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George
**The
Broadcast
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Journal**

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**No. 1
1948**

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**A Message
to the Members
of NABET**

from
JOHN R. McDONNELL
Vice-President, NABET

Gentlemen:

Each year for several years I have become more involved in NABET affairs. This January 1st finds me involved almost to the point of being overwhelmed. Seriously, I have been greatly impressed by the display of good faith by the membership in the future of our organization. That faith, implemented by the leadership you have elected to the National Council, and solidified by a determination to tackle all of our problems squarely—and together—will enable us to meet any situation which may confront us, either presently or in the future.

To all of you—my Best Wishes for a Happy and Prosperous 1948.

Deadline remains 2nd of every month. Example: Copy received March 2nd appears in the April issue, which is put in the mail about March 25th. Put your copy in the mail early enough to permit delivery in Richmond Hill not later than the 2nd.

Copy Information. No special instructions; follow usual courtesies of normal correspondence; type all copy, double space, and leave normal margins; type on one side of sheet only, number pages consecutively; most important: read your copy before submitting it for publication. When you have finished editing and correcting your copy and it is in final form, it must be passed on to your Section or Chapter Chairman for his reading and initialing. The purpose of this procedure is two-fold; first, it affords your Chairman the courtesy of knowing what will appear in his Chapter's column, and second, it affords him the opportunity to edit or delete items that he may feel are more injurious to the individual mentioned, than they are funny.

Ham Calls. If your call was not listed in our Yearbook, pass it on to your Chapter Associate Editor, who will make corrections and additions and submit them for inclusion in our next list. Under former NABET V-P Thor (W6LN) LaCroix's guidance, the Journal has made a number of appeals to the membership for this ham-call data; to date, only half our Chapters have responded. Not reported to date, are: Baltimore, Boston, Cleveland, Detroit, Dixie, Mohawk, Philadelphia, Rocky Mountain, St. Lawrence, Syracuse, Atlanta, Fairmont, Louisville, Richmond, and Springfield.

Special Ham Issue is in the works, and will depend upon receipt of the balance of our Ham Calls. For this special issue, we would like each Associate Editor to submit a photo or two, together with appropriate story, of one of the more active hams in his Chapter. Deadline for this special material: March 20th.

FM—Part II *How FM will affect the presently employed AM Broadcast Engineer*

By Frank Burns

THE first article in this series attempted to show what operating procedures the present AM engineer would need to be familiar with if employed at an FM station. It covered the various operating positions up to and including transmission of the program to the transmitter.

This article is intended to cover the differences in operating procedure at the transmitter proper.

Perhaps a brief summary of the characteristics of an FM transmitter would aid in pointing out the main differences between operation of an AM and FM station.

There are 100 channels available for FM broadcasting starting at 88.1 megacycles and extending to 107.9 megacycles. Each channel is 200 kilocycles wide which means that at 100% modulation (± 75 kc) there is a 25 kc guard band at each end of the channel.

The output frequency is varied at a rate corresponding to the frequency of the modulating signal and the amount of frequency deviation (% modulation) is proportional to the amplitude of the modulating signal but independent of the frequency of the modulating signal. This frequency deviation should be symmetrical about the assigned carrier frequency. The carrier, or center frequency, must at all times be within 2000 cycles of the assigned station carrier frequency.

Power output is the same with or without modulation although the power in the carrier (center frequency) varies with the degree of modulation. It will be shown later that there are times during modulation (depending on the frequency of the modulating signal and the degree of modulation) where there is no power output at the carrier frequency and all the power is in the sidebands. Also, when the instantaneous amplitude of the modulating signal is zero (output being swept past its carrier or center frequency) all the power is in the carrier, there being at that instant no modulation and hence no sidebands.

Requirements pertaining to permissible noise level and frequency response characteristics are the same for the transmitter as for the broadcast studio equipment. That is, the equipment must have a noise level which is at least 60 db below program level and must be capable of transmitting frequencies from 50 cycles to 15 kilocycles.

Pre-emphasis

Due to the wide band widths required in both the FM transmitter and receiver in order to pass these frequencies, it is standard practice to use pre-emphasis in the transmitter with complimentary de-emphasis in the receiver. The use of pre-emphasis is predicated upon the assumption that the energy at high audio frequencies present in speech and music is small and that a rising transmitter frequency characteristic can be used without danger of overmodulation.

The reason for using pre-emphasis is that the most disturbing noises seem to lie in the higher frequency range between 5 kc and 15 kc and because the energy of speech and music is relatively low in this range; a particularly poor signal to noise ratio results if no compensation is employed.

Pre-emphasis in the transmitter as well as de-emphasis in the receiver can be accomplished with rather simple R-L or R-C networks. These networks are fixed to give the desired audio frequency response to the equipment and do not require any operational control or adjustment. They are designed to give a time constant of 75 micro-seconds as shown in Figure 1. The deviation of the system response from this standard pre-emphasis curve must be between the two limits shown in Figure 1.

Of course the de-emphasis circuit in the FM receiver must have a 75 microsecond time characteristic also, in order to reinstate the relative amplitudes in the signal as they were before pre-emphasis.

The effect of this compensation is to greatly increase the energy of the desired signal in the upper frequency region where noises are most objectionable, return them to their normal relative amplitudes after detection in the receiver and thereby obtain a much greater signal-to-noise ratio in the receiver output. Figures 2 and 3 show the effect of pre-emphasis on receiver output noise.

Volume Compression

There has been much discussion as to the advisability of using volume compression in Frequency Modulation broadcasting. One of the arguments against its use is that it limits one of the main advantages of FM, namely the dynamic range, or difference between the highest level to be transmitted and the level at which noise becomes objectionable. As mentioned in the preceding article, FM unlike AM does not have a 100% modulation limit above which distortion rises very rapidly. An amplitude modulated carrier is of course limited by the 100% negative limit at which the carrier disappears, and in the positive direction at the point where overload of the transmitter stages takes place. With a frequency modulated carrier more than 100% modulation will cause more than the permissible ± 75 kc deviation but no sharp or sudden in-

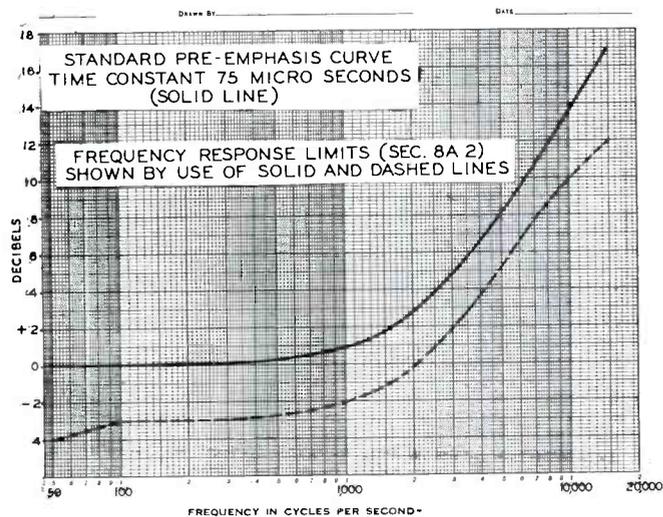


Figure 1 — Pre-emphasis curve.

crease in distortion takes place, and no overload of the final stages occurs as there is no increase in power output.

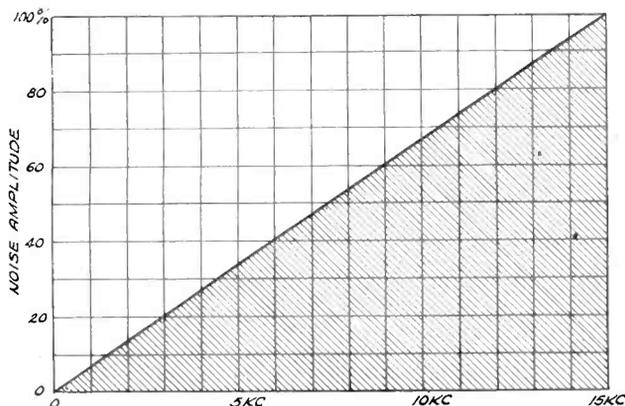


Figure 2 (Top)—Graph showing percent noise in FM receiver WITHOUT pre-emphasis.

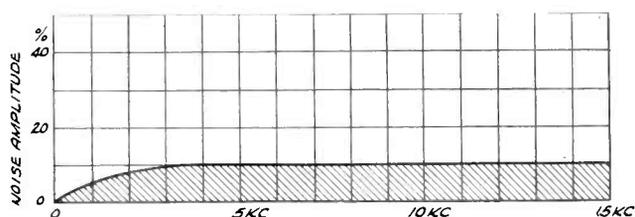


Figure 3 (Bottom)—Graph showing percent noise in FM receiver WITH pre-emphasis.

The counter arguments favoring the use of compression, point out that the average listener, due to his environment, cannot take advantage of the full dynamic range possible with FM. Since the noise level of the entire transmitter-receiver system is that of the link having the highest noise, there is no benefit to be obtained in having the transmitter and receiver capable of a 70 db volume range if this range is limited in the listeners home to 40 db for example, by background noise and maximum permissible volume of reception. It is therefore necessary to accept some workable compromise on dynamic range in practically every receiver installation. This allowable range is narrower in almost all cases than that required by FCC standards for FM transmitter installations.

Different types of programs permit varying degrees of compression before it becomes objectionable. The practice of having skilled engineers anticipate very low and very loud passages and make necessary gain adjustments has been widely criticized by musicians who complain that their efforts to obtain artistic expression are defeated. However, these complaints are usually from the artists and not the average listener who in most cases considers the compromise beneficial and preferable to the original rendition under normal listening location conditions.

It must also be kept in mind that although no definite 100% overload point in FM transmitters takes place, there are limitations in both transmitter deviation capability, receiver deviation acceptance, and allowable channel width. If these limitations are exceeded some distortion will result. Further, even though both transmitter and receiver were designed for greater than the normal value of modulation, the assigned channel width serves as a specific limitation.

It is obvious that the upper limit of volume level is almost as rigorously restricted in FM as in AM broadcasting, and the lower level limit determined in most cases by conditions in the listeners home.

