# COMMERCIAL RADIO

SEPTEMBER
1934

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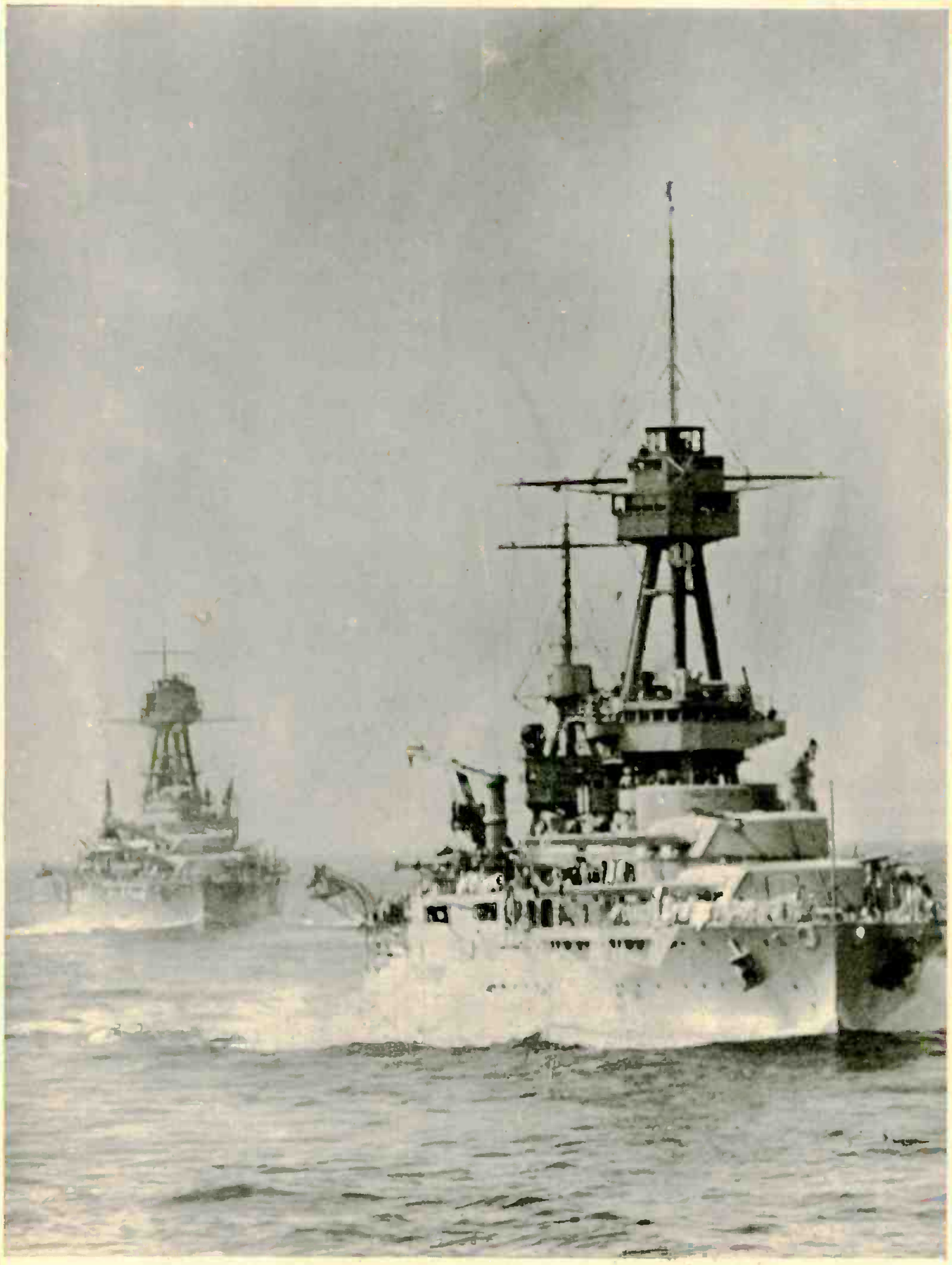

