut permitting ready adjustment for horizontal alignment. This recorder has a unique lowering device for the head which permits the operator to gently lower the cutter on to the record, thus avoiding styli breakage or deep cuts from sudden dropping. The angle of the stylus

and the depth of cut may be conveniently adjusted even during operation. A spiraling hand wheel permits spacing between musical selections without breaking continuity of the groove. A timing scale is provided which gives an accurate indication of the remaining recording time. It is calibrated for both 33 1/3 and 78 r.p.m. The lead screw is precision machined and hand honed, thus insuring smooth operation and uniform spacing between recorded grooves.

A standard high quality magnetic cutting head is furnished with the equipment. It provides highly satisfactory reproduction between 60 and 6,000 cycles. Where higher recording fidelity is required, the MI-4887 Recorder Head is recommended. The MI-4887 reproduces within  $\pm 2$  db. from 50 to 10,000 cycles and permits recording with high levels without distortion.

#### Specifications

Power Input — 3 watts

Input Impedance — 15 ohms, nominal

Frequency — 60 to 6,000 cycles

Feed Screw Pitch — 112 lines per inch

Recording Time—15 minutes on 16" record at 33 1/3 r.p.m.

#### Accessories for OR-1

The following accessories are available for use with the OR-1 Recording equipment:

1. Spare input plug for MI-11211 Turntable, Stock No. 26126.
2. MI-11259 Tube Kit for MI-11212 Amplifier.
3. MI-11251 VU Meter Kit for MI-11212 Amplifier.
4. MI-4894/4913-2 Automatic Equalizer for 72-C.
5. MI-4916 Orthacoustic Recording Filter.
6. Microphone Plug MI-4630-B.
7. MI-4887 High Fidelity Recording Head for 72-C.
8. MI-4876 Outside-In Lead Screw for 72-C.
9. MI-4879-A Steel Recording Styli for 72-C.
10. MI-4878-B Sapphire Recording Styli for 72-C.
11. MI-4842 Sapphire Recording Styli (70°) for 72-C.

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The DAVEN catalog lists the most complete line of precision attenuators in the world; "Ladder," "T" type, "Balanced H" and Potentiometer networks—both variable and fixed types—employed extensively in control positions of high quality program distribution system and as laboratory standards of attenuation.

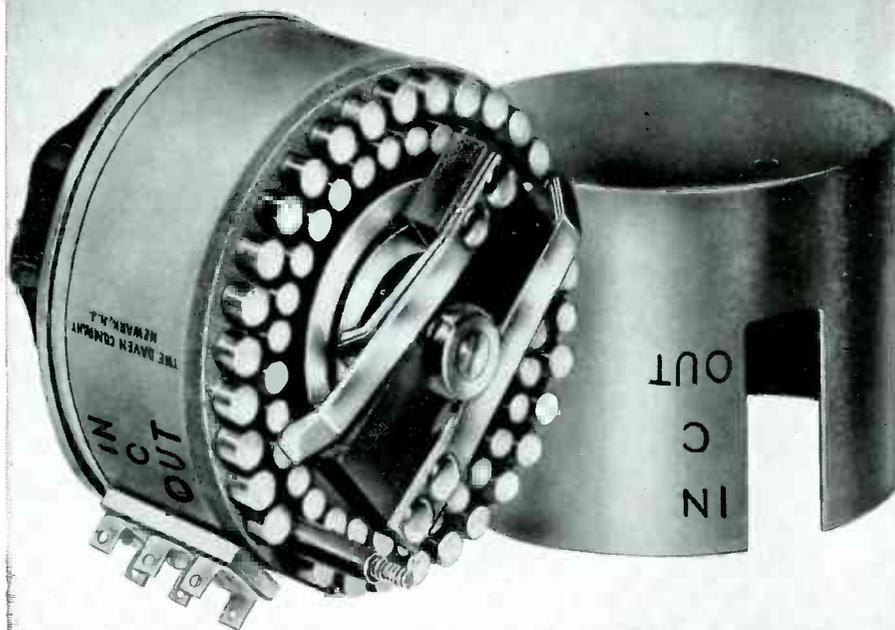
Due to the specialized nature of high fidelity audio equipment, a large number of requirements are encountered where stock units may not be suitable. If you have such a problem, write to our engineering department.

Special heavy duty type switches, both for program switching and industrial applications are available upon request. These switches employ the same type of high quality materials and workmanship as supplied in Daven attenuators.

Super DAVOHM resistors are precision type, wire-bound units of from 1% to 0.1% accuracy.

To insure precise quality and rugged dependability in your speech input or special laboratory equipment, specify DAVEN components.

**THE DAVEN COMPANY**  
158 SUMMIT STREET • NEWARK, NEW JERSEY



# Television Arrives

By Raymond F. Guy

Radio Facilities Engineer, National Broadcasting Company

THE National Broadcasting Company is again making history and setting new milestones in the field of public entertainment by radio. On June 17, 1941, RCA and NBC television climaxed thirteen years of experimental operation by becoming the world's first commercial television licensee. By publishing the world's first television rate card

heights never attainable by ordinary sound broadcasting. "Acutely" because he went through an exactly similar period in sound broadcasting beginning in 1921, when the only audience was a few dozen amateurs and the only purpose in broadcasting was the hope that it might support itself through the sale of receivers. The FCC order of June 17, 1941, granting the first commercial license is a historical document and is reprinted below for those who like to retain such information. It is suggested that you keep it because it will be interesting reading in your old age. Perhaps more so than you think.

51351

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D. C.

In Re:

NATIONAL BROADCASTING CO.  
(Television Station W2XBS)

Application for: Construction permit  
for commercial television broadcast  
station pursuant to Commission's order  
of April 30, 1941

FILE NO. B1-PCT-1

Application for: License to cover  
construction permit for commercial  
television broadcast stations

FILE NO. B1-LCT-1

## ORDER

At a session of the Federal Communications Commission held in its offices in Washington, D. C., on the 17th day of June, 1941;

The Commission having under consideration the above-described applications of the National Broadcasting Company; and

IT APPEARING, that the existing transmitting equipment of station W2XBS as set forth in the application for a construction permit (B1-PCT-1) and documents filed therewith meets the engineering requirements of the Commission's Rules and Regulations adopted April 30, 1941, for Governing Commercial Television Broadcast Stations, and that the operation of station W2XBS will be in accordance with said Rules and Regulations which permit commercial operation to begin July 1, 1941, with the provision that a minimum of fifteen hours program service be rendered each week; and

The Commission being satisfied upon the information before it that public interest, convenience, and necessity will be served by the granting of said applications;

IT IS ORDERED, That said applications BE, AND THEY ARE HEREBY, GRANTED.

This Order shall become effective immediately.

FEDERAL COMMUNICATIONS COMMISSION

(Signed) T J Slowie

T J Slowie  
Secretary

In the years to come the first week's television program will provide equally interesting reading. It is reproduced herewith.

It is fitting that NBC should lead the way with its new call letters WNBT because in the thirteen long years since 1928 it has carried the ball with experimental broadcasts

**STATION WNBT**  
NATIONAL BROADCASTING COMPANY  
WEEK OF JUNE 30th — JULY 5th, 1941

Audio frequency 55.75 mc. | NEW YORK CITY  
Video frequency 51.25 mc.

<b>P.M.</b>	
<b>MONDAY</b> June 30th	9:00-11:00 (1) Amateur Boxing at Jamaica Arena.
<b>TUESDAY</b> July 1st	2:00-5:00 (2) Baseball—Brooklyn Dodgers vs. Philadelphia at Ebbets Field. 6:45-7:00 (3) Lowell Thomas. 9:00-10:00 (4) Culmination of U. S. O. Drive with: Mr. Thomas E. Dewey Mrs. Winthrop W. Aldrich Mr. Walter Hoving Lt. General Hugh Drum Admiral Adolphus Andrews Mrs. Ogden L. Mills
<b>WEDNESDAY</b> July 2nd	2:30-5:00 (7) Eastern Clay Court Tennis Championships at Jackson Heights. 9:00-10:00 (8) Feature Film "Death From A Distance" with Russell Hopton and Lola Lane.
<b>THURSDAY</b> July 3rd	2:30-5:00 (9) Eastern Clay Court Tennis Championships at Jackson Heights. 9:00-10:00 (10) Variety (11) Julien Bryan, Photographer-Lecturer.
<b>FRIDAY</b> July 4th	2:30-5:00 (12) Eastern Clay Court Tennis Championships at Jackson Heights. 9:00-10:00 (13) Film "Where the Golden Grapefruit Grows" (14) "Words On The Wing", a Streamlined Spelling Bee.
<b>SATURDAY</b> July 5th	2:30-5:00 (15) Eastern Clay Court Tennis Championships at Jackson Heights.

● ALL PROGRAMS SUBJECT TO CHANGE WITHOUT NOTICE

**TEAR HERE**

Please Check Your Opinion  
Regarding Program Content  
And Mail Card to Us

NO STAMPS REQUIRED

	1. Amateur Boxing	2. Baseball game	3. Lowell Thomas	4. Culmination of U. S. O. Drive	5. "Bottlenecks of 1941" Excerpts	6. Truth or Consequences	7. Tennis Championships	8. "Death From A Distance" Film	9. Tennis Championships	10. Variety	11. Julien Bryan	12. Tennis Championships	13. "Where the Golden Grapefruit Grows" Film	14. "Words On The Wing" Spelling Bee	15. Tennis Championships
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EXCELLENT  
GOOD  
FAIR  
POOR

No. 1

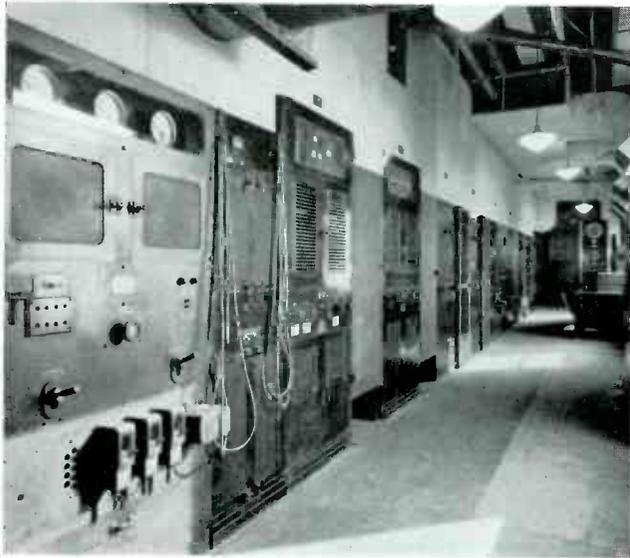
Name \_\_\_\_\_  
Address \_\_\_\_\_

and by broadcasting the world's first commercial television programs on July 1, history was made and a great new industry was launched.