Many FM stations incorporate volume limiting with what they consider very satisfactory results. These limiters must have low noise level, flat frequency response, low intermodulation distortion, and a nearly flat compression curve above the bend. It should be so arranged that the control can be adjusted to give the desired amount of compression (operating practice indicates that no more than 3-6 db of compression should be employed), gain and output level. Recovery time is also very important and should be variable to permit optimum results with different types of program material. Practical experience with volume limiters in many stations indicates that the recovery time should be variable from .2 to 1 second.

One advantage of the volume limiters is related to the use of pre-emphasis. As explained before, the use of pre-emphasis is predicated on the assumption that the energy at high audio frequencies in speech and music is small and a rising transmitter frequency characteristic may be employed without danger of overmodulation. This assumption is not always justified for certain types of program material. Sound effects such as jingling keys, clinking coins, or crackling paper often produce sharp transients with high amplitude at frequencies of 10 kc or more. These sharp transients which may be short enough to cause no indication on the volume indicator may nevertheless cause the carrier to deviate beyond the channel limits, especially after pre-emphasis. Because of this effect it is usual practice, after setting the gain of the system for 100% modulation on peak program level, to back off the gain several db in order to prevent transient overmodulation. Thus, the gain in signal-to-noise-ratio obtained by using pre-emphasis is partially lost by having to compensate for these transient peaks. By employing a volume limiter, the average level does not have to be dropped as much and a gain in signal to noise ratio can be obtained.

Another decided advantage of using a program limiter concerns being able to modulate with a greater average program level. If a transmitter is adjusted for 100% modulation on program peaks and the modulation integrated over a period of several minutes, it will be found that the average level is very low. This is particularly true of program material such as speech or piano music where in many cases the average modulation may be as low as 10 or 15% and represents a waste of transmitter capability. With the limiter this level may be increased without fear of overmodulation on peaks.

Measurement of Frequency Deviation

In practice the transmitter engineer must know what program level is required feeding the modulator to cause 100% modulation (± 75 kc deviation) in order that the full dynamic range capabilities of the FM system may be utilized as well as to insure that this program level is not exceeded, which would cause overmodulation and possible resultant spill-over into the adjacent channels as well as distortion due to exceeding the bandwidth capabilities of the transmitter and receiver.

Measurement of percent modulation of an FM transmitter although slightly more involved than the usual routine of checking percent amplitude modulation, is none-the-less quite straightforward.

The most generally used procedure for making the

check depends on the fact that the power of the FM carrier (center frequency) varies with the degree of modulation (frequency deviation). For any specific modulation frequency the power in the carrier is zero (all the power being in the sidebands) at deviations equal to 2.4 times the modulation frequency, again at $2.4 + \pi$, or 5.5 times the modulation frequency, once more at $2.4 + 2\pi$, or 8.65 times the modulating frequency and so forth as shown in Figure 4.

It is, therefore, possible to choose a modulating frequency, f , such that $2.4 \times f$ (or $5.5 \times f$) is equal to ± 75 kc (the 100% modulation point) at which time the carrier will be observed to have zero power by one of the procedures to be described.

Any of several methods may be employed for checking the deviation by means of this carrier-null phenomena but the most commonly used incorporates an ordinary super-heterodyne receiver of the type used for amplitude modulation reception.

A modulating frequency is chosen which will cause zero carrier power at the 100% modulation point of ± 75 kc. For example, see Figure 4. A modulating frequency of 13.6 kc ($75 \text{ kc}/5.52 = 13.6$) will cause zero carrier power at a deviation of $(13.6 \times 2.4) = 32.64$ kc again at $(13.6 \times 5.52) = 75$ kc.

The first step in the procedure is to tune the super-heterodyne receiver to the unmodulated carrier frequency of the FM transmitter. A headset is used on the output of the receiver detector and the receiver oscillator frequency is set to give a low frequency beat note of about 100 cycles.

Now, the output level of the audio oscillator is gradually increased causing a greater deviation of the transmitter frequency. It is noted that the intensity of the 100 cycle beat note gradually decreases until a point is reached where the beat note is no longer audible. This means the

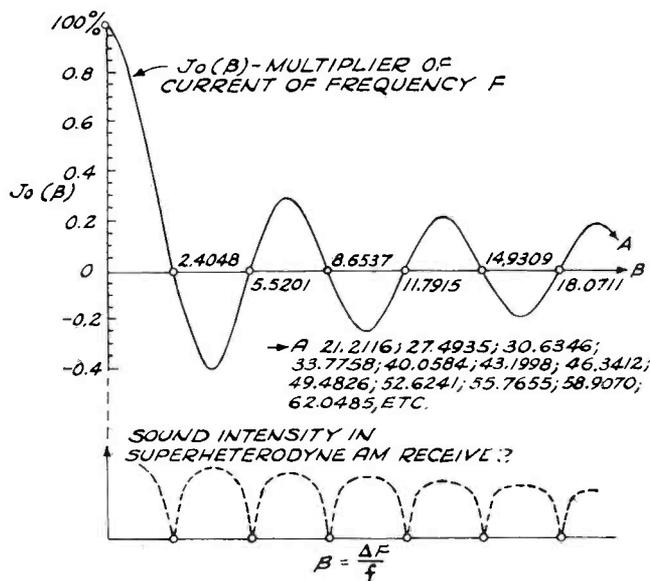


Figure 4—Curve showing power in FM carrier for various degrees of modulation. (From "Frequency Modulation" by Hund, Fig. 24, Page 86—1942: Experimental determination of the maximum frequency deviation ΔF .)

deviation is $(2.4 \times 13.6) = 32.64$ kc. As the amplitude of the 13.6 kc modulating frequency is increased further, the 100 cycle beat note again becomes audible, reaches a maxi-

imum level, and then decreases in intensity until a point is reached when the 100 cycle beat note is for the second time inaudible. This indicates a carrier deviation of 75 kc, or 100% modulation.

Of course, if desired, some other modulating frequency such as $(75 \text{ kc}/8.62) = 8700$ cycles could be used in which case the same procedure as above would be employed, except that the third carrier-null will be sought rather than the second. The only disadvantage to using the lower frequency is that each additional carrier-null is slightly more difficult to discern in the headset than the preceding one.

Another method for checking deviation employs a heterodyne frequency meter. This may be used because at

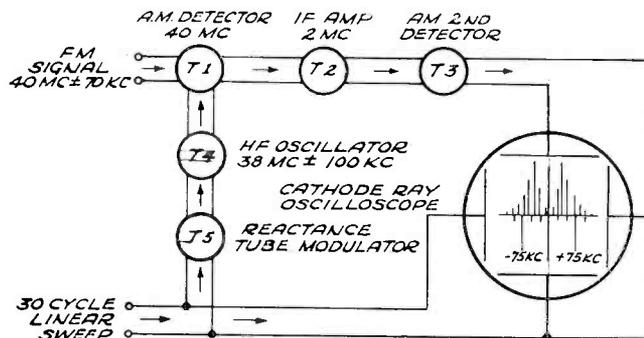


Figure 5—Block diagram of suggested FM Deviation Monitor. (From Aug. 1940 Proc. IRE, page 375; FM Monitoring System by R. J. Pieracci; Fig. 2 qv.)

low modulating frequencies such as 60 cycles per second, an essentially continuous frequency spectrum exists (side bands spaced 60 cycles apart on each side of the carrier) over the range covered by the deviation.

The 60 cycle modulating signal is gradually increased in amplitude and at the same time the heterodyne meter is tuned back and forth on each side of the carrier frequency until the amplitude of the 60 cycle modulating signal is great enough to give a response of 150 kc spread on the heterodyne meter. At this point, 100% modulation (± 75 kc) is indicated.

A more accurate measurement of frequency deviation and one that offers a continuous indication during actual program time may be obtained by employing a super-heterodyne receiver and a CRO tube as shown in Figure 5.

T1, T2, T3, and T4 make up the superheterodyne receiver portion of the monitor and are capable of operating at the FM transmitter frequency. The high frequency oscillator T4 has a center frequency 2 megacycles below the transmitter center frequency and is frequency modulated and swept across a band of ± 100 kc or more by the reactance tube modulator T5 at the rate of say 30 cycles per second, using a linear (sawtooth) sweep circuit. The oscillator T4 therefore actually "scans" the spectrum 100 kc above and below the carrier frequency and passes on to the IF amplifier, T2, any signals it encounters during its excursion. Therefore, when a frequency modulated signal is applied to the input of the monitor, the carrier and side band components beat against the local oscillator, and are translated to the IF frequency, amplified, and applied to the detector T3. The output of the detector is a sharp

(Continued on Page Nineteen)

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Artificial crystals, grown in the laboratory from ordinary chemicals, are starting to be used in the nation's expanding telephone network as a substitute for scarce but indispensable natural quartz.

In a few years, the artificial crystals are expected to replace as much as 90 per cent of the natural quartz used in long-distance telephone systems—and do as good a job as its scarce, natural brother. Some New York to St. Louis circuits are already operating with synthetic crystal units. Additional urgently-needed long-distance circuits are expected to go into operation appreciably earlier than otherwise possible as a result of development of the new crystal.

Announcement of science's latest triumph of imitating—and even improving upon—nature was made recently by Bell Telephone Laboratories, where the crystal growing technique was developed, and Western Electric Company, which has constructed a crystal plant at Allentown, Pa., to mass-produce the new crystals for use in long-distance telephone circuits.

The new crystals, ethylene diamine tartrate, are familiarly known as EDT. Although these crystals differ markedly from quartz in chemical composition, both are piezo-electric in character; that is, both are electro-mechanical transducers; they can convert mechanical energy to electrical energy or they can reverse the process.

The new crystal is the direct result of long-range research on growing artificial crystals which has been in progress at Bell Laboratories for a quarter of a century. During the war the Bell Laboratories research program led to the development of synthetic crystals for use in sonar, the underwater equivalent of radar. Those crystals were composed of ammonium dihydrogen phosphate, abbreviated to ADP.

In cooperation with BTL, Western Electric mass-produced some 20,000,000 of the crystals for U. S. Navy sonars in one of the most closely guarded projects of the war. Sonar played an important part in breaking the back of the Nazi sub campaign, and later enabled our own submarines to sink tremendous tonnages of Japanese shipping.

In the telephone system, the crystals are used as filters to separate multi-channel telephone circuits.

Heretofore, telephone filters used quartz crystals which occur in suitable size only in nature. With the present increased demand for long-distance telephone circuits, the supply of quartz, already heavily drained for war needs, proved inadequate. Bell Laboratories' long-range synthetic crystal research provided EDT as the answer.

The Allentown plant of Western Electric, geared to produce hundreds of thousands of crystal plates a year, was established after extensive development work and pilot plant operations at Bell Laboratories. In commercial production the artificially grown crystals weigh about a pound and are about six inches in length and two by three inches in cross-section.

These full-grown crystals are cut into plates, roughly an eighth of an inch thick, an inch and a half long, and a half-inch wide, and are coated with a film of gold hardly a millionth of an inch thick, which serves as an electrical connection. They are then mounted in a glass envelope to form a crystal unit.



Like a cluster of glowing ice cubes, these seeds of synthetic crystals are about to be lowered into a growing tank at Bell Telephone Laboratories where engineers have developed a method of culturing them as a substitute for scarce but heretofore indispensable quartz.

The first tiny seeds of crystal from which subsequent crops were harvested were only a third of an inch across. They were obtained by evaporating a saturated solution of the chemical in a dish, just as sea-water can be evaporated to obtain salt.

These were then swished slowly back and forth in a solution of the chemical which was kept super-saturated. Slowly, more crystal was added to these seeds—that is, they grew. The process is the same as that in which rock candy is made but, of course, it is necessary to produce single crystals rather than the haphazard growth of many crystals. The entire growing process must be very precisely controlled. Temperature variations, for example, must be kept within a tenth of a degree.

A crop of crystals can be harvested every three months, and the seeds cut off from the new growth and replanted in the solution to start another crop.

In the search for a quartz substitute, Bell chemists and physicists investigated more than 100 crystals before they selected EDT.

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Review of Current Technical Literature

By Lawrence W. Lockwood

Journal of Applied Physics, October, 1947

Quarter Wave Coupled Wave-Guide Filters—
W. Pritchard

This paper considers the theory of band-pass wave guide filter formed by cascading rectangular cavities separated by quarter wave-guide lengths. The specific design procedure is outlined including the design of a finite thickness inductive aperture.

A Computational Method Applicable to Microwave
Networks—R. Dicke

A method is devised for computing the properties of a complex microwave network in terms of the properties of the circuit elements which in combination form the network.

Bell Laboratories Record, November, 1947

A Preview of Radio Relaying—G. Thayer

A history and description (with photographs and block diagrams) of the experimental microwave link set-up by Bell Labs between New York and Murray Hill which led to the commercial link between New York and Boston.

Communications, October, 1947

Television Receiver Production Test Equipment—J. Bauer
Concluding installment of discussion on 22 rack, 13

NABET Employment Service

Due to the day-to-day changes in status and availability of unemployed NABET members, it has not been deemed practical to publish such a list of names in each issue of the Journal. Instead, each available member should immediately notify the National Office, with copies to his Chapter Chairman, of availability together with brief resume of experience, etc., and notify them immediately of any change in status or availability. The Chapter Chairman for the area, and the National Office, each of whom are called upon to fill vacancies, will thus be kept up-to-date to the mutual advantage of all concerned.

channel video and sound test setup at Camden, with details on head-end alignment, H-F distribution system, F-M sound transmitter, combined sound and picture transmitter and future equipment.

F-M and A-M Broadcast Transmitter Buildings

Major factors to be considered in laying out the building and choosing a building site.

Aluminum Waveguide for Lightweight Communications
Equipment—R. Sherman

Lightweight waveguides for aeronautical, mobile and personal applications employ new techniques in bending, brazing and plating.

Proceedings of the IRE, November, 1947

Microwave Converters—C. Edwards

Microwave converters using point-contact silicon rectifiers as the nonlinear element are discussed, with particular emphasis on the design of the networks connecting the rectifier to the input and output terminals.

Propagation of Radio Waves In the Lower Troposphere—
J. Smith and L. Trolese

A theory is proposed which is in agreement with the salient propagation characteristics observed on a nonoptical link.

Video Storage by Secondary Emission from Simple
Mosaics—R. McConnell

It has been found that the derivation of a video signal in an iconoscope by scanning does not involve bringing each element of the mosaic into an electron exchange equilibrium while under the beam. Consequently the mosaic charge is erased not at the instant of passage of the beam but continuously by the rain of low velocity electrons. A discussion of a study of these factors is presented.

The Motion of Electrons Subject to Forces Transverse to
a Uniform Magnetic Field—P. Weimer and A. Rose

The factors which govern the paths of electrons in a uniform magnetic field, which are of interest in a variety of vacuum tubes, are discussed.

Parabolic-Antenna Design for Microwaves—C. Cutler

This paper is intended to give fundamental relations and design criteria for parabolic radiators at microwave frequencies (i.e., wavelengths between 1 and 10 centimeters).

A Mathematical Theory of Directional Couplers—
H. Riblet

Directional couplers are becoming an increasingly important component in microwave radio-frequency circuits. A suitable generalization of concepts used in discussing the lumped loading of a single transmission line is presented which enables one to discuss the interaction of the coupling elements of these more complicated circuits in a reasonably complete and elementary manner.

**Force at the Stylus Tip While Cutting Lacquer Disk-
Recording Blanks—H. Roys**

In order to study the requirements of lacquer disk recording, equipment has been developed to measure the force at the stylus tip while cutting unmodulated grooves. The results of this study are presented.

Coaxial-Cable Networks—F. Cowan

This paper discusses the general features of the coaxial system, its application for both telephone and television, and the future prospects for very-broad-band transmission facilities in the communication network.

Tele-Tech, November, 1947

WOR's Field Pick-Up Studio for Spot Broadcasts

Four transmitters, powered from bank of storage batteries make mobile equipment independent of AC lines—specially designed vehicle.

Design of Simple SYNC Generator—E. Noll

Details of a 60 frame 260 line non-interlaced system useful as a basic timing and shaping unit and for checking purposes.

Improved Type of Ratio Detector—A. Hayes Jr.

Originally developed as a mathematical computing circuit, the arrangement provides high transconductance for FM detection.

**Feedback Recording Head Giving Low Intermodulation—
E. Cook**

Improving frequency response and stability in disc recording by controlling a feedback loop from the last amplifier stage.

Television Topics Dominate NAB Technical Conference

Engineering sessions study theater screen projection, direct photographing of TV images from tube face—discuss FM propagation systems.

Communications Problems Engage West Coast Engineers

Television, FM and radio propagation subjects hold attention of 750 during five-day technical convention and an exhibition.

Radio and Electronics, September, 1947

(New Zealand)

The Syncrodyne

Dr. D. Tucker of the British Post Office Research Station has invented a type of radio receiver which has the somewhat revolutionary property of possessing extreme selectivity and any desired bandwidth at one and the same time. The functioning of this receiver is described.

A Practical Analysis of Untrahigh Frequency Transmission—Resonant Section, Resonant Cavities and Waveguides—J. Meagher and H. Markley

Diagrams with characteristics and simple analogies of some of the above.

Audio Engineering, October, 1947

The Magnetophon—D. Dreuner

This is the first complete discussion of the studio model R22-A Magnetophon which has greatly influenced the design of tape recorders in this country.

**Dynamic Symmetry and Acoustic Room Design—
M. Rettinger**

How properly proportioned acoustic rooms improve appearance and increase utility.

A New Phonograph Pickup Principle—A. Hayes, Jr.

A simple method of obtaining high audio output from a capacitive pickup.

Analyzing Sweep Frequency Transcriptions—W. Johnson

Describing a simple method of making instantaneous frequency response tests of audio apparatus.

Musical Acoustics—B. Tilson

Fifth of a series on music written especially for sound engineers.

Electronics, November, 1947

FM Chain Broadcasting

Economic salvation for the small FM broadcaster may lie in the methods of relaying high fidelity program from one station to another now used by the Continental Network and others. Techniques employed successfully since 1939 include one that does not require conversion to audio.

**Interconnecting Facilities for Television Broadcasting—
W. Bloecker**

Video facilities now available or to be completed by 1950, include a 12,000 mile nation-wide system using coaxial cable, local networks employing shielded-pair telephone cables, and microwave radio circuits.

**Recording Skywave Signals From Broadcast Stations—
W. Smith**

Description of monitoring station set up by Canadian Government to investigate skywave interference occurring when two or more broadcast stations share the same channel.

Simplified Microwave AFC Part I—F. Jenks

Combinations of motor and electronic AFC action for microwave oscillators are discussed.

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**If it concerns the Broadcast Engineer—**



**he will read about it in the  
Broadcast Engineers' Journal**



## Book Review

The RCA Review Department of the RCA Laboratories has published the first volume of its new Engineering Book Series. This volume has been written by the Director of the Patent Dep't, and is titled **Patent Notes for Engineers**. The text is 6 x 9 inches, 165 pages, and may be obtained from the RCA REVIEW at a cost of \$2.50 for the cloth-bound edition.

The subject matter is extensively treated, with frequent quotations of court decisions which help clarify a highly technical subject. The text points out some of the pitfalls to be avoided if your invention is to be rewarded with a valid patent, and also equally important, some of the required "musts" that are necessary to establish the date of invention, exactly what was invented in terms of the prior art, etc. The subject matter discussed includes these headings:

Invention defined in popular sense  
Unpatented invention not protected  
No definition of statutory invention  
Invention defined negatively by Courts

Exceptions to "Negative Rules"  
Doctrine of commercial success  
Essentials of statutory invention  
Other requisites of statutory invention

Undisclosed conception of invention  
Oral disclosure of invention  
Written description is best evidence of invention

Reduction to practice  
Relation between conception of an invention and reduction to Practice—Diligence

Records of Invention  
Standard form for disclosing inventions

Substance of disclosure  
Preparation of patent application  
Patent Office procedure  
Amending the application  
Appeal from final rejection

Reissues  
Disclaimers  
Definition of interference  
Examiner's interference search  
Claims proposed for interference  
Primary examiners reference to examiner of interference

Declaration of interference  
Avoidance or postponement of interference

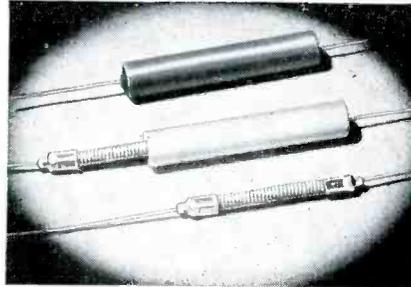
Priority of invention  
Ownership of inventions and patents  
Use of patent  
Patent Licenses

Table of Citations  
Table of Illustrations

This text should be on the broadcast engineer's bookshelf.