Your profoundly humble scribe is acutely cognizant of the significance and implications of this new service which is destined one day to raise the statute of broadcasting to

under the experimental call W2XBS, W2XK-W2XF and before that, in the 2 megacycle band, with the original call W2XBS.

The first commercial program in the world, on July 1, 1941, was a one minute televised picture of a clock showing the correct time and the name of the sponsor, the Bulova Watch Company. Later in the first day after a televised Dodgers-Phillies ball game there was a Sun Oil Company sponsored newscast by Lowell Thomas, and sponsored pro-



WNBC Transmitter Room

grams "Uncle Jim's Question Bee" by Lever Brothers and "Truth or Consequences" by Proctor and Gamble. A new era in entertainment thus came into being. And its future success was symbolized by the signing of a thirteen-week Bulova contract immediately after the first day's programs had been completed. Those who had formerly listened to "Truth or Consequences" and then saw it on WNBC were given a unique demonstration of the new vast horizon which sight adds to sound. A conspicuously portly gentleman, entering into the spirit of the fun, donned diapers and a baby bonnet and with the aid of a nipple, a "mother," a rocking chair and some excruciating wails, provided five of the most uproarious minutes ever seen. Spontaneous and unrehearsed, as outstanding hilarity usually is, the attribute of immediacy brought by Television made a profound impression on the observant "looker in," not omitting some blase engineers who have been identified with Television for many years.

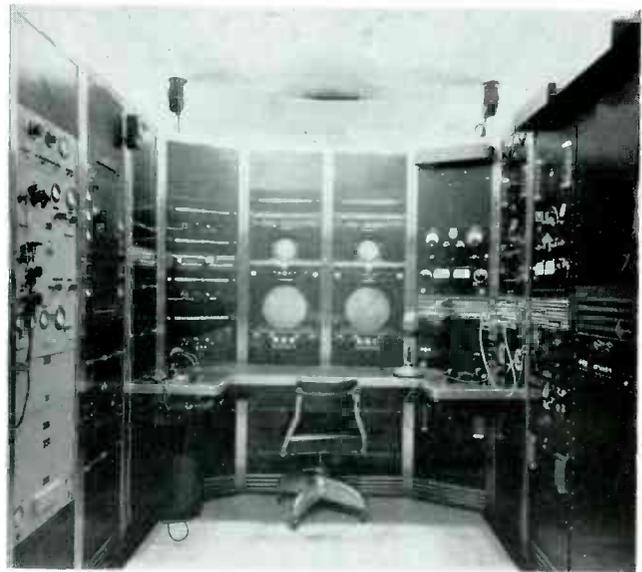
The Columbia Station WCBW, in the Chrysler Building, initiated program service on July 1 and now for the first time in history a Television audience may choose from more than one source of entertainment. And more sources are being made ready.

Even as prosaic a subject as news commands increased interest when, as WNBC does it, maps of the theatres of conflict are employed to illustrate the gigantic maneuvers of millions of struggling humans. The future of this new medium

taxes the most fertile imagination. In years to come it will dwarf any picture now conjured up by its most optimistic proponents. It will not only give the listener a front row seat at every outstanding event, but it will also draw upon bags of electrical and optical tricks, equalling and surpassing the best magic of Hollywood. The path to the end of this rainbow will be long and difficult because a great deal remains to be done. But it will be done. Television is a "natural". It will be the next great field of entertainment, and one of civilization's crowning achievements. It has so much to offer that no temporary obstacle or setback, regardless of what it may be, can stop it.

Your profoundly humble scribe has cause to recall vividly that one of the world's most prolific and imaginative inventors was contemptuous of sound broadcasting during its first year or two. Equally brilliant men were equally contemptuous of the horseless carriage. But radio and horseless carriages have been doing fairly well since these pessimistic prognostications.

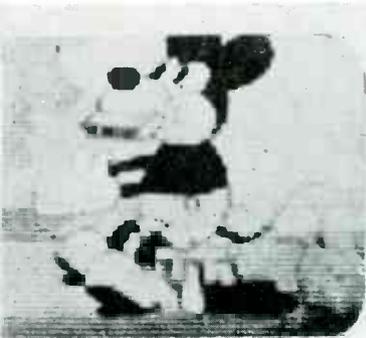
When a new invention emerges from the laboratory and the public begins to enjoy its benefits they think of it as new. The Hollywood Tycoons have romanticized such situations by picturing the inventions as the fruit of the genius of a highly photogenic young man, usually a poor, half starved fellow, who in the end triumphs over heart-breaking odds, frustrates the villain and wins the girl with the heart of purest gold, a la Don Ameche. Possibly such conditions occasionally exist. However, we know that in our more



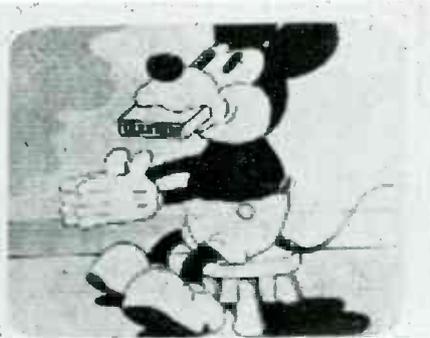
WNBC Empire State Control Room

practical world invention is usually the contribution of great institutions in which many individuals play a part.

There is a threadbare saying that there is nothing new under the sun. It is true of Television because the basic idea is certainly not new. It is older than wireless itself. There reposes in the German Patent Office expired German patent



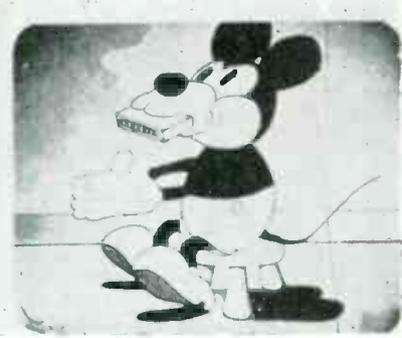
60 Scanning Lines



120 Scanning Lines



180 Scanning Lines



240 Scanning Lines

number 30105 which was issued only a few years after our Civil War, and which contains the fundamental process used in our most modern Television System.

This patent covers the transmission and reception (by wire) of Television pictures by means of pencils of light or scanning beams, light cells and scanning discs, and was granted to Paul Nipkow on January 6, 1884, more than a half century ago. And the only reason for his system not working better than it did appears to be the lack of good photoelectric devices and a method of amplifying feeble currents such as was provided by Lee de Forest in 1907 and others who followed. Nipkow used in the sender selenium cells which had been discovered by May in 1873, and in the receiver a Faraday polarized light device. Bear in mind that there were no nice synchronous electric motors available to drive the scanning discs. Nipkow proposed to use Phonic wheels controlled by tuning forks. This man was not by any means the first worker in Television but he appears to have been the first inventor of the fundamental system which so many think of as quite new.

About fifteen years ago the beginning of the present period of rapid development of electronic devices saw the construction of relatively good photocells and the beginning of workable Television. In the late twenties development got under way in several laboratories including the Van Cortlandt Park Research Department of the RCA where your humble scribe and his assistant, Mr. Lester Looney, got in their first licks at it. Except for synchronous motors, photocells and vacuum tubes, the first 48 line scanning disc equipment was as much like Nipkow's as the two peas in the pod. The 48 line pictures of 1928 were not exactly what one would call the ultimate in optical perfection. Not quite. But one could, by squinting, recognize Mickey Mouse, Television Impressario number one. Sixty line pictures followed and Mickey began

to emerge from the fog. The 60 line discs had hardly been warmed up before new ones were being drilled for 120 lines. And then came 180 and 240 lines—and electronic scanning. At this stage of RCA television research, about 1939, the work was transferred to Camden and your scribe came to NBC. He couldn't find a photo of a 48 line picture and can't recall that any were ever made. After all, no self respecting camera——. However, the results of a few of the early years of development are illustrated in the photos of 60, 120, 180, and 240 line pictures reproduced herewith. Drop down one stage below this graded series and you have 48 lines in all its pristine glory. Five hundred and twenty-five line pictures are now standard.

When 48 lines was first obtained it provided quite a lift and spectators gathered around the whirring machine from far and wide for a first glimpse of Television.

In 1928 a 500 watt picture transmitter was built by the Research Laboratory and placed in regular operation at 411 Fifth Avenue. This was the first W2XBS. Have a look at it. You see the transmitter, studio, engine room, wheelhouse, galley and crows nest all wrapped in one package. There was one actor—Mickey Mouse—plus kibitzers who dropped in. It was later taken over by NBC and moved to the Amsterdam Theatre roof and was finally in 1931 replaced by the present Empire State station when advancing Television development made it hopelessly obsolete.

The Empire State stations were at first licensed as W2XF and W2XK but when single calls were assigned for the combined services of sight and sound the old call was again issued to NBC.

RCA's program for Television development and research has not been confined to anyone of its component companies. Each requirement for ultimately complete and successful Television service was assigned to some department of the RCA family best equipped to handle it so that when the time came for the transition from the laboratory to the field, it would represent the coordinated efforts of the most competent research facilities in existence. Full advantage was taken of RCA Radiotron Company for electronic devices such as iconoscopes and kinescopes, RCA Communications for certain wide band filter and antenna projects, RCAM for transmitting and studio apparatus and NBC for coordination, adaptation to practical usage and cooperative development.

The NBC Developments in apparatus and technical methods have been legion and have guided the other labora-

W2XBS — 1930



tories in their efforts. But that tells only part of the interesting story of NBC Television. The development of program and operating technique, the Keystone of the Television structure, has been the exclusive contribution of the alert and capable organization carefully assembled by Mr. Hanson for that function years ago. And Mr. Hanson's own indefatigable personal interest, his many technical contributions and his firm convictions about the future of Television have provided the inspired leadership that makes the lads determined to do or die.

Heading the Television group is Mr. Robert Shelby, inventor of the cathode ray FM modulator, whose experience and knowledge in Television are unsurpassed. Mr. T. J. Buzalski, Station Engineer of WNBT; Mr. H. See, Television Field Supervisor; Mr. F. Wankle, Senior Television Supervisor, and Mr. R. Monfort, Television Maintenance Supervisor, are responsible for the functions described.