## Trade News . . .

**C**LAROSTAT Mfg. Co. announces ceramic-cased midget wire-wound resistors. These units are inexpensive, and are intended to replace the



more cumbersome and costly bracket-mounted units. Rated at 7 watts, 1 3/4" long, in values up to 5000 ohms. Smaller units measure only 1" long, rated at 4 watts, up to 1000 ohms.

The Phillipine Government has issued a commemorative stamp showing President Roxas taking the oath of office, with Paul V. McNutt in the background, and a Shure Brothers "556" microphone in prominent display. Broadcasting has arrived!

The Cannon Electric Development Co. announces a new studio warning light, designed especially for broadcast



stations, film studios, and applications where controlled warning lights are required. Available in 24V, 15cp; or 115V, 10W.

G.E. Co. announces that it is carrying on a commercial shipping radar research program on the Great Lakes; the equipment is being tested under all conditions of navigation.

For the first time in the industry's history, more than two million radio and television sets were manufactured in one month—according to the RMA.

Inactive NABET Member and president of Maurice D. Holland Radio, announces that his company is installing and servicing a huge fleet of mobile and marine radio-telephones in the gen-

eral vicinity of Freeport, Long Island, performing a similar service to that offered by the telephone companies in the larger cities. Good Luck, and keep us posted.

Shure Brothers announces three new wire recording heads, featuring a variety of impedances, closely controlled air-gaps, reduction of hum pickup, and controlled groove contour for optimum position of recording wire.

Aerovox Corp. announces the addition of high-capacitance low-voltage units to the midget-can line. Available in 6, 12, 15, 18, 25, and 50 volts DCW; from 100 to 4000 mfd.

Cannon Electric Development Co. has issued a completely revised Fourth Edition of the Type "DP" Bulletin, con-



sisting of 24 pages of photos, dimensional sketches, junction shells, and mounting hole variations. Copies of the catalogue may be obtained without charge from the Cannon Electric Dev. Co.

RCA Tube Dep't announces a new edition of its famed RCA Receiving Tube Manual, RC-15. This is the first revision of the manual since the RC-14 edition of 1939. Available at 35 cents from tube distributors. A standard line of PM speakers has also been announced by RCA. The largest is a 12" unit rated at 12 watts. The Alnico magnet is locked into position. An adjustable voice-coil mounting permits accurate alignment of the cone.

★ DO WE HAVE YOUR ZONE NUMBER? ★

# Large Screen Television Progress

**I**N SEPTEMBER, RCA demonstrated a six by eight foot television picture at the Washington convention of the Theatre Equipment and Supply Ass'n. The projection throw was 15 feet; the whole equipment is similar to that supplied by RCA to Warner Brothers and 20th Century-Fox in their theatre-television research programs. At the 32nd Annual Meeting of the Optical Society at Cincinnati, RCA delivered a paper on projection screens for home television receivers. The paper described how the two 15 by 20 inch lenses used for the front and back of the 15 x 20 inch screen, concentrate the light in the desired viewing field. The rear piece is a "Fresnel" field lens—a thin Plexiglass sheet moulded with a series of fine, concentric, circular ridges, somewhat like the surface of a phonograph record. The front of the screen is a multiple-element lens of narrow vertical cylinders molded in Plexiglass. Laminated between these is a thin Vinylite sheet containing enough silica opacifier to render "moire" effects unobjectionable. This screen provides a brightness gain of 7.5, and in combination with large aperture reflective optics, provides a 15 x 20 inch picture having highlights with a brightness of more than 50-foot-lamberts, which compares favorably with direct-viewing kinescopes, and more than satisfies the recommendations for good motion picture practice. The reflective optical system referred to makes possible a quality of screen illumination equivalent to a conventional F:2 projection lens, while the amount of light reaching the screen is about 6 or 7 times as great.

The optical system of the projector consists of two elements—a 21-inch spherical mirror and a 14-inch aspherical correcting lens—mounted vertically in a tubular housing. A seven-inch, metal-backed, high-intensity projection tube is placed in such a position that its face is directed toward the magnifying spherical mirror, which is pointed at the projection screen. The large spherical reflector greatly magnifies the picture picked up from the face of the projection tube and projects it through the 14-inch aspherical lens onto the beaded screen.

The use of a spherical reflective lens with a large aperture introduces diffi-

culties in focusing and results in a certain amount of distortion. For this reason the specially ground weak aspherical correcting lens is used to introduce an amount of distortion which is equal to the opposite of that caused by the mirror. The effect of the aspherical lens then, is to balance out the distortion of the reflective lens and the rays of light arriving at the screen produce an undistorted and greatly enlarged version of the original picture, which in this case is 6 by 8 feet, or producing an enlargement of about 16 diameters.

The special projection tube or kinescope employed in the Large Screen Projector was specially developed by RCA for use in reflective optical systems. Into this projection tube was designed a metal-backed screen such as is used in all RCA projection tubes. In order to obtain light of proper brilliance for projection, extremely high acceleration voltage is required, in this case 50-thousand volts.

New types of phosphor compounds were developed which were coated with a fine metallic film, thin enough to allow the passage of electrons. This greatly increased the tube brilliance. In addition to this, a new type of electron gun and other elements were developed to withstand the very high current used by the projector. The result is a tube which produces a brilliant white light nearly as dazzling to the eye as that of an arc lamp.

The developmental Tube, the reflective optical system, and the necessary power supplies and control equipment are all self contained in one unit. While the projector is designed for fixed focus operation, the various operating controls which are mounted on the unit, permit the engineer to adjust the brightness, focus, and framing of the picture. Only slight adjustment is necessary for an entire program.

A new type of power supply has been incorporated into the large screen projector which eliminates the danger usually present when high voltages are used. A high frequency oscillator power supply used, instead of the conventional 60 cycle type, prevents the storage of high voltage in the filter circuits, and thus eliminates the potential hazard to the technical personnel.

Television signals can be fed to the Large Screen Projector from any regu-

lar television sources such as network coaxial lines, microwave television relay sources, from studio or camera pickup sources, or any other standard RMA video signal sources.

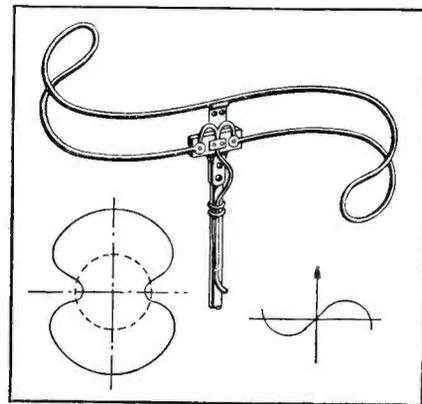
## Television and FM News

**R**EDUCED television owner's policy renewals have been announced by RCA; the initial \$45 policy renews at \$30 for the second year. Others in proportion. RCA has released three new television receiver models, ranging from a 10" table model at \$325, to a deluxe Television-AM-FM-Phono combination console at \$675.

The FM Ass'n's second annual convention will be held in Chicago at the Sheraton Hotel, Oct. 11-12, 1948. This date was chosen specifically to avoid conflict with the usual time of the NAB convention, and is intended to permit maximum attendance at both meetings.

The News Syndicate Co. (NY Daily News) has purchased a 5 kw video transmitter from RCA, plus associated equipment. The News station, WLTV, will operate on Channel 11, 198-204 mc. General Electric is supplying the studio equipment.

An omnidirectional FM-Television antenna has been announced by Technical Appliance Corp, The folded "S"



dipole is said to fill the need for a non-directional horizontally polarized antenna for reception of several different stations located in different directions from the receiving location.

# from San Francisco . . .

THE month of November 1947, has wrought many changes for the San Francisco Chapter. To start the month off, KGO-FM blasted forth with their 3 kw rig on 106.1 mc and there was no let-up for the transmitter boys. The 50 kw rig was under construction and on intermittently for field measurements. The big day for ABC San Francisco was December 1st at 9:50 A.M. during the Tom Breneman Show, "Breakfast in Hollywood". A three-way switch between Breneman, Gov. Earl Warren at the Capitol, and ABC's board chairman, Edward J. Noble, in San Francisco turned the trick. On Gov. Warren's cue, the 50 kw rig swapped places with the old 7500 watt KGO. The inaugural of KGO, 50 kw on 810 kc marked not only a change for listening audience, but means a nice new plant for the ABC boys.

In the words of Ken Martin, TE "—the rig is awful purty, the building is modern, sound-proofed and all. The situation makes us very happy, but tell

the SE boys to watch their steps lest they get exiled to this Siberia."

The new site of KGO is on the west approach to the Dumbarton Bridge about 25 miles south of Oakland, and is virtually floating on mud and salt water. (Shortly, maybe the boys could use a shotgun for ducks, say about—oh about 28 gauge.)

The three towers of the directional antenna system are in-line and erected on piles and fill, as is also the transmitter house. The fill around the transmitter house is already landscaped, complete with trees—so grass has been growing amidst the hustle and bustle. I hear the KGO boys have Middlebrook Blues.

Three men have been added to the transmitter staff of KGO to help carry the load of operating the 3 kw FM, the 7½ kw standby, and the new 50 kw unit. The new TE's are: John Petty, vacation relief for the past 2 years; Tom Curtis from Dixon; and Jim Mehren ex-WENR.

NBC San Francisco came in for its share of excitement also this month. KPO became KNBC during the Hail and Farewell Show 6:30 P.M. Sunday November 23. The Show was released locally from six to seven PM. Gov. Earl Warren introduced NBC Prexy Niles Trammell, gave the last KPO local, and then Prexy Trammell gave the first KNBC SI. Fred Allen in N.Y. broke the suspense for all concerned with a quick ad lib, making the most of VP Sid Strotz' losing his place while reading the script. From then on out everyone had fun. The show was a big success with many facets, and lots of credit is due "Steve" Stevens, who did the mixing, backed up by Bobby Wood, Russ Butler, and Bryan "The Duke" Fuhrman who handled the transcriptions and studio inserts respectively.