Scores of highly skilled men have been plugging away quietly but effectively for many years in RCA Television Research but it was not until this month, after the expenditure of over \$10,000,000 that it enjoyed its commercial debut.

Naturally, a project as broad as this one required not only laboratories and shops but also a good Television experimental plant where the fruits of the laboratories and shops could be tried out under actual service conditions. W2XBS was originally built for this purpose.

First it served as a proving ground for the laboratories, then as part of the field test of Television, the purpose of which was to try out the complete system and give it a shakedown or rehearsal for regular service, and finally for the ultimate commercial public service which was inaugurated July 1, 1941. The original transmitters installed ten years ago have been modified or rebuilt time after time as increasingly greater picture detail stiffened the requirements. The present antenna assembly is the third in six years. The first consisted of a pair of ordinary end fed vertical dipoles, one for the sound and one for the picture. The second was a single antenna for both services consisting of a group of horizontal dipoles. Both failed to meet the stiffening demands for greater picture detail and freedom from parasitic images and had to be replaced after relatively short periods of service. The development of the antennas could not be conducted on top of the Empire State Building, so a full scale model of the top of the building was built at Rocky Point, accurate in detail and dimensions.

The transmitters are another story of efforts to meet the continuously more exacting demands. Improvements have been made the hard way and the expensive way but such is the history of all advanced development. The end result of all this work is the sleek, simplified, efficient and streamlined super-doooper transmitting apparatus made available as standard equipment for stations wishing to enter this new field. It's as glamorous as an up hair-do.

Tallyho!

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- Alterations, RCA Communications Building, 66 Broad Street, New York
- Erection of NBC television antenna on dome of Empire State Building, New York
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- WABC guyed tower erection and foundations, Mountain View, New Jersey
- American Radio News tower erection and foundations, Carlstadt, New Jersey
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# Special Effects Photography

By Roy A. Meredith

Staff Cameraman, National Broadcasting Company

**I**N ALL the branches of the photographic art, there is none more interesting than special effects cinematography or special process photography. This includes Table-Top, miniatures, the Dunning (synchronous motion picture background screen projection) process, optical printing, and the like. The Hollywood studios have departments devoted to photographic processes of this nature.

The evolution of process photography (trick processing) came about because it provided a means of filming scenes that could not be filmed easily, safely, or economically by the regular conventional methods.

Of great interest to the amateur photographer, is the Table-Top because it does not call for expensive layout of equipment, filters, lenses, and other optical equipment. A little imagination, hardware, and paint is all that is necessary to get an amazing amount of effects and a lot of fun and useful experience.

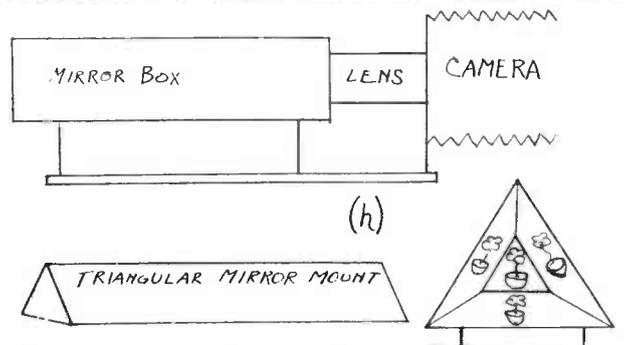
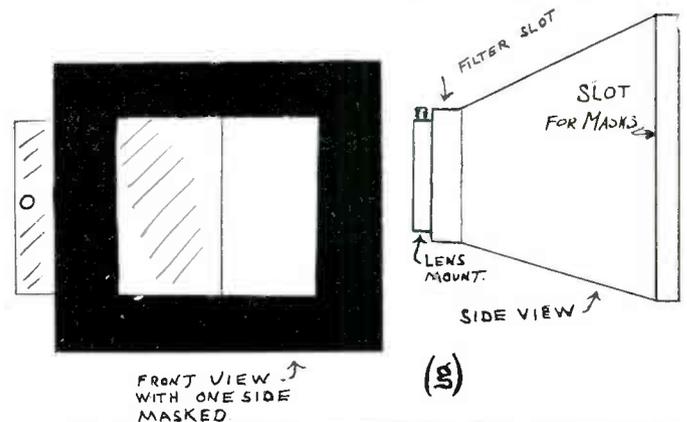
The basic idea of the picture you intend to make should be planned on paper in advance, and it should tell a story or put across an idea. A list of props necessary should be made so that they will be on hand when needed. There is nothing that can cause more inconvenience than not having a prop within reach when you need it most. If there are any models

to be built, make sure they are scaled down to accurate size as compared to the real object. Most Table-Tops usually consist of characters made of pipe cleaners, fruit, dolls, etc. They make interesting pictures.

As a hobby, the Civil War and the campaigns of the Army of Northern Virginia and Robert E. Lee have always been of interest to me. The maneuvers of the Southern Armies are said by military observers to be real examples of military art. For the past year or so, I have been building a War Game with miniature soldiers and equipment of that period. With these, I tried to set up the battle positions of

(a) Charge of the New York Fire Zouaves on the Confederate position at the Battle of Skinkers Gap. The shell bursts are cotton wadding

(b) Battle formation of Confederate cavalry ready for a charge



(g) Matt box, used for split-screen effects

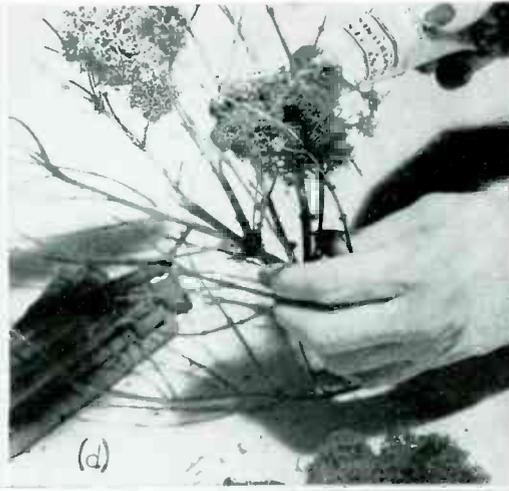
(h) Trick mirror setup for triple exposure on one negative

each engagement as it was fought from day to day. It occurred to me to photograph the set up just to see how realistically it could be done. This required the scaling down of the original maps of the maneuvers, of which I have a collection. Foliage and trees had to be made for the picture, also abattis, railroad ties, and sand bags for fortifications. The Sand Tables used for instruction at the War College and at West Point gave me the idea for simulating the terrain.

**MODELS:** The soldiers are made of lead, and are dressed in the correct uniforms of the period. The Ordnance is built to scale in brass, and was designed from photographs in Mathew Brady's *Photographic History of the Civil War*.



(c)



(d)



(e)



(f)

(c) This battery of mortars was known as the battery that never fired a shot. It was part of the line facing Richmond when Stonewall Jackson turned the position rendering it useless

(e) These dinosaurs were used in an animated motion picture, and represents 58 tons of the huge animals

(d) Glueing rubber foliage on the twigs

(f) The Pola-Screen, used to remove glare and other unwanted reflections when photographing glass and other reflecting surfaces; also used in color photography

These gun models are detailed as to rivets, bolts, and bases. The shells are small ball bearings painted black. The fortifications and abattis are actual copies of the period.

**SCALING:** The scale of the set ups are usually one-quarter inch to the foot, and of course larger scales are used according to the amount of detail that is needed. The trees and foliage must also be scaled to the size of the object it is photographed with. As an example, at one time, I had to photograph models of prehistoric dinosaurs that were to be animated. The trees were scaled small, so as to give the lizards great height. For this work, sometimes live lizards are used, and plastilene appendages are glued on their backs, so that they look like their ancestors. A haze filter was used to give the area the misty effect of a swampy territory, and was photographed in a low key.

**LIGHTING:** One of the most important steps in Table-Top photography is lighting. Good lighting can sometimes improve the picture of a poorly built model. To get feeling in the picture, the lighting should be adapted to the subject. For example, the Dinosaur Picture had to be lighted in a low key in order to bring out the atmosphere of a dismal jungle, but in the battle scenes, daylight had to be simulated. At the time the battle pictures were made, I had no sky backing, so

I lighted the figures with two 500 watt spots, thereby blacking out the unwanted background. Most Table-Tops are done with one spot light with good effect, but interesting effects can be obtained by using several spot lights.

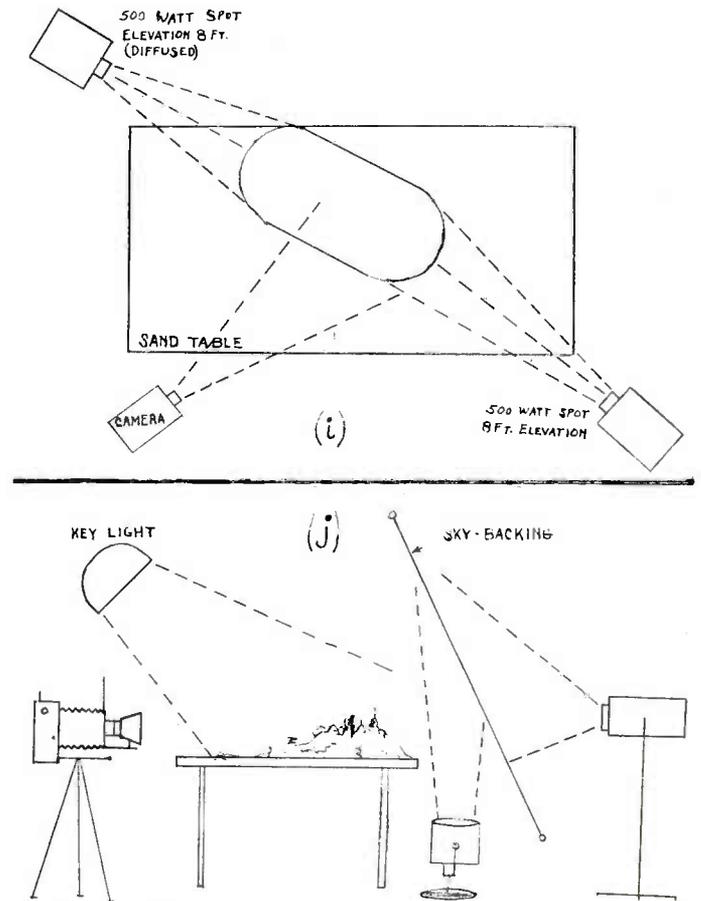
**OTHER EFFECTS:** There are an unlimited number of photographic tricks that can be done with ordinary equipment. Some mirrors from the local five and dime stores put in a block and taped in a triangle can give you a multiple printing shot with one "take". A Speed Graphic or View Camera that has a ground glass back should be used for this work, as you can see the results before shooting, thereby leaving nothing to chance. A good home made sun shade and matt box that will fit the camera without cutting the angle of the lens will enable you to use filters, diffusers, split screen shots, and other tricks.

Very important are good properties, and as I have stated before, the five and dime store comes in handy when the expense angle enters the picture. Here is a partial list of common props that can be had very cheaply:—for snow or desert scenes, common table salt answers the purpose; different types of colored sand can be bought from any hobby store and sponges can be painted and cut to resemble trees. Cigarettes placed on a drilled board and lighted can be made

to produce fog, and smoke when fanned lightly across the set up. For tropical settings, palm trees can be cut out of paper and painted. For sky backing, ordinary muslin makes a good substitute, especially when painted, and if tilted backward slightly, will give an illusion of great distance.

The split screen shot is accomplished with a matt box. It simply means that one side of the picture is masked out while the other side is being exposed. With this trick, you can have any style or shape of masking matt such as, binocular, circle, keyhole, heart, or quarter and half masks for multiple exposures, etc. The split screen shots are not at all complicated. After the shot is lined up, slide the mask into the matt box on the side that is not to be exposed. Expose the one side, slide the mask into the side that has just been exposed and expose the other side. The masks can be made of thin aluminum or good stiff cardboard and painted black. By the use of the split screen method, Table-Top multiple exposures can be made especially if dolls or models are used: if glass figures are being used for a Table-Top shot, a good piece of equipment to have is the Pola-Screen. With it, all unwanted reflection and glare can be taken out of the shot especially where there are reflections from highly polished surfaces.

Another good stunt is Table-Top Aerial Photography.



(i) Cavalry lighting setup

(j) Typical lighting. The sky background is linen. The spot can be used either in front or back of drop, depending on desired effect

All that is needed is the sky, backing lights, and a couple of model planes. Any number of different types from World War planes to the modern jobs are available in kit form and are amazingly realistic even down to the metal machine guns.

Special Process photography is such a vast field in each of its branches, that it would take reams of material to explain the various tricks and formulas used in this work. The building of elaborate miniatures and sets, not to mention the laboratory developing and printing, which is an important factor in itself, has brought this type of photography out of the old movie "trick" stage to a precision engineering stage. The Hal Roach pictures, *Topper*, *Topper Takes a Trip*, and *One Million BC* are fine examples of this work. Walt Disney's animation has opened an entirely new field in the realm of process photography. His use of the Multiplane Color Camera and sound has brought a new medium to the screen with his *Fantasia*.

The Table-Tops suggested herein are very simple and comparatively easy to do, and I am sure they will prove an interesting and educational diversion.

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# Mr. Abfalter and the U. S. Navy

By Tom Gootee

ONE of the first signs of Spring in Chicago is the appearance of Engineer Hugh F. Abfalter with a copy of "The Rudder" or "Motorboating" tucked under one arm.

Until recently Skipper Abfalter was keenly interested in sailing; during the past two years he practically lived with one foot in the water—literally and figuratively, as will be explained later. And in all justice to Hugh, let it be noted that he is not only a good sailor but also a remarkable mariner.

But his sailing career came to an abrupt halt this May, following a very embarrassing incident with the U. S. Navy.

His once-doughty little boat *The Plummet* now lies beneath forty fathoms of water—and Mr. Abfalter is most unhappy. He not only lost his boat that night, but he also made a very unfavorable impression with the local branch of the U. S. Navy. And on top of all that, the finance company is demanding that Hugh pay for the *Plummet*—which isn't of much use under so much water.

The entire affair was a misunderstanding. And although Skipper Abfalter prefers not to discuss it, the incident was due entirely to a minor fault of the *Plummet*. It was given to occasional sinking spells!

The *Plummet* not only sank often, but quite irregularly and without cause. On occasion it might sail along for several hours before submerging beneath the waves—other times it might go up and down like an agitated yo-yo top.

When Hugh bought the craft (second-hand) it was positively guaranteed not to sink under any conditions. But since making the down payment, the *Plummet* failed its master with a regularity often embarrassing.

But this was only one strange characteristic of the slightly-wormy vessel.

The *Plummet* was not more than twelve feet long, and some ten feet amidships. This enabled the craft to travel sideways with equal ease—due to the absence of both keel and rudder. Mounted

forward and somewhat loosely was the mainmast: a tired 8-foot pole on which was hoisted the mainsail. The mainsail consisted of patched worn cheesecloth—generally water-soaked due to continual submersion. The hull of the *Plummet* was the personification of contaminated debris, and had all the qualities of a sponge. The wood was so infested with *torredoes* worms, it should have been on exhibition in a museum. No wonder that the boat sank often and without (?) reason.

The "sinking habit" of the *Plummet* kept Skipper Abfalter quite busy, of course, as he had to jump overboard, keep the water-logged hull from submerging too far, and then somehow manage to bail out the unseaworthy craft. This not only kept him occupied, but was also a great muscle builder—since the routine was repeated any number of times an hour.

When he first bought the boat in 1937 it had a leaded keel, tiller and rudder, and numerous other modern conveniences. But Hugh removed the heavy lead keel and sold the metal, in order to make the second payment on the *Plummet*. This not only made the craft lighter, but also made it easier to handle when in the process of submerging.

To make the third payment, Skipper Abfalter scraped off all the copper paint from the hull and sold it for used metal. This, of course, made the boat more susceptible to sinking—but it was cheaper than making that third payment out of his own hard-earned money.

The rudder and tiller dropped off the boat in the midst of a bad lake storm in 1938 and sank immediately—since both were waterlogged and quite heavy. Steering the *Plummet* after that unfortunate incident became a problem. But it was easily overcome by the talented Skipper. He merely steered the craft by dragging one foot over one side or the other of the *Plummet*—depending on his intended direction of travel. This maneuver required no little skill, but Hugh mastered the art and was quite adept at

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it—until his brush with the Naval Authorities.

The cheesecloth sail was hoisted up the mainmast by means of twine hal-yards that had been broken and retied so many times it looked like a tangled fishing line running up and down the mast every time the sail was sent up or brought down. And in the stern was a narrow piece of pine board which served to rest the Skipper—whenever he wasn't swimming around in the water refloating the *Plummet*.

All of which completes a general description of the infamous craft, as it was prior to its Last Cruise in May. Except to mention that it was also without any sort of rudder, keel, bilge-pump, motor, or running-lights. In fact, it was the absence of lights aboard the boat that first aroused the suspicion of the bridge-tenders along the Chicago River.

Skipper Abfalter often sailed up and down the River, and up and down the placid coast of Lake Michigan. It was his greatest source of pleasure—and also a means of exercise.

Then came that fateful day and night in May when so much trouble befell him—and when the *Plummet* plummeted to a watery grave.

Mr. Abfalter slept late that morning, and it was well after three o'clock when he arrived at his South Chicago dock where the *Plummet* was moored. Hugh was attired in his conventional sailing costume, which consisted of a pair of old slacks and tennis shoes. And the *Plummet* was in its conventional attire: resting gently on the bottom of the shallow estuary.

Within the usual fifteen minutes Skipper Abfalter succeeded in refloating the water-logged craft. He wrung out and hoisted the moth-eaten cheesecloth sail, cast off the lines to the dock, and sailed serenely out of the narrow harbor onto the calm Lake Michigan.

"Avast!" said Mr. Abfalter aloud. "Hoist the top-sails! Run up the anchor! Hard to port, men, hard to port!"

By dangling one foot over the port side he managed to get the boat directed on a northerly course. He kept up a running-fire jargon as he sailed, ad-

dressed to no one in particular—since he was very much alone—but mainly to put himself in the spirit of sailing before (or aft) the mast.

"Avast! Avast!" said the Skipper, growing louder. "I ain't no landlubber. Gimme a good ship and a star to steer 'er by!"

Slowly and with much effort the *Plummet* sloughed northward. He passed the 35th Street Piers, and then caught a first glimpse of the towering buildings of the Loop.

"Avast, Chicago!" yelled Mr. Abfalter into the breeze. And several negro fishermen on the bank dropped their fishing-poles into the water with obvious surprise. "Avast! Avast!" repeated the Skipper, for no particular reason. The bank was then some thirty feet away, and the fishermen were using some very nasty language.

"All hands on deck!" yelled Mr. Abfalter, as the quivering *Plummet* passed the 12th Street Docks.

"Avast below! Haul up the topsail! Throw out the spankers!" This was all a little silly, of course, since the boat would have turned squarely over if another ounce was hauled up the slightly-bent mainmast. Hugh's mastery of sea language surpassed even his artistry at the tiller of the *Plummet*—if it had had a tiller.

Just off the foot of Van Buren Street the boat started to sink, but the Skipper managed to keep the craft upright—bailing vigorously with his cupped hands, and an old tin bucket.

"Avast!" he shouted into the almost-still wind. "All hands stand by! We're goin' up the River!"

"Aye, aye, aye, aye, aye!" mumbled the Skipper under his breath, in answer to himself.

So ordering, he maneuvered the *Plummet* into the mouth of the Chicago River, and changed his course westward by the conventional feet-dragging method. He sailed majestically up the narrow River, passing easily under the many bridges that cross this glorified drainage canal. At times he even waved to passersby on the bridges above him—particularly any good-looking girls.

"Avast!" he would shout at his watchers above, or along the River bank. "The good ship *Plummet's* under a high blow and sailin' all the way to China! Avast! Avast!"

No one ever bothered to answer him. In fact, most people were inclined to view the venerable boat and salty Skipper with some suspicion and alarm. But that bothered Mr. Abfalter not a bit—as long as he could keep the vessel afloat.

He was just a little embarrassed near the Wells Street bridge, however, when the *Plummet* started sinking just ten feet from the Merchandise Mart—and several of the NBC engineers leaned over the bridge rail to jeer at his energetic efforts in righting and refloating the boat.

"Avast! Avast!" screamed Mr. Abfalter, thrashing around in the water with one hand and attempting to lift the stricken craft with the other. "Avast! Avast! Avast!"

He finally had the *Plummet* under sail again, and steered southwest from there, following the River and so proceeding around the Loop. There was a stronger wind behind him, and his boat scooted through the murky waters.

He continued shouting sea slang phrases at all the bums and vagrants that gathered along the river bank to watch him and, in short, he had a very enjoyable afternoon.