Another pre-Christmas addition for NBC came in the form of a new Pontiac Station Wagon for the Field Dept. Seems as though the Mercury will go to the Dixon Plant, retiring the poor beaten Plymouth. We may have to use taxi coupons for a while until the Pontiac gets accustomed to its new stall.

"Little John" McDonnell has been a very busy person this month, and with good reason—hope you are settled in the East by this time, Mac. The San Francisco Chapter is very proud of Mac because of his new responsibility as Pres. Pro Tem for NABET. We wish to extend our heartiest season's greetings to him and his family and wish him continued success with his present burdens.

Rus Butler is taking over Mac's job for the Chapter and says that it certainly cuts into the ham radio, ad infinitum. He is temporarily holding down two jobs in NABET, plus MCD relief, plus studio and field tricks. (How'll ya trade for the new Collins ham rcvr Russ?) Bobby Wood is acting relief for McDonnell and wants to know if it entitles him to all the rights and privileges thereto pertaining, instead of being Number One Shine Boy. (He says he's only kidding, Mr. Evans.)

Among a few things the boys would like to have for Christmas is an automatic gadget to illuminate the spot write-ins one minutes before they are to be played; a chronometer with a boxing glove attached, with remote sighting; and a blonde for each knee on remotes. From what I hear, lots of people have had an early Christmas . . . Happy Holidays.—egs.

## Telev. - FM News

A portable sweep generator especially designed for alignment of FM equipment has been made available by RCA, Type WR-53A. RCA also has in production a new FM transmitter, Type BTF-10B, rated at 10 kw at any specific frequency in the 88 to 108 mc band.

General Electric announces a high quality FM-AM table model receiver, at \$189.95; designed to fill the need for school use, features push-button tuning, built-in FM antenna, 8-inch speaker, and stabilized tuning.

RCA has been experimenting with "beyond the horizon" television serv-

ice, by picking up WNBT's signal 105 miles distant, and successfully micro-waving the signal into a nearby community resting in a deep valley; the local receivers were fed from the micro-wave relay receiver.

General Electric announces a \$90 table model AM-FM receiver, with 5" speaker, intended to fill the need for a good-quality FM tuner in conjunction with an AM receiver.

General Electric is supplying complete television transmitting equipment for WNAC, key station of the Yankee Network. GE is also supplying television equipment for Detroit's WTVO, and for WOR, New York, and WGNA, Chicago.

Following is the monthly breakdown of FM, Television, and all radio set

production for the ten months ended Oct., 1947, as supplied by the RMA:

| MONTH                      | FM-AM   | Television | All Sets   |
|----------------------------|---------|------------|------------|
| January (five weeks) ..... | 51,318  | 5,437      | 1,564,171  |
| February .....             | 53,594  | 6,243      | 1,379,966  |
| March .....                | 67,264  | 6,639      | 1,377,269  |
| April (five weeks) .....   | 112,256 | 7,886      | 1,759,723  |
| May .....                  | 84,507  | 8,690      | 1,316,373  |
| June .....                 | 76,624  | 11,484     | 1,213,142  |
| July (five weeks) .....    | 70,649  | 10,007     | 1,155,456  |
| August .....               | 72,014  | 12,283     | 1,265,825  |
| September .....            | 90,546  | 32,719     | 1,339,980  |
| October (five weeks) ..... | 151,244 | 23,693     | 2,002,303  |
| Total .....                | 830,016 | 125,081    | 14,364,218 |



## WASHINGTON

By Warren Deen

THE 14th meeting of the NABET National Council was held in the Franklin Room of the Wardman Park Hotel from October 20 to 24th. The destiny of the Journal was discussed, among many other things.

I have a suggestion that the members in each council group cooperate by sending any news articles they may hear of to their Associate Reporter. It is difficult to get around to all of the members in order to get all the interesting events recorded that deserve to be published.

Wally Ward is doing a wonderful job as Councilman for the Washington Field Television Group. Keep up the good work Wally.

The Washington Field Television Group has been putting in a lot of overtime in the last few weeks working on the football games. The overtime pay is quite welcome at Christmas time!

"Mac" McClelland wishes that he could put a few more hours on his new boat the "Winnie Poo". Football season is over now so maybe he will be able to. The basketball season is on now, but "Mac" can take heart because the games aren't all in Baltimore like the Colt and Navy football games were so there are some hours traveling saved.

Frank Spain (Sen. Claghorn) has a vocabulary all his own. Some of his colorful phrases are "Let's take off like a herd of turtles" or "Let's take off like a scalded dog." Clag. is a young man with a promising future. He does well on the television camera or handling audio.

Improvements are going ahead on the Wardman Park Theatre in order to convert it into a first class studio complete with air cooling and full studio control equipment. With the opening of the film studio full movies are being shown. Before the studio was opened Jim Weaver really had a job on his hands. Joe Colledge supplied him with an old Ike chain and a 16 MM projector. Jim fed the audio through a pad into an ND 10 amplifier and from there on to the transmitter. The picture was fed via the regular image orthicon field equipment switching control and then on to the transmitter. The transmitter had to fill in with slides between the successive reels just like the early vintage of silent movies. Now, with the ultra modern conveniences of a fully equipped master control room Jim and his group of men can supply any type of film at any time. The film studios at the Wardman have been dubbed "Little 5F" by the men in the field crew.

The story of the month from the Washington Television Field Crew is a description of the hectic day Friday, November 21st. The day started by televising a football game from Washington & Lee High School in nearby Virginia. At the end of the game the equipment was loaded on the truck and taken to the Mayflower Hotel. The equipment was set up in a room on the 2nd floor in preparation for the Richard Harkness show scheduled that evening. Immediately after that show was over the cameras were dismantled and reassembled on the balcony of the main dining room where the annual Board of Trade convention was in session. At air time the stage was lighted with 2 kw kleigs. One of the principal speakers was our own Mr. Carleton D. Smith. Ray Michael did the announcing. By this time the crew was just beginning to get hot. Immediately following the Trade show the cameras were turned 180 degrees on the news of the day photos. The news was read over the din on the loudspeakers of the Trade meeting. Next, the crew went to the studio room 260 on the 2nd floor and set up the equipment for the Gunther's sport show, while the fights from New York were being enjoyed by the Trade meeting delegates who were able to watch them on RCA sets distributed about the room. When the cables were finally gathered up and the crew got home it was 2 A.M. Long day——

Another comment oft heard on the local scene is "When I get my new

car——". Joe Colledge has a Buick and is on a waiting list, and Wally is waiting to trade his Packard in on a new Cadillac. Mac McClelland has his heart set on a new Hudson to replace his 10 year old Dodge. And as for me, I'll settle for a new '48 Chev.

## HUDSON

By  
Al King

HAMS at WOR are very happy these days about the formation of their new club which will be known as "The 1440 Club." As the result of balloting, the officers have been selected as follows:

President ..... Jim O'Connor  
Vice-President ..... Howard Donniez  
Secretary ..... Bob Albrecht  
Treasurer ..... Jim Carter  
Trustee ..... Jim O'Connor

The station license is being secured as soon as possible, and all equipment donations will be cheerfully accepted. Members of "The 1440 Club" will be informed of all club activities through a weekly club bulletin.

Just found out that Paget of Recording is the proud papa of twins. Are they twins, or just a dubbing job, Sy?

Speaking of Recording, what is that fantastic-looking devise the boys in that department are experimenting with? It involves a lot of mirrors, photo-cells, etc.

Al King is now penning a book entitled, "The Neutralization of Push-Pull Triodes."

A number of the boys have procured 522's and are playing with 2 meters; among them are Jim O'Connor, Gene Clark, and Howard Donniez.

Bob Albrecht recently purchased a home in New Jersey—now he needs a car. Anyone knowing of a car, 1940 or newer, for about \$300 please contact him! Incidentally, Bob is now legally driving since he passed his test with "flying" colors.

Bill Boher is thinking of starting an animal farm—not an ordinary animal farm, but specializing in hamsters. In case you don't know what a "hamster" is, it's a little guinea pig type of creature. However, Bill says he doesn't expect to start the farm until he is too old to push the switches in Master Control. Besides, he says, pushing switches isn't so smelly!

Bill DeCosta handling John Gambling's show from St. Luke's Hospital. Best of luck, John, and get well soon.

Jim Shannon finally got his new car and is now sporting same on his SUMMER vacation—believe it or not!

# About Rochester . . . .

**T**HE biggest news in Rochester at present is the fact that another bachelor—and a hardy one—has hit the dust. Walter Harrison, who never would admit even associating with the expensive sex, has committed matrimony. Last month's rumor is now confirmed and the deed is done. Now let's see if that bankroll holds out. Wonder how much radio equipment he'll be buying now? Well, good luck, anyway, Walt.

Speaking of Hamdom, Yoe Seiler (we're still at WHAM) has finished his dickering and finally bought AND installed a sixty-foot windmill tower to put out with on 10 and 20; call, W2EB. He hasn't reported any outstanding contacts yet: you'll assume that comes later. Incidentally, he said he heard of a KL7 working Rochester on 50 Mc. a few nights ago. That band must be hot, as other people have said they've heard unusual DX around there. For instance, WHFM, WHAM's FM outlet, was

heard in the State of Washington recently on 45.1 Mc. Not bad for line-of-sight xmission, eh?

With Radio City approaching completion, it is gladsome news to the xmitter boys that the new transmitter is progressing. The building is now at the point where it is possible to install the cubicles for the transmitter proper and the tower will be going up shortly. Al Balling, transmitter supervisor, was watching the ceilings being plastered one day when the foreman asked him how he liked it. "Well, all right, only a bit slow," said Al, in a most critical tone. "Dammit, that's harder than it looks. I'd like to see you plaster a ceiling," snapped the foreman. "Well, why not?" said Al, "It looks simple". Saying which, he leaped up on the platform, grabbed the hawk and the trowel from the astonished mason, and proceeded to lay on the plaster with long, expert strokes. When the hawk was empty he laid it and the trowel down, casually

brushed his hands together, jumped down from the platform and walked away, leaving the foreman and the other masons to poke in their bulging eyeballs. That was one of Al's best days, for he never told them that in days gone by he was a great help to his father—who was a mason. . . . Still at the transmitter(s), Alex Gresens and Hank Boyce are getting advance knowledge of the new one. Many of the transmitter boys in town are having trouble with long-wave code stations' signals creeping into the transmitter via open wire lines. Anyone else bothered that way, I wonder?

Dropped into see WVET's setup the other day. They, like WARC, both new stations to Rochester, are operating in a temporary condition until their studios are properly built, and operation there is pretty rough on the men. The stuff sounds good on the air, though, and when all the studios are built they can relax a bit and enjoy radio.

Al Powley handled negotiations for the new WHAM contract, amid the usual atmosphere of smoke-filled rooms and hectic, last-minute meetings. He's a good conductor; the contract was finally signed and both sides remain good friends and satisfied.

The WHAM CR has a dearth of news this month. The boys are a bit hazy as to where they work, one day at the new place, another day at the old. It's getting to be quite a trick to find enough men to put on the shows. Ray Gondek is getting deeper and deeper into the musical world, having taken a job, part-time, at the Eastman School of Music, in charge of (let's make it sound good!) their recording equipment. Sooner or later he'll worm his way into a few concerts, then his hair will grow long, he'll start playing an instrument, then . . . well, there's no telling!

Haven't heard a word from the men at WENY, so we can't dish any dirt of them. What say, Hartman? Likewise from WRNY, except that we note that their new FM transmitter is on the air and putting out a good signal. They have no net and programming the same shows that are on the AM, so far.

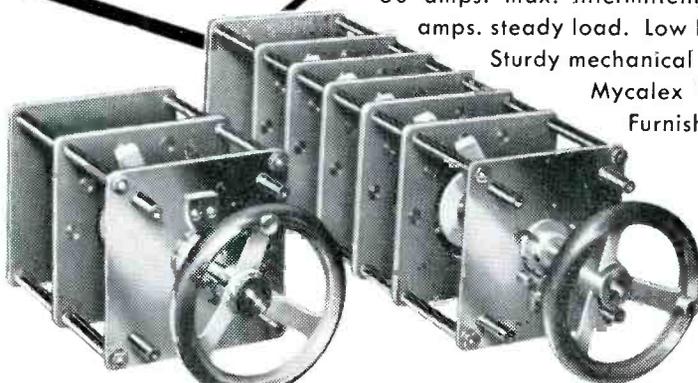
From WHEC, GEORGE Wilson sez as follows:

Appearing on the Rochester scene a few days past was the "NABET NEWS—ROCHESTER CHAPTER." It's a welcome little rag, edited and typed in letter form by Fred AMBROSE. It's done "purely as a labor

**AN  
IMPORTANT  
TECH LAB  
DEVELOPMENT**

**New Type 1250  
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Write for Bulletin No. 472

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of love" sez FREDDIE, and "to be of service to the boys." OK chum, WILSON & ANDERSON will believe all that, but come now, isn't it that old natural urge to see your name in print? Then again it could be a gentle hint that the official scribes are not sending in enough stuff and nonsense to the NABET JOURNAL for editing therein. That could very well be true, 'cause we readily admit our aversion to composition and laziness in the "snoop" department. There's really plenty of goings on to snoop into around town, what with two new stations bursting forth on the local air-waves during the past month, namely WARC and WVET. The first carries the American Broadcasting Net and the latter the Mutual web. And speaking of WARC reminds us of FRED AMBROSE our Treasurer and "sub-editor"—it seems he has a highly developed social consciousness and believes in being first to extend the welcome hand to visitors and newcomers in the radio world. Hence, not to be outdone by the other organizations, and in the name of all good NABET members locally, he devised and had sent a well worded telegram of congratulations to the WARC management on their first day of broadcasting. It wasn't long before he received a phone call from the-powers-that-be at WRNY, an already established station here with a NABET contract, where the voice on the other end said "thanks for all the nice things you said, but what have we done to deserve them?". We assume he got out of that gracefully because FREDDIE is still on the WHAM payroll and shows no signs of bruises, other than that usual "red-face" look, or as Fred would have it's his "new look".

—Don Anderson  
—George Wilson

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The Broadcast  
Engineer



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# H O L L Y W O O D N E W S

By

norman dewes

**WELL** . . . after a year's naps 'n lapse, the Hollywood Column herewith emerges from hibernation, to resume its former invaluable contributions to the litterature . . . hiatus was **PURPOSELY** arranged, to test the popularity of our stuff by counting the **THOUSANDS** of letters and cards and also **VERBAL** queries which would come in, noting our absence and **VEHEMENTLY** demanding that we **RETURN** . . . well, two letters **DID** arrive last week, one from an avid reader requesting more girl-type **PICTURES** and the other from **Stolzenberger**, not quotable under any conditions! Such expressions of loyalty are **VERY** touching, and **OF COURSE** we will be glad to again to continue to scribe our succinct and succulent stiver of **HOLLYWOOD** . . . so, **THANKS**, fellows, and grasp yer proboscides gently, for **HERE** we go **AGAIN**. . . .

**PIX** . . . to reward our **NUMBER ONE** correspondent, we submit under separate cover (but **NOT MUCH**, huh . . . weef, weef!) two shots of some current Hollywood **PULLchritude** . . . first scene shows a lovely Latin lovliness from Hoocares, who also **SINGS**, and next slide is shot of we believe a **FORMER** Noo Yawk gal and Powers model who is showing you where to throw yer **DART** to get ". . . in the **RED** for **ONE!**" or whatever they say on the ABC "Darts for Dough" show . . . if you will examine the **FIRST** pickture **CLOSELY** you

will note that the lovely **SHE** is standing near a typical California swimming pool . . . neither **ONE** are ours . . . **NEXT** month we promise some peachy-keen **TECHNICAL** photos for whoever of you may be more seriously minded . . . or **OLDER**. . . .

**MANY THINGS** . . . seem to have happened during the past year, as we look around us lately, and to tell **ALL** of them would not only be being licentious, libidinous and **LIBELOUS**, but **Stolzie** can't be **THAT** hard up for material . . . so rather than risk all those things, we will simply mention the highlights and leave the **SHADOWS** lay. . . .

**TAKING THEM** . . . by networks, **NBC** is all **CHANGED AROUND** out here . . . the Building has undergone many alterations of an architectural nature, including much knocking out of walls for **MORE ROOMS** and a **CAESAREAN** in the southern portion which resulted in two **NEW STUDIOS**, namely "E" and "F" . . . these delightful new auditoriums have been



Rosina Pagan from Brazil, featured singer with Buzz Adlams ABC Hollywood Orchestra. (Owner of swimming pool to remain amphibious . . . )

blessed with several **OTHER** appellations, due to their having rather **DIFFERENT** acoustical properties . . . they seem to lend sort of an Orthacoustic effect to the pickups, which is **FINE** except that you have to sort of **FILTER** yerself **MENTALLY** in order to imagine what the stuff **REALLY** sounds like . . . should be very **GOOD** for **FM** howsomever, and also **VIDEO**, being decorated in beautiful gold and silver and bright colors . . . **UNDER** these lush labial laboratories are located lesser labyrinths which **NOW** are the abode of the Recording Engineers, whom we once knew and loved as fellow employees and **NABET** members, but whom now we **SELDOM SEE** . . . rumor has it that the poor fellows are **KEPT** down there by massive **CHAINS** attached to their Scullys and only let loose for feeding periods or absolutely **URGENT** calls of nature . . . the only means of communication is the **PAX** phone and when you dial their number **SOMETIMES** one will answer, in a plaintive voice that seems to come from another world . . . and when you actually **SEE** one in the upper halls you whisper in a hoarse whisper, ". . . look! and shhhhhhsh already . . . there is a guy from **RECORDING** . . . Wonder how he **GOT LOOSE**, hey. . . ." Then there is the **RUMOR**, which we **DON'T BELIEVE**, that some of their eyes and **OTHER** organs are **ATROPHYING** due to disuse, like fish in an underground cavern, etc. Surely **HOPE** that isn't the case. . . . While down in the **NETHER** regions, we noticed also new large storage spaces for Sound Effects gear, stage props and general **STUFF** which used to be stacked **UPstairs** wherever there was a hole for it . . . and a fancy big automatic **ELEVATOR** for transporting these effects, which **SCARES** everybody and besides takes four **STRONG MEN** or seven Sound Effects fellows to lift open its **DOOR**. Then tambien, there are rooms for darkrooms for the Publicity photographers, swanky office rooms for Messers **Les Culley, Sil Carancini** et al the Disc Dignitaries and their resp. secretaries . . . all very **CHI-CHI** . . . and several **SECRET** rooms we haven't explored yet, including a new-type Echo Chamber. Back **UPstairs** again, where Recording moved out from, is now again the Field Shop, as was yence when the Building was first designed. . . . Field Man **Hal Platt** now has at long **LAST** come into relatively commodious **QUARTERS** for all his gear and shop

facilities; with swell new lockers, cabinets and benches and ALSO doors that open onto the connection corridors with Maintenance, MCD and the Engineer's Lounge, making HIM one of the fellows now too and so that he can give various cohabitators who chance to be passing by, the HAIL and the time of day. . . . Last of the more im-PAWtant structural changes are the taking over of the old Stand-by Studios "J" and "K" rendered obsolete by NBC Chief Announcer **Frank Barton's** BRILLIANT idee of abolishing all stand-by announcers and musicians and making the STATIONS shift for themselves in case of line failure, by **McMurdo McKenzie Productions**, who specialize in Bing Crosby-type transcriptions for ABC. . . . place is full of veddy ULTRA magnetic tape recorders, out of which come some of the most beautiful-quality music we've EVER heard. . . . more on the technical aspects of this deal later, as it seems due to become quite QUITE quite soon in ABC activities. . . . place is stacked with veddy FAWNCEY items of furniture for the utter comfort of those while dubbing. . . . we UNDERSTAND that most of the lush plush was inherited from the **Paul Whiteman Show** after when it left for the East, and includes some FINE divans, double-strength springs, of COURSE. . . . To complete the tour, NBC Re-Recording and stylii sharpies **Hal Lea** and **Howie Cooley** who were erst in "J" & "K" temporarily are now also nicely set up in the Basement Annex where they are as happy as the day is long. . . . how LONG can days BE, huh. . . . should mention the Great Fire in Studio "B" not long ago, we guess. . . . which burned up and down the front curtain and generally smoked up the WHOLE BUILDING. . . . then, with the Fire fellows chopping their holes in the ceiling and shooting their water around, the place was SAVED but had to be redecorated. . . . now, the curtains aren't back from the CLEANERS yet and the studio has been re-painted in a nice silver and green motif and the boys report that the joint sorta looks and SOUNDS like **Utter McKinley's** Place for Permanently Prone People. . . . and OF COURSE they book the staff orchestra in there and the musicians "take five" and leave, but the MUSIC keeps on playing until they get back. . . . understand **Petrillo** threatens to insist on a stand-by orchestra to stand-by for the regular stand-by orchestra while its music is playing