All too soon he realized that the sun was setting and that he would have to come about and retrace his route back to the Lake. But Mr. Abfalter failed to realize the wind was stronger—and against him.

"Avast," muttered the Skipper, eyeing the River ahead and feeling the cool wind on his sun-burned face. "Avast. Howinell am I gonna git home tonight?"

It would probably take him four or five times as long to return to his warm home on land!

Then, as if to add to his troubles, the *Plummet* sank in midstream.

Only after twenty valiant minutes of swimming and maneuvering was he able to right the craft again, wring out the sail, and proceed somewhat unsteadily northward.

"Avast," mumbled he, shaking some

(Continued on Page Twenty-four)

# New York Engineering News

By R. A. Isberg

**T**HIS month's headline from Audio Facilities is the DC to AC conversion of power for the studio section. The job is now under way with Erick Berglund in charge and haunting the Power Room and Maintenance day and night. A temporary switch board has been installed in the Power Room to facilitate the change over. An interesting side light on why DC was originally installed for the studio spaces is that it was then believed that AC would be unsatisfactory for television lighting.

DellEra and Jordan, borrowed from N. Y. Maintenance, are in full swing on new transcription equipment for Washington. Don Castle is working furiously to assemble all the necessary engineering information. They are scheduled to leave for Washington soon to begin installation.

Jerry Hastings has equipment designs for 6A and 6B practically completed and construction will start shortly. Some of the studio engineers' suggestions regarding arrangement of mixer controls and general panel layout are being incorporated. (Ah—Utopia!—Ed. S.)

Gordon Strang, Bev Fredendall and Elmer Mead are busy in Chicago with the new recording layout and three new studios. Three new blonde mahogany consoles which are said to out-Hollywood Hollywood's, have been completed by Ted Nolan's construction group and shipped to them.

In the Radio Facilities Group, Siebert is busy with plans for the new FM transmitter at Empire State Building. The old experimental television studio where Felix the Cat and Mickey Mouse were stars prior to the installation of studios in Radio City has been torn out to make room for the new transmitter. In the meantime, W2XWG, a one kilowatt transmitter, keeps NBC programs available to FM listeners.

Looney and Costello were injured in an automobile accident near Port Washington. Lester's car was demolished but

both men were fortunate that they were not seriously injured.

Antenna patterns for WNBC-WRCA, the International Stations, keep Duttera, Fitch, and McMillan occupied, while Dietsch and Todd continue to make improvements in the equipment, increase the powers to 50,000 watts and build new high gain antennas.

Ray Guy is again a real estate agent. This time he is selling the WEAFF Bellmore property. At present, a portion of the premises is used by the NBC Short Wave listening post.

Television is once again going ahead with a full head of steam. Most of the personnel who were loaned to other New York Engineering groups after the damper was closed on television about a year ago are back in their accustomed places. In the Studio group,

Davis, Gronberg, Townsend, and Protzman alternate on audio, video, and as technical director. Conn, Fraser and Stolzenberger are assigned to cameras and Burns is busy keeping the mike boom out of the picture.

Harold See's telemobile group keep busy with Wilbur, Burrell, Carson, Clark, Jackson, Plaisted, Peck, States and Wade assigned to telemobile units 1 and 2 operations, and W. Clark, Hettich, Mallen and Nathan doing the set up work, and I mean *work*.

Maintenance and equipment room operation (Master Control) keep Monfort's group very busy. Christian, DeBaun, Duke, Smith, and Wilder are assigned here. The Empire State Group, headed by Buzalski at present include: Barker, Sweeney, Fricker and Isberg.

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# Hollywood News

By Ray Ferguson

We feel it very worth mentioning here of our recent trip to March Field with Bert Capstaff to do the Bob Hope show. We were very happy over the assignment. Bert is a swell guy to work with, and is the pride and joy of the Hope show. One of our most vivid recollections of that interesting occasion are the many windows along the west side of the army gym from where the show was put on. Through those windows poured the last rays of the setting sun. Bert's two ND10's just happened to be set-up so as to face the sudden glare of the sunset. As the show went on the air, Old Sol appeared and beamed through right into Bert's face. Well, we couldn't change the sun's position or the booth's either, for that matter, then. For the first fifteen minutes Capstaff mixed the show in the sun's glare. Then, finally, the streaming sunlight abated and Bert was able to open the other eye. Out on the stage, meanwhile, Bob Hope was wowing the March Field audience. It was very warm. Hope was working in his shirt sleeves. The army boys liked him and the show so well they almost wrecked the joint.

One amusing incident happened when we arrived at the Post in the early morning the day before. As we drove up to the main entrance to the Field a car was stopped in front of us at the sentry's box. As the car started and drove on in, we did likewise. Bert sort of "glided" through. We looked back and saw the sentry looking bewildered no end and scratching his puzzled head. That sort of thing just wasn't being done, and living to tell about it yet. We held our breath. No—the sentry wasn't reaching for his gun. We had not, of course, deliberately passed through without stopping. Our car had just seemed to "ease" on through.

That afternoon, Lieutenant Gray, a grand fellow in charge of the entertainment end of things at the Post, had to telephone all over the field to get apass so we could get out safely; so we could leave at all! Officers and men alike would look our way and mutter things about crazy guys, etc. However, this breach of etiquette failed to dim the welcome, cooperation and swell time the entire March Field gang showed not only us but the rest of the company as well. There were two things we saw that gave us an inner feeling of great security: Boeing Flying Fortresses everywhere along with the very capable, fine pilots who fly them.

We must break down and confess right now being the culprit that almost broke up the Hope after-show. Boy, were we embarrassed, too. The after-show was on for about three thousand men who were unable to get in for the broadcast. It happened when we were making our way carefully down from the top of the gym balcony. Hope and Jerry Colona were right in the middle of a skit.

Suddenly, as we reached out to guide our wandering feet around the pipe-railing enclosing the P.A. control and the spots, a metal folding chair inside the railing somehow accidentally got tipped over. It landed right on top of an eleven-inch fan running full speed. Immediately there was a very loud, metallic h-u-u-u-r-r-r-r! It was as though a bomb-shell had exploded. The gym was packed from the floor to the rafters.

\* \* \*

In that moment when one's thoughts hover between life and death, they say you see all your past life whiz past in quick review in a split-second. Well, we saw our past, present, and somewhat doubtful future gallop past with that wild, uncertain feeling one has when it's either to make a run for it or just fall flat on your face. Down on the stage Hope stopped, looked up in our direction and cracked, "Don't tell me Hitler is here already!" The guffaw that roared out brought the house down.

\* \* \*

Not to be outdone by the Army, the Bob Hope show went to the Naval Training Base at San Diego last week. We were fortunate in being assigned again to assist Capstaff, and try not to be too much in the way at the same time. The show was done from the Navy's beautiful, new auditorium there. The Navy ate the show up. Hope never misses. It is always such a treat watching him work. Perfection of showmanship in every detail.

The Navy must have gotten wind of how swell the Army was to us because they certainly were wonderful to the entire show. Nothing was lacking in hospitality from Commander Wood on down to "Jeep," a sailor. "Jeep" took us all over the Base. We even managed to attend a class in gunnery. We listened to a CPO showing his class how to line up the .30 and .50 caliber guns on an old Boeing F4B4 fighter.

Next week, once again we will be on the road with the Hope show. This time, Camp Ord.

\* \* \*

The other day we asked Bob Callan, ace recording engineer, to give us something about his early life in recording experiences. Bob obligingly gave us the story you will read in this issue. We like it and hope Bob will continue to submit such interesting material. Bob, for a while, spent some time in Hong Kong, China. Having ourselves been there, too, when pounding brass for the Dollar Line, we have much in common with Bob Callan. We both can speak pidgeon English.

\* \* \*

Floyd Wettland told us something funny that happened to Jimmy Brown one day recently. Both Floyd and Jim are Control Relief engineers. While stopping by Master Control Floyd told us about Jim, getting tired of tagging along behind some ?/!%\$\$(\* so and so in a car in front of him cut around in front of the other driver to make a signal. Leave it to the law to always be on hand at such a

time. The traffic cop roared up alongside of Jim and, after the usual "what's the idea, etc., etc.," asked for Jim's driver's license. Looking it over, with Jim still protesting his complete innocence, the officer looked up and said, "Say, you're just four months older than I am. Get going, Grandpa!"

\* \* \*

Ralph Dennechaud, Control Relief engineer and the fancy Continental and Morse when we work the wire with him from March Field and San Diego, says his baby already is getting the code down pat. The other day, Ralph heard his child saying, "dit-dit-dah-dit . . . coo-coo-coo!"

\* \* \*

At the moment the surf is beginning to get just about right for some first-class body-surfing. The sun is beaming merrily down and everybody is content and happy. So, excuse us, please . . . the water looks just fine. It is the fashion here and you are right in style when you wrap a wave around you.

G'by, now.

\* \* \*

The Osawatamie Philosopher says: "It's surprising how much better and more work a fellow will do for a pat on the back and a little expressed appreciation."

## Cleveland News

B. J. D. Disbrow

**P**RACTICALLY every field engineer throughout the U. S. has had one or more pick-ups in the "Defense" type of program. Cleveland being located geographically at the focal point of many of the very necessary fabricating plants of steel, rubber, aluminum, powder, machine tools, etc., has had many "Defense" shows and parts thereof which were fed both networks and locally. The amount of work necessary in preparation for these pick-ups is no secret. Recently we were called upon to cover a portion of the "Voice of Firestone" from the Firestone plant in Akron in connection with the first "Pom Pom" type of anti-aircraft gun being built for the Army. Two points of pick-up were necessary. One from an air-cooled conference room where executives and Army men participated for several minutes. The other from a section of the plant where the temperature was near the one hundred mark and consisted of five seconds of heavy gun fire. It was at this location that S. E. Leonard, Engineer in Charge, Cleveland, and Jim Hackett spent several hours working with the gun crew, placing mikes and testing. The boys moved about the job with every confidence showing their passes and credentials to all who stopped them. Finally, with perspiration streaming down their faces, dirt, dust and noise everywhere, they announced everything was ready for broadcast. "Hey! Buddy," says a hardboiled FBI man, "How'd you guys get in here and

what's all this stuff ya got set up?" Passes, credentials didn't mean a thing. Explanations, reasoning, even pleading didn't help. "Come on, snap, get out of here and quick," says he, "This is government property." So the whole set-up had to be made all over again in another part of the building. Later they found out they had picked a small room which contained several thousand dollars worth of secret tools and drills and had planted their mike inside a newly developed secret type of fuel tank. All for five seconds air time, "Did ya hear it?"