Orville Anderson, producer/mc of ABC's "Darts for Dough" show, showing Poni Adams, glamorous hostess, just how he would throw her dart. . . .

while it's OUT. . . . many exciting incidences occurred during the fighting of The Fire, but most of it has been covered ELSEwhere, except of course the escapades of "Madman" **Lew Winkler** of Maintenance. . . . It SEEMS that **Lew** is always around when something ketches fire and ALWAYS figures PROMINENTLY in subsequent rescues, dashing around gas-masked and smoke-begrimed and squirting the non-workable extinguishers and SCARING the H— outa everybody. . . . Messers **Saxton**, NBC Engineering Head and **Adams**, NBC Field Dept Head dropped by shortly after things were under control and **Lew** rushes up and screams "Honest, Mr. Saxton, I DIDN'T DO IT!!!. . . ." (Tip: iffen yuh wanta get **Lew's** DANDER up, just stroll thru Maintenance in the evening and casually remark, after sniffing loudly a few times, that you seem to "smell something burning. . . ." Things will get PLENTY hot. . . .)

BETTER. . . . tell some stuff about the OTHER network, namely ABC, or someone will accuse us of being PARTIAL to the WRONG PARTY. . . . newest news from outa tha BLUE is that ABC's KECA-FM is about to burst forth with deviations very soon now. . . . our man "**Rags**" **Ragsdale** has returned from a prolonged picture-taking jaunt in the mountains and has

been tooth 'n nailing down the new three-quart General Electric FM rig out at Transmitter Chief **Rex Bettis'** bastion. . . . set will be installed alongside regular KECA AM crock temporarily, and the boyes have been busily erecting some sort of super double TURNS-TILE sky-hook on top of the AM towers so's we can get on the air 'n hold the license, etc. "**Little Beaver**" (**John Eilers**, ABC Maintenance Super) has been busily scratching holes in the walls of KECA's Studio 6 and environs and running cable into an associated script room for the FM audio gear, which will include a complete studio channel with turntables run thru and new Scott Dynamic Noise Suppressors. . . . ABC Operations Super **Ralph Denechaud** even has sanction to hire a couple of additional engineers to feed the rig. . . . ABC's Very Own Recording Department is now in full spin, and Recording Super **Lloyd Hockin** reports very favorably on the rather ambitious undertaking of undertaking to take over ALL of the net's Hollywood cutting of the delayed ET's from NBC, who've done them ever since that UNKNOWN FIEND dreamed up the whole idea. . . . sez his staff of Stylus Stickers are of the "none better" type, and in fact we are ALL proud of them. . . . the two playback Studios "O" and "P" over at Sunset 'n Vine have been re-routed thru KECA's Master Control Room Channels 2 and 3, to KECA's Studios "1" and "5" and all playbacks to the net are done from "Sunset 'n Highland" now also, which, together with local station operations, keeps our **Thor LaCroix**, Master Control Supervisor and the ONLY one, veddy busy making it all come out even. . . . sez SO FAR that he doesn't NEED an assistant, but we WONDER how much longer he will be able to HOLD OUT. . . . it gets PRETTY DAM BUSY there in the evenings, and you may quote ANY of us. . . . in addition to the discing, ABC is going in for tape recording in a BIG WAY. . . . besides using the special Palmer High Fidelity channel for the Bing Crosby original cuts and dubs, several of the new Brush "Soundmirrors" have been rigged for Field use and are working out fine. . . . Our Mr. **George Otte** seems to be chief TAPE WORM lately and has discovered many interesting facts about the things. . . . REMINDS us to tell about one of his RECENT tape takings. . . .

CONTEST. . . . we are thinking of get-

ting into the contest business with one of our own, NAMELY one for a name for the Hollywood Column . . . just “. . . from HOLLYWOOD” doesn’t seem to DO much for us, or at least NOT ENOUGH . . . and anyway, it could refer to Hollywood, Florida, which would be FINE, only we couldn’t AFFORD it, hardly being able to afford Hollywood, California . . . so something more distinctive would be NICER, huh . . . as FIRST PRIZE, are thinking of offering a custom-built, guaranteed infallible “Girl Detector”, a device upon which we have been working for some time and have only recently perfected . . . out here in Hollywood such a contrivance is getting to be almost a NECESSITY, and it should prove valuable almost ANYWHERE where there are sexes of several types present. Roughly, you carry the thing around with you and when you get near something DOUBTFUL, or what you BELIEVE to be a girl, it will tell you for SURE by having a little flag fly erect or a little bell tinkle or, for night use, a little light will flash, etc. . . . details of the indicator haven’t

been entirely completed yet . . . it will ALSO detect the presence of UNKNOWN girls, hidden girls, girls in jodpurs, girls with boyish bobs, etc. and there will even be a small meter calibrated to read their RADIATION constant in British Thermal Units or maybe ergs . . . then if you check some chick for say 125 ergs urge you will know that the evening will show some PROMISE . . . more contest details next month . . . also more about the FIRST PRIZE, which we have been trying out on Mabel, for purposes of calibration, of course . . . but are having a little TROUBLE . . . can’t seem to keep TUBES in the darn thing. . . . WELL . . . we are getting up in the PAGES again and dread to face the possibility of Stolzle having to print on the edges of the pages again wherein he cuts off our VITALS just as we are getting into the JUICY stuff . . . so will close with a joke and a TAG . . . this joke is one of those jokes which we don’t UNDERSTAND, but it seems perfectly CLEAN, anyway, so maybe SOMEONE will get it. . . . IT SEEMS a couple of engineers met in the

Lounge one day and the FIRST engineer sez to the OTHER one, “Say, I’m sorry to hear that your girl friend has been ill, old man . . .” and the second engineer replies, “Ill? Not that I know of . . .” and the first engineer sez, “Why, she must have been . . . this fellow told me that she was bedridden. . . .” Curtain. Get it??

**TAG** . . . real estate company ad appearing in a recent issue of a Hollywood trade paper:

For Cavemen: \$13,500

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Brother, that’s for US . . . pack our toothbrush, Mabel honey, and let’s get to THAT CAVE !!! BCNU. . . .

## Labor History — III

From the Labor Information Bulletin

**T**HE Civil War brought a demand for large quantities of munitions and other factory goods. Prices rose, profits were large, and many new businesses were started.

Factory goods from Eastern States were shipped by rail to the West. In their wake, new factories were built in the cities arising along the Great Lakes and the Mississippi Valley.

Between 1836 and 1864 local unions in 20 Northern States increased from 80 to 300. City centrals followed the organization of local unions. A short-lived effort at federation was made in 1864 when several city centrals formed the International Industrial Assembly of North America.

### National Unions Develop

National and international unions developed more slowly but quite steadily, with 13 appearing between 1861 and 1865. The plasterers, cigarmakers, and the bricklayers and masons have continued to the present day.

The decade and a half following the Civil War was an important formative period for the American labor movement. Encompassing two cycles of economic recession and revival, the period saw the rise of 14 new national unions, the expansion of total membership to 300,000 by 1872, and subsequent contraction to 50,000 only 6 years later.

### Demand for the 8-Hour Day

Three attempts were made to unite the various craft organizations into national federations. At this time also, the 8-hour-day movement arose and there appeared the first signs of the long, bitter, and frequently violent indus-

trial warfare characteristic of the struggle of American unionism for recognition and survival.

The National Labor Union, a loose federation of city centrals, but also including national and local unions and social reform organizations, was established in Baltimore in 1866.

However, after a rapid evolution away from trade-unionism to the promotion of producers’ cooperatives, the NLU passed from the scene in 1872. Its emphasis on State and Federal legislation bore some fruit. In 1868 Congress established an 8-hour day for Federal employees, and in 1884 a Government labor bureau was provided by law. William H. Sylvis of the Molders’ Union was the driving personality behind NLU.

In 1873, and again in 1876, several leading craft unions tried unsuccessfully to revive interest in a federation with a trade-union program.

### Depression Brings Violence

A new depression began and industrial workers became involved in a series of violent strikes and lockouts. Cigar makers, textile workers, iron makers, coal miners, and others fought bitterly against wage reductions. Railroad strikes brought in their wake riots, killings, martial law, and intervention by State and Federal troops.

In the Pennsylvania anthracite fields, the “Molly Maguires,” a byproduct of the distress and poverty of the times, used terroristic methods against employers and strikebreakers.

Despite the failure of workers to win their objectives, this turbulent period brought recognition of the labor movement, developed within it a consciousness of solidarity

and common purpose, and directed public attention to the social and economic ills it was attempting to remedy.

### Unskilled Workers Join Unions

For the first time, unskilled workers, in the railroads, mines, and textile mills, played a significant role and organized labor was no longer exclusively skilled workers.

With improvement in economic conditions new locals of skilled workers and new city centrals appeared, few of which had survived the depression. Some 18 national unions had survived, and 9 others were established.

By 1885 total union membership again reached the 300,000 level of 1872.

## FM — Part II

(Continued from Page Five)

pulse for the FM carrier and each side band component in the spectrum. The pulses are applied to the vertical plates of the oscilloscope. In order for the components to be properly spaced on the oscilloscope screen, the same 30 cycle sawtooth voltage which modulates the oscillator is applied to the horizontal plates. The resulting pattern on the screen shows the amplitude of the carrier and all the side band components as well as their relative spacing and bandwidth.

Naturally, the screen of the monitor must be calibrated in order to indicate the  $\pm 75$  kc points. The simplest procedure for accomplishing this is to modulate the FM carrier with a 15 kc signal. The amplitude of the 15 kc modulating signal is then increased until five component pulses are obtained on each side of the carrier as observed on the oscilloscope screen. Each of these side band components, of course, are 15 kc apart and the fifth one indicates the  $\pm 75$  kc deviation points. The scope horizontal gain is set for desired pattern width and marks or a scale can then be placed on the screen indicating the  $\pm 75$  kc points. Thereafter these marks indicate 100% modulation and afford a continuous and accurate check of the FM signal under all modulating conditions.

Thus far this article has attempted to point out the main differences in AM and FM transmitter characteristics and the more important operating techniques employed at the FM plant. In a future article this subject will be pursued further and the various operating procedures tied together by describing a practical routine of setting up and monitoring an FM transmitter for actual operation.

## St. Lawrence News

By Aleen Corbin

Some very good news, too. Dave Lane married Miss Frances Owen, also of Black River (incidentally, Dave says I wronged the town by claiming only 400 hundred inhabitants for it . . . there must be at least 1000). This ending to their school days' courtship made the gang almost as happy for Dave as he was for himself. Fran and Dave took a honeymoon trip up through the New England states, stopping off at WGAN, Portland, Maine, to visit Bob Mauers, a former announcer at WWNY.

Everyone is back now from vacation except Bill Walck, who is visiting his home in Pennsylvania with his wife, Anne. The Bob Bouchards, with young Albert Thomas, took a trip up to Boston to see Mrs. Bouchard's family and

(Continued on Page Twenty)

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# New York News

Balloting on the new proposed NABET Constitution is going along smoothly, and is expected to be completed well ahead of the 60-day deadline.

Chairman Westover doing a tremendous job handling the New York Chapter's 315 members, negotiating contracts, and presiding over a 20-man Chapter Council. The latest chore taken on by Westy is the revision and bringing up-to-date of the New York Chapter By-Laws. It was the Council's pleasure to have NABET V.P. McDonnell as a guest at its recent Council meeting, where the possibility of the National Office drafting a set of outline by-laws was recommended; this to save much time and duplication of effort in NABET's twenty Chapter Councils, all working toward the same end—the smoother functioning of the organization.

Secretary-Treasurer Rooney resigned as of January 1st, 1948, and the Council voted him their appreciation for his efforts. The magnitude of the job of Chairman and Sec'y-Treasurer of the New York Chapter is not too widely appreciated. Eight separate contracts require administering: NBC Engineering; ABC Engineering; NBC Sound Effects; Muzak; ABC Traffic & Communications; NBC Traffic & Communications; RCA-Victor Recording; and RCA Matrix. In between times, prospective employees are supplied and processed. There is almost always at least one of the contracts in the process of re-negotiation; preparation for general and council meetings, and last but not least, NABET Trusteeship of this journal. In addition, Westy provides his membership with a two to three page bi-weekly mimeo of current NABET activity—both local and national. The fact that Westy—or anyone else for that matter—could keep up his now well-established pace, has amazed a lot of people—let's hope he can keep it up by getting more assistance from the side lines.

Westy has appointed the w-k Ted Kruse as the new Sec'y-Treasurer, to be assisted by Phil Falcone, as Assistant to the Sec'y.—EdS.

## About Rochester

The WHAM boys have been pretty quiet lately, not doing anything much worthy of reporting. However, added to the trouble at the transmitter that were dealt with in the last issue, one of the main circulating pumps for the tube-cooling water let go and froze up, tight. Luckily, the manufacturers are only a few miles from the transmitter and the offending pump was removed, fixed, and re-installed in short order while the boys crossed their fingers and ran on the spare. One thing most remarkable at the Control Room; another bachelor bit the dust. On November 29th Walt Harrison journeyed to Pennsylvania to marry Miss Alice Stewart. Us old married men who know what he's getting into still offer our heartiest congratulations and best wishes for the future. . . . A good many of the men here have acquired surplus ART-13's and are apparently working everything from hell to breakfast, judging by the brags being heard around the place. One thing that cheers us all mightily is that an official opening date has been set for WHAM's "Radio City," February eleventh, 1948. That'll be something to look forward

to. . . . The NABET contract here is shortly coming up for renewal and everyone is chewing about it: "Now what we oughta have is . . . !", and so on, far into the night.

From WHEC the report is as follows: WHEC's engineer of the week—of the month—of the year—**Craig Williams**. This man's claim to fame stems from the unusual, the unexpected, the rare. Life is never dull or monotonous when CRAIG is on a nemo assignment. Indeed, he seems to inspire a special type of activity—this column has related some of his experiences in the past, and each episode makes an interesting "do you remember when" tale. CRAIG arrived at Max Raney's Bar M Ranch out on Route 20 south of the city and set up his equipment for the weekly Saturday night Barn Dance pickup. Then he spent the hour before broadcast time sweating and saying, "Hello Walt", into a line that was dead, and I mean **dead**. By this time the dancers had picked up the phrase and were laughing and shouting "Hello Walt!" to each other. Then, as the air time got nearer and nearer, a car parked just outside caught fire. Everyone thought the joint was going up in flames and in less time than it takes to make a station break the Barn Dance floor was empty, the orchestra scooted in the middle of a down beat—but not Craig. He calmly sat alone in an empty dance hall patiently calling, "Hello Walt," over a dead line. Now, "Hello Walt," is in the same Hall of Fame as yesteryear's "Where's Elmer?". As an anti-climax to all this, WILLIAMS was unable to get his car out of the parking lot for the next four hours. And all because the volunteer firemen left their cars parked every which way while they wound up the evening dancing in the barn that never did catch fire.

At the present time **Leo Enright**, of the transmitter staff, has recently been on the sick list for the several weeks, but is expected back shortly.

The Reader's Digest, on page 24 of the October issue brought a variety of fame to WHEC.

It won't be long before **Al Keltz** cr, W2TXB, will be able to claim contacts with 100 countries. He has 91 to his credit right now.

**Ed Lynch**, our Chapter Chairman, celebrated his trip to Washington by driving down there in his new Mercury. The plutocrat! —**George Wilson** and **Don Anderson**

## St. Lawrence

(Continued from  
Page Nineteen)

then went sightseeing off Chicago way. **Mike** and **Bev Yonkovic** divided their time between a visit to Shamokin, Penn., and **Mike's** family, and a trip to New York. **Glenn Hall** took **Anne** to see his folks in Penn Yan, and **Pappy Davis** and **Thelma** with their Junior Miss spent their vacation with Mrs. Davis's family in Auburn. **Gail Branche**, who has set her wedding date as Easter Saturday, spent her vacation getting tanned at her family's cottage. **Betty Gillespie** was content with just a few days at the beach and then took off for a visit to an old school pal in Vermont. **George** and **Helen Gebhard** with the family went to Canada for a couple of weeks of relaxing.

Our FM station, which is one of the largest in this section of the country, is well on the way to completion. The tower is up, and work on the studios is underway. **Willie Walck** took some interesting snaps of the tower in various stages of construction, which I shall forward next time. Till then, so long.



**WHAT  
MAKES A GOOD  
RECORDING BLANK  
GOOD?<sup>\*</sup>**

◦ *The 'Broadcaster'*  
10" 12" 16"

◦ *The 'Playback'*  
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◦ *The 'Audition'*  
6½" 8" 10" 12" 16"

◦ *The 'Maestro'*  
12" 13¼" 17¼"

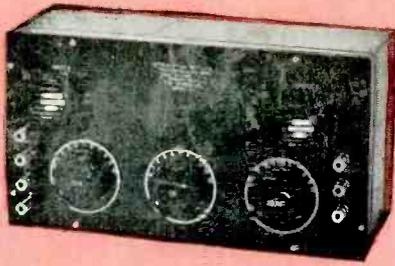
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- Of all metals, compositions, and plastics ever tried, sheet aluminum more nearly meets product requirements. Other materials may lack a truly smooth surface, warp or curl, or are not available in quantities and at prices commensurate with the market.
- So that your Soundcraft disc surface will be a perfect darkened mirror, a premium grade of sheet aluminum is used. Lacquer coatings, unless hand-rubbed, are only as smooth as the base to which they are applied. The best recording surface, therefore, is obtained only with sheet aluminum rolled at the mill to a mirror finish.
- This "reflector sheet" aluminum is further processed for Soundcraft by "stretcher leveling," a treatment which slightly elongates the sheet to relieve strains, eliminates warp, and hardens it somewhat to increase bend resistance. The now flat "reflector sheet" is next stamped into the various size circular bases which are shipped to Soundcraft degreased and individually packed to prevent scratching. At this point a Soundcraft precoating inspection takes over. Not just aluminum, but the right kind of aluminum helps keep Soundcraft on top qualitywise.

\*Watch this space for succeeding ads in this informative series on how Soundcraft discs are made.



**REEVES SOUND CRAFT CORPORATION**  
10 EAST 52nd STREET • NEW YORK 22, N. Y.



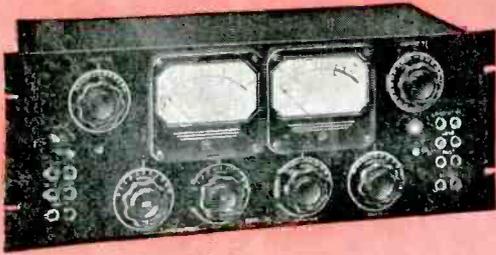
ATTENUATION BOX



DECADE VOLTAGE DIVIDER



RATIO ARM BOX



TRANSMISSION MEASURING SET



OUTPUT METER



ELECTRONIC FREQUENCY METER



VOLUME LEVEL INDICATOR



POWER OUTPUT METER



DECADE RESISTANCE BOX



# DAVEN

## MEASURING, TESTING AND CONTROL EQUIPMENT

These DAVEN instruments are the "trusted aides" of audio communications and general electronic engineers the world over. Each type of equipment is built to the highest standards of precision and durability, and is available in a wide selection of standard models.

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