It seems every month H. L. Clark, TE, breaks out with something unusual and this month he is definitely in the "Dog House." Coming home from work recently he decided to help "the little woman" by putting the washing to soak. Into the washer went the sheets, linens, shirts, etc. The next hour was spent in the front porch "stretched out." Returning, he opened the washer to discover that everything had a very decided coffee color. Clawing through the numerous pieces a bag of "Bull Durham" appeared in a shirt pocket. Whether you smoke it from choice or necessity, Horace, you're gonna pay for new linen.

Quips & Quickies:—I see Joe Arnone is "messin' around" out there in San Fran. Look out for that "wop." The gang waiting for Caskey to return from vacation with those big fish lies. We gotta real fish ruler this year. Hugh Walker reports everything "Pom Sat" in Georgia. And now to sine off, I'll be back in three weeks.

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## Aluminum for Defense Freed by New RCA Recording Disc

**M**ANY tons of aluminum has been freed for use in the National Defense Program by the success of the RCA Research Laboratories in perfecting a new 16-inch fire-resistant, paper-core recording blank for use in radio studios, airline terminals, and other locations where sound is recorded for "reference" purposes. This new disc is thinner and lighter than the aluminum-core blank, and is being sold at one-half the price of the old type.

The new blank is said to provide a quality of reproduction that is unsurpassed by any other paper-core blank, no matter of what size. Many months of research preceded the perfection of the special type of paper used in the core. The result is an amazing flexibility which prevents warping and allows the disc to flatten out at the mere pressure of the cutting head.

The new 16-inch blank joins the smaller sized paper-core blanks previously announced by RCA Victor, and widely used in studio and home recording.

The disc itself is slow-burning because of the paper core, and the shavings will not support combustion. With no fire hazard involved, the shavings can be thrown into any rubbish can. Its cutting surface permanency is assured, since the secret formula lacquer will not harden with age.

### HERMANN FLOREZ

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### The Iron Horse Is Dead

By RAY KIMBELL

Perhaps the Yanks will win today,  
The Dodgers may come through —  
And if our luck is holding out —  
The Giants will win one too.

But though our favorite teams succeed  
There's little will be said —  
Who cares *who* wins the ball games now —  
The Iron Horse is dead.

There's something tight down in my throat —  
It's hard for me to say  
What's on my mind — I can't forget —  
Lou Gehrig's gone, today.

To you — old Lou — we doff our hats,  
We know you're better now —  
And knowing that (for me at least)  
It seems to help, somehow.

I know that up there where you are,  
The gates were opened wide —  
For never has there been a man  
Of greater stuff, inside.

"Lou Gehrig's dead," the headlines say,  
And baseball's not the same —  
For never has a player been  
More credit to the game.

So if our favorite teams all win —  
There's little will be said —  
Who cares *who* wins the ball games now —  
The Iron Horse is dead.

### Radio Engineer's Life Saved by Own Equipment

**T**URNER GRIFFIN owes his life to the fact that a police transmitter he was road-testing functioned perfectly after the car in which it was installed was overturned in a traffic accident.

Griffin was riding in an Orlando, Florida, police car with an officer while Harry Mickel, manager of RCA Police Radio Sales, stood by the radio equipment in the station house. After the accident, in which the police car was virtually demolished, the driver was able to switch on the mobile transmitter and call the station house. Mickel immediately phoned the hospital, which dispatched an ambulance and had a surgeon on hand for an emergency operation.

Griffin's injuries, including a severed artery, torn leg muscles and head wounds, are healing nicely, and he is expected to return to his installation duties soon. He is recuperating at his home in Audubon, N. J.

## NABET Obtains Another Increase for NBC Members

From 201 North Wells Bldg., Chicago, office of E. C. Horstman, National President of NABET, comes word that a committee composed of himself, G. M. Sellar, Vice-President; F. R. Rojas, Assistant Secretary-Treasurer, and Messrs Clark and Duke, have recently concluded negotiations on a new contract with NBC affecting both the Television and Audio personnel. Television salaries and working conditions have been brought to parity with those in Broadcast effective July 1, 1941, coincidental with the start of commercial Television.

Further gratifying news was that effective January 1, 1942, and running to December 31, 1943, further upward revision of salaries, both Television and Audio, will go into effect. These raises, coupled with those effected January 1, 1941, represent an increased income to NABET's 400 members in NBC alone, of well over one quarter of a million dollars, within one year. Mr. Horstman feels that NABET may point with pride to this achievement.

A story on NABET itself will be presented in an early issue of the Journal.

## VWOA Holds Chicago Meeting

During the Radio Parts Show the Veteran Wireless Operators Association held a Chicago meeting. Among those in attendance were Jack Binns, whose first "CQD" made history thirty-three years ago; George Sterling, Chief of



Left to Right: Jack Binns, George Sterling, W. J. Halligan, Charles Ellert, and T. R. McElroy

National Defense Operations Section of the F.C.C.; W. J. Halligan, President of The Hallicrafters Company and Chairman of the Western Division V.W.O.A.; Charles Ellert of the F.C.C., and T. R. McElroy, World's Speed Champion Code Operator.

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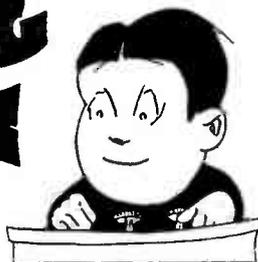
## Transmitting Tube Manual

RCA's finest and most complete engineering and amateur guidebook on transmitting tubes is now off the press and is being made available through RCA Tube and Equipment Distributors throughout the country at 25c a copy. This 72-page book describes 69 tubes, five transmitters, 150 circuits.

## 'Statistics of Communications Industry' Yearbook

Financial and operating data relating to common carriers and broadcast stations subject to the provisions of the Communications Act have been assembled in a single volume entitled "Statistics of the Communications Industry in the United States," which has just been placed on sale by the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 25 cents a copy. The initial volume covers the year ended December 31, 1939. The publication includes summary data, individual company data and intercorporate relationships of telephone, telegraph, cable and radiotelegraph carriers, and financial and operating data relative to standard broadcast stations and networks.

# RIDING GAIN



# ON THE AIRALTO WITH TONGOOTEE

**A**LTHOUGH summer commercial schedules are now complete for radio broadcasting, they were much slower in taking shape this year because of unsettled business and musical conditions. Sponsors were particularly disinclined to start on a selling campaign for a product which might be rationed for national defense. But July finds all of the desirable time on the networks well-filled.

\* \* \*

In line with Major Bowes resignation from New York's Capitol Theatre, come rumors that the Major will retire from radio in the fall — thus ending almost two decades of broadcasting.

\* \* \*

First FM station to receive full approval to operate on top power commercially and with no experimental restrictions was W-47-NB, sister station of WSM, Nashville, Tennessee.

\* \* \*

Pre-radio work for many of the artists and entertainers, indicate some strange occupational affiliations. Ben Bernie and Wally Butterworth both worked in department stores. Frank Black was a chemical engineer. Fred Allen once worked in a public library, before turning to juggling and the stage. Don Ameche studied law. Goodman Ace was a reporter and drama critic. Edgar Bergen was a photographer during the First World War. Andy Divine once played football. Bob Burns was at one time a pilot of a river ferry. Larry Clinton was a vacuum cleaner salesman. Donald Dickson is a by-product of the steel mills and steel industry. Phil Cook once drew a series of cover illustrations for Collier's Magazine. George Hicks was a truck driver, a clerk in a hardware store, and later worked in a pickle factory. Jim Jordan was

a washing-machine salesman, also a mail carrier. Bob Hope — among other things — was a shoe salesman, telephone lineman, newsboy, drug clerk, and butcher (no cracks!). Bill Stern was a theatre usher. And Lowell Thomas has been a cook, geologist, gold miner, and sold newspapers.

\* \* \*

After a successful forage of Los Angeles and San Francisco tobacconists, Bill Thompson — the "Old Timer" with Fibber McGee and Molly — has, at the ripe old age of 27, now pronounced his pipe collection complete. Bill finally found the one pipe he has searched for years: a "Torpedo" pipe. (P. S.: Thompson doesn't smoke!)

\* \* \*

Ransom Sherman — now well started on his new commercial comic career with the Johnson's Wax program — spent eighteen years building his own name, only to change it to Hap Hazard for his new show: The proprietor and manager of the screwball hotel "Crestfallen Manor".

Sherman, until recently emcee of the afternoon Club Matinee show, is well-known in the Middle-West. Ten and fifteen years ago he was a member of that infamous team of comics "The Three Doctors" — at a time when Dr. Sherman, Dr. Pratt and Dr. Rudolph were practically a household word. Later he took over the managerial duties of the NBC afternoon Club Matinee — when it ran for a full hour daily, and six days a week. During that time Ransom wrote his own script, acted his own parts. And now Ransom Sherman is to be Hap Hazard.

He has few qualms about this name change. For behind him is the same combination of forces that once lifted Marian and Jim Jordan from comparative obscurity and built them into "Fibber McGee and Molly" — the number one comedy show on the airlines. The change proved good for them, it should be good for Sherman. He fills the Tuesday night spot vacated by the McGee's, giving him his first coast-to-coast break on a major commercial show. After that, when Fibber and Molly return from their vacation, there is a good possibility that Hap Hazard will move into his own spot for the same sponsor.

\* \* \*

Bus man's note: Sam Taub spends his spare time away from NBC ringside announcing at Madison Square Garden covering the amateur bouts at the Jamaica Arena for television.

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Charlie McCarthy's face was quite red over something that happened while he and Edgar Bergen were at the San Diego Naval Training Station, for a recent broadcast. A few of the officers attending rehearsal decided it would be a good idea to toss young Charles into the brig for the night — before the broadcast. Bergen demurred, but finally agreed on one condition. So, into the brig went Mr. McCarthy, with bug-eyed sailors staring between the bars at him and his bread and water — but the key to Cell 11 rested in Bergen's pocket, just in case.

\* \* \*



Sharon Grainger

Leading actress Sharon Grainger rates the radio engineers, the boys behind the controls, as "strictly tops" — and not without reason. Looking back over a meteoric and successful acting career, she appreciatively recalls the help and assistance she received from the engineers handling her broadcasts. She is one of the busiest actresses on the networks, currently

heard on "Wings on Watch", Authors Playhouse; "Story of Mary Marlin", "Bachelors Children", the First Nighter Program; "The Bartons", and many other shows.

\* \* \*

A steel-armored cable over three miles in total length, and weighing fifty tons, now lies on the bottom of Long Island Sound — connecting Columbia's new transmitter for WABC to the mainland. The new location for the key station equipment is on an island in the Sound, a mile off New Rochelle, N. Y.

\* \* \*

Due to the scarcity of certain precious metals — particularly those used in the manufacture of radio transmitting and receiving tubes — those "old" tubes and "bottles" that were formerly destroyed, may now be saved and converted into usable tubes again if the scarcity of certain metals becomes acute.

\* \* \*

NBC's early morning Breakfast Club from Chicago attracts an astonishingly large audience which journeys to the Merchandise Mart almost before the crack of dawn to see and hear the broadcast. In a burst of curiosity recently, Don McNeill — conductor of the program for over eight years — decided to query his early-rising guests as to their points of origin, and reasons for visiting. A two-day view of the

audiences revealed 23 different states and Canada were represented — but none from Chicago, or Illinois.

\* \* \*

The famous black-face team of *Honey and Lasses*, of the Grand Ole Opry program, has dissolved. Honey will debut soon as part of a new team, *Jamup and Honey*, on the Ole Opry show over the NBC-Southern Red network.

\* \* \*

Hawaii's 75,000 radio-equipped homes at the cross-roads of the Pacific hear "Information Please" some 25 days after each broadcast from Radio City in New York. Recordings made of each program are mailed to Honolulu, more than 5,000 miles away, and rebroadcast there over KGU.

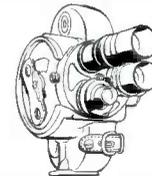
\* \* \*

*Ten Years Ago in Broadcasting.* Ted Husing and Graham McNamee were handling most of the network sports broadcasts. Other announcers heard frequently in 1931 were Frank Singiser (NBC), and David Ross and Norman Brokenshire (CBS); and John B. Gambling was conducting a regular early morning exercise show that all of New York listened to. In the Mid-West, a few of the leading announcers were Jean Paul King, Everett Mitchell, Wally Butterworth, Louis Dean, Gene Rouse, and Ted Pearson.

\* \* \*

*Twenty Years Ago in Radio.* Unknowingly anticipating the sudden popularity of broadcasting and increase in radio listeners, set manufacturers were beginning to advertise in the few trade journals on a grand scale. A copy of *Radio News* for July, 1921, advertised a new style regenerative receiver with such features as: "6 tuning dials and 4 controls" (for what?), "large moulded variometers", "rubber-tired verniers", and "battery posts in the rear" (for no unsightly connections!). In the same issue were also advertised: over fifty different makes of variometers ranging from \$5 to \$28 apiece, plain and fancy grid-leaks with mountings, enormous amplifying coils (transformers), and "horn type" speakers for about \$15 each. The main source of power for home receivers: 22.5 volt B batteries, were selling for between \$3 and \$5 each! Priceless components of 1921!

## HEADQUARTERS for Broadcast Engineers



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Harold Soffer

# San Francisco News

By Lee Kolm

**S**O completely sold on photography is Cliff Rothery, SE, that he will soon purchase a Perflex 8mm camera with turret lens and later plans to get a Lieca for Kodachrome slide work . . . Ed Manning, KPO, has reached the point where he can walk after being dependent upon crutches for a long spell. His house wiring will be done by a neighborhood electrician after this . . . Ed Callahan, FE, has been called to active service in the Navy and he is now a commissioned officer on the USS Minneapolis . . . Quote: Why all the fuss to get people up to the building site at O'Farrell and Taylor Streets when there is an eight-foot fence on Taylor Street and "KEEP AWAY" signs on O'Farrell? Unquote. Senator Thomas Q. Watson, SE, usually furnishes the reports from the new building . . . Joe Arnone, NY Engineer, had an unpleasant experience after the NABET Ladies' Night at the Bal. His car was missing after the party. When found later, the car was a total wreck and all personal articles had been removed . . . Dan Williams, FE, and Frank Barron, SE, have plans to go East to pick up their new cars. Dan is thinking about the Dodge and Frank favors the De Soto . . . George Greaves, FS, and Joe Arnone fished from SF Municipal Pier recently and a 23 and a 25 pounder made George happy, except that the really big one got away . . .

## "The Praise You Take..."

Benjamin Franklin once said, "The praise you take, although it be your due, will be suspected if it comes from you."

We say, "Ask the people who buy here what they think of us."

## TERMINAL RADIO CORP.

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### THE UNITED STATES OF AMERICA IN CONVERGENT INVERTED MERCATOR PROJECTION

Representing relative importance and proportionate size as conceived by a resident of New York (top) and a resident of the West Coast (bottom)

Much mystery over Oscar Berg, ME, acquiring a fine large rhododendron free, for nothing. If there's a bare spot in Golden Gate Park we'll have the answer . . . Recent overtime will come in handy for Andy Mitchell, SE, who plans to expand his photographic equipment with a tripod and light meter . . . George MacElwain's interest in the sport pages isn't entirely baseball. His wife is quite a golfer and has been making a name for herself as a member of the Crystal Springs team . . . Pals of Jim Summers, CS, would have you believe he plans an early marriage. That new home in the East Bay will be under construction shortly and from what we hear a certain young lady has been a great aid in drawing up the house plans . . . At last it happened. A defective relay caused the burn-out of the generator in Red Sanders, FE, Ford. No longer can he go around the plant inferring that the Ford was the only car not requiring repairs of any kind . . . Art Dingle, KPO, visits Montana during the next three weeks. Possibly several national parks will be included in the itinerary . . . George Dewing, SE, has headed South for his vacation, but was rather indefinite as to just exactly what places he'd visit . . . Gardening will occupy Mark Dunnigan's, SE, vacation period . . . No word on the starting date of construction for the Kilgore residence on Belvedere Island. Charlie Kilgore, CS, plans to establish a Sidewalk Superintendent Club at the 22nd floor control room window. Don Hall's, ME, glasses brings the building site right up close. Many of the boys have spent time at night looking for the site, but the glasses are reported to be poor for night use, at least at that distance.



## A New Idea in FM — AM Receiving Equipment

**T**HERE are many professional, experimental and laboratory applications involving FM which present equipment requirements that are not satisfied by the home type receivers that are now blossoming forth. Particularly is this true of centralized program installations where the equipment is called upon to provide high output for multiple speaker operation, and perhaps facilities for microphone and phono inputs as well.

Where the required audio system is on hand and only the provision for FM and high quality AM inputs are to be added, the Model S-31 FM/AM tuner introduced by Hallcrafters some months ago serves the purpose admirably. For anyone starting from scratch, however, a new combination unit is presented in the Model RSC-2. This includes not only the S-31 but the S-31A high-fidelity amplifier, a monitor speaker and provision of 500, 8 and 4 ohm outputs for feeding any desired combination of external speakers. The whole outfit is assembled in a special 3-panel inclosed rack.

In effect this new combination provides facilities for complete public address system operation. In addition to the radio input terminals, the S-31A amplifier has phono and microphone inputs as well and from these or the FM/AM tuner input provide an undistorted output of 25 watts. The frequency response of this amplifier is flat within plus or minus 1 db. from 40 to 15,000 c.p.s., and within plus or minus 1½ db. from 30 to 20,000 c.p.s. It is therefore capable of more than holding its own with any available input or speaker equipment available today.

For the distribution of programs in hotels, schools and various other institutions such a set-up is just about ideal not only as it is highly economical as compared with much of the equipment that has heretofore been available for these applications, but the noise reduction afforded by the FM feature offers a distinct advantage in this type of service where local elevators and other electrical equipment has in many cases seriously interfered with good AM reception.

In various laboratory and experimental applications this RSC-2 model provides for reception of the standard and FM broadcast services in the ranges of 540-1650 kc. and 40-51 mc., but any other type of tuner can be worked through the universal audio system. This is a convenience in these days when all sorts of experimental receiving equipment is being

developed and tried out in connection with the various new u.h.f. services and in relay pick-up work.

Adding to its flexibility and reducing the obsolescence factor is the fact that this equipment is rack assembled so that at a later date any other unit may be substituted for the present tuner, additional ranges can be provided by substituting another tuner in place of the monitor speaker unit and so on. These factors suggest a logical application in broadcast stations, not only for general listening-in and monitoring purposes but, through the use of an external relay tuner (or one substituted for the monitor speaker panel), for actual relay pick-up operation.

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## Abfalter and the Navy

(Continued from Page Fourteen)

of the chlorinated water from his slacks and shoes. "It won't take so long."

But his progress was slow. And the *Plummet* definitely did not favor the northern course. The boat sank every twenty or thirty feet along the River—and it looked like a long, cold, wet night for the Skipper.

Darkness covered Chicago and the River while Hugh was engaged in re-floating the craft for the ninth time—then he realized he might never get home at all.

Apparently the sight of a frail craft foundering on the River and occasionally disappearing from sight was too much for some people to watch. Unknown to the brave mariner aboard the *Plummet*, many citizens began calling the Police Department, the Coast Guard, and finally the U. S. Navy. It was a mystery ship, possibly a submarine, afloat in the River—and without lights!

But Mr. Abfalter was not aware of any interest in his behalf. Under cover of darkness he was struggling to get the staggering *Plummet* back to its South Side dock—a super-human task. The boat sank at almost regular intervals of ten minutes; and it took the Skipper nearly eight minutes of working at top speed to refloat the vessel after each submersion. So his speed up the River was just a little slow.

And to add to his troubles the large Coast Guard cutters and the Police motor-boats kept roaring up and down the River, causing huge waves to hasten each successive sinking of the *Plummet*.

"Avast, ye lubbers, avast!" shouted the Skipper, as each boat tore up and down the River. But no one heard him, and after about two hours of fruitless searching the Police and Coast Guard gave up the chase. This was a welcome relief to Hugh.

By midnight the *Plummet* was about a half mile from the Lake, and was giving the Skipper a little less trouble. It then sank only every fifteen minutes—which made for faster travel.

Heartened by his speed under such trying circumstances, Mr. Abfalter pro-

ceeded to again lift his voice: shouting orders to his imaginary crew. Some passersby on the Clark Street bridge saw him struggling in the water and shouting gibberish, and they promptly reported the strange antics to the nearest police officer. Once again the authorities became alarmed, but that time the Naval Base near the mouth of the River was notified—all unknown to the struggling Skipper.

Nearly an hour later the searching beam of a spotlight aboard a Navy destroyer picked out Mr. Abfalter—just as the *Plummet* was settling for the 300th time.

But the Navy completely misunderstood!

Admiral Clark, aboard the destroyer, viewed the disappearance of the unknown craft with incredulity.

"That," pronounced the Admiral in certain terms, "looks very suspicious to me! I think we'd better stop this ship and see what's going on down there."

"It looks like a submarine," put in the Second Mate.

Whereupon the huge destroyer swung around and idled close by the spot where the *Plummet* had submerged. Hugh was thrashing around in the unsavory water and pulling the hull up from the bottom by yanking on the mainmast. The Admiral came out on the deck above him, and glowered down with obvious suspicion.

"Whaddaya think you're doing down there?" asked the Admiral, with polished politeness.

"Glub! Glub!" sputtered Mr. Abfalter, choking with too much water. Then: "Avast, me hearties, avast!"

The Admiral turned to the First Mate, who turned to the Second Mate, who turned to the Cook.

"What's he talking about?" asked Admiral Clark. The crew shook their collective heads slowly. "He must be a foreign spy! He don't speak English, anyway!"

"Glub, glub, glub! Sputter!" answered Mr. Abfalter, finally getting his boat upright and almost hailed out. "Avast, me hearties! An' thanks fer the use of your lights!"

"That fellow is definitely crazy," said the Admiral.

"Avast!" yelled Mr. Abfalter hoarsely.

"That's all, brother!" said the First Mate.

Whereupon the destroyer swung around, two sailors reached down and yanked the Skipper upon the clean, dry deck.

"What's the meaning of this?" asked the Admiral.

"Avast!" muttered Mr. Abfalter. "Man an' boy, I been sailin' before the mast for ninety years, an' I never heered tell of a man bein' yanked aboard a lousy barge like this!" Whereupon Mr. Abfalter stepped back to take aim, and let fly with a hard right to the Admiral's jaw. In less than a minute after that, Mr. Abfalter was below decks chained securely to the galley stove. He missed much of the excitement up on deck.

By the time the crew had fished the Admiral out of the River and dried him off a little, the frail *Plummet* had again sunk from sight. It took the crew almost an hour to retrieve the cat-boat, refloat it, and tie it on aft the destroyer.

Then the destroyer went roaring down the River, out into the Lake, and toward the Naval Armory. It was undoubtedly the fastest that the tiny *Plummet* had ever traveled; in fact, the strain was a little too much for the wooden vessel, and it sank for the last time when it was well out in the Lake.

Rather than bother with refloating the stricken boat, the crew merely chopped the towing hawser—and the *Plummet* settled gently into the watery depths it had so often cheated.

But Mr. Abfalter didn't find out about the loss of his precious boat—with eight payments still due—until the Navy court-martialed him the next morning.

Hugh finally explained that he wasn't really a seaman at all, much less a spy—and that they already had proof he wasn't operating a submarine without a state license.

It was all very embarrassing, but they finally told Mr. Abfalter he could return home—and everyone parted unhappily except, of course, the misplaced *Plummet*.



**THE LIGHT THAT MUST NOT GO OUT!**

**F**ROM hour to hour, on wavelengths from far and near, Americans owning 50,000,000 radio receiving sets hear the news of war overseas. The broadcasts tell of raiders in foreign skies; they tell of terrific explosions and flames seen more than 100 miles away. Commentators tell of blackouts—15 hours of blackness at a stretch in London... In the United States, radio is the voice of national defense.

A light in the darkness that enshrouds the world is the truth of an uncensored radio... broadcasts from American aerial towers that stand as sentinels of freedom. The light of truth in American radio is not shaded or hooded... it is the glow of hope for free men everywhere. For many months now, the National Broadcast-

ing Company, through modern improvements in equipment and increased power in short-wave transmitters, has helped to make certain that the slit of light on radios in homes throughout the Americas will burn as one great beacon of freedom... for these broadcasts spread into the far corners of the darkened world.

By short waves, NBC is flashing

the truth, as it is received from its American observers in foreign lands, and from the press associations.

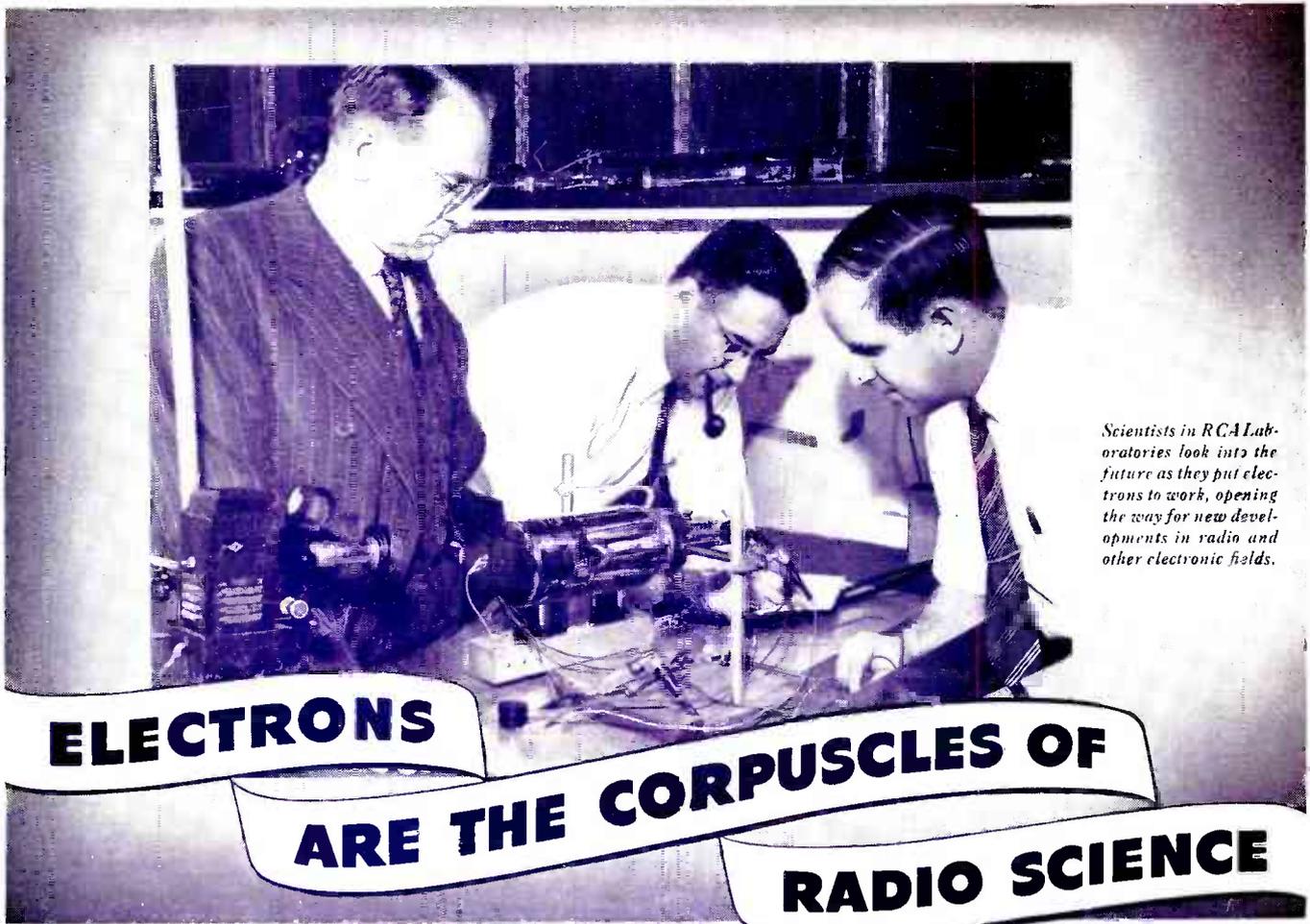
Cordial, two-way relations have been established through exchange of programs between North and South America... and NBC is happy that it has the opportunity and facilities to contribute to the cultivation of all-American friendships... every one of NBC's programs are

sent free of charge to Latin America, that they may be rebroadcast for the pleasure of our southern neighbors.

That there shall be no blackout in the light of American radio... that there be no blindfolding of listeners, no hooding or curtaining of the truth, is the aim of NBC... Radio's light of truth must never fail.



**National Broadcasting Company**  
 A Service of the  
**RADIO CORPORATION**  
**OF AMERICA**  
 Radio City, New York



Scientists in RCA Laboratories look into the future as they put electrons to work, opening the way for new developments in radio and other electronic fields.

# ELECTRONS ARE THE CORPUSCLES OF RADIO SCIENCE

*Electrons are the corpuscles of radio. The vacuum tube is the heart that pumps them through the copper veins and arteries. Electricity is electrons in motion—it is the lifeblood of communications by wire and radio,*

**E**LECTRONICS is a science born of radio. Both are members of one family. The modern radio research laboratories are electronic laboratories—the two are inseparable. Radio tube and electron tube are synonymous. Both pump the billions of electrons which flow in the electrical blood stream of communications and industry.

Putting electrons to work in a vacuum tube opened the Radio Age. It gave a voice to wireless, enabling it to talk and sing. Today, while millions of tubes glow in broadcast receivers, millions of others pulse with commercial dots and dashes, radiophotos, facsimile and television.

As the advent of broadcasting in 1920 there were a few thousand radio tubes at most, largely in the hands of experimenters. Today, there are hundreds of millions, in more than 50,000,000 American radios.

Revolutionary developments in radio

since the first World War can be traced to the vacuum tube. It has been a key to progress. It has enlightened the world through broadcasting. It makes short waves, ultra-short waves and television what they are today.

Now, the wonders that the radio or electron tube has worked in communications are spreading into other electrical and industrial fields. As the research experts have developed and improved the tube, they have multiplied its uses. As a result, today industry is being *electronized*. The Electronic Age is opening. The electron

tube, once believed to be limited to radio, is recognized as an extremely sensitive and precise tool for manufacturing and processing control. The uses of electronics in industry appear limitless. Superhuman in its response to light, sound, touch and color, the electron tube is acclaimed as a new brain of industry.

From electronics came the electron microscope, which uses 52 radio tubes to perform as an ultra-eye that sees far into the sub-microscopic world.

In 1940, more than 106,000,000 electron tubes were produced for radio and industry, so that man might find life more pleasant and his tasks speeded and simplified, yet with accuracy and efficiency.

The electronic corpuscles of radio carry promise of new wonders as they flow silently and unseen through electricity's endless stream.



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