U. S. Naval Radio Reserves

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Men Who Are Making Radio

Factors Affecting Sound Reproduction

A MONTHLY JOURNAL DEVOTED TO THE COMMERCIAL RADIO & ALLIED FIELD

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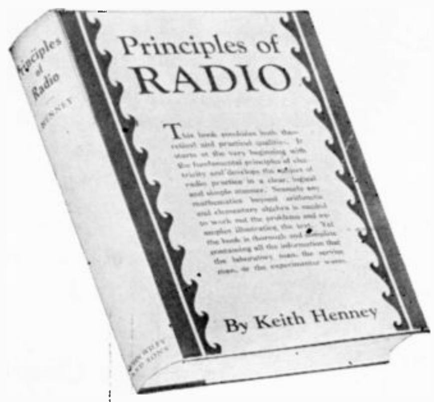


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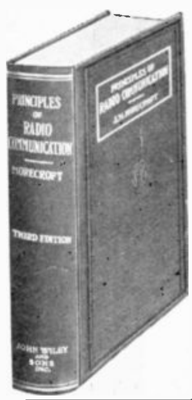

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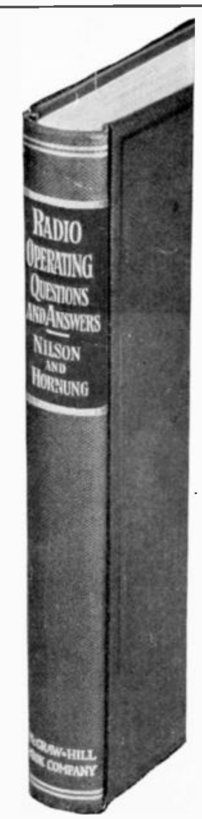


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VOLUME III NO. 12

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Recently the American Federation of Labor adopted resolutions to drive out of its rank the so-called radical element.

With the years of experience of the Federation in labor matters, no labor organization can afford to ignore this. No labor organization can long exist if controlled by a radical group. It is the old question of meeting a problem not only head on, but more important, head up.

To say that employers should and MUST give this or that is contrary to American policy. Employers themselves do not make headway by such policies. It is a matter of long and persevering patience that brings lasting results.

Unfortunately, it is a fact that in most labor disputes, the employers immediately attempt to bring in the designation "radical," or "communist." It is then that level heads unless strongly in control, run into adverse public opinion. The general public is seldom familiar with the exact nature of the dispute, but an action where small gains are obtained to correct real, not fancied injustice, convinces the employer as well as the general public of the soundness and fairness of the organization concerned in the labor movement.

Years of constructive thought and action can be lost overnight, and the organized working man set back irreparably by a few overzealous though well intentioned few not giving consideration to all angles of a problem.

It is to be hoped that the radio man, though far behind in recognition of his craft and skill, will not fall victim to such an unfortunate circumstance.

# COMMERCIAL RADIO

*(FORMERLY "C-Q")*

*The Only Magazine in America Devoted Entirely to the Commercial Radio Man*

## Contents for September, 1934



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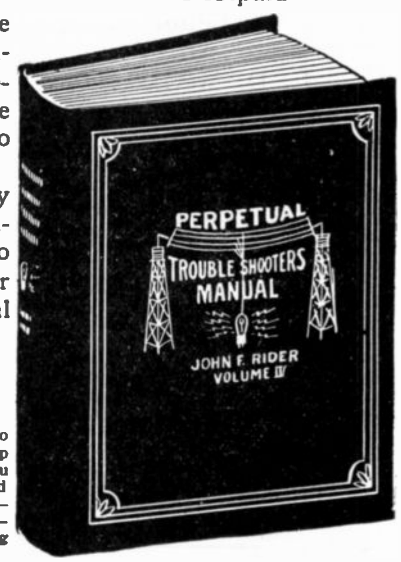


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# JOHN F. RIDER, Publisher

1440 Broadway NEW YORK CITY

# FACTORS AFFECTING SOUND REPRODUCTION

By BERNARD EPHRAIM, E. E.

IN ANY transmission network where speech and music are being reproduced, it is necessary to include brief data relating to the physiology of hearing. Investigators have found that the transmitting mechanism of the ear is non-linear in its response to sound. and that the quality of a complex sound is dependent, to a large extent upon the intensity of which it reaches the ear. To the listener the attenuation of certain frequencies or the elimination of any desired frequency band has a most pronounced effect. Comparative data from many laboratories have shown that the ear is most responsive to sound changes when a group of either high or low frequency components are eliminated. It

*Irene Taylor, blues singer, also takes a good photo*

has also been found that the ear is more highly sensitive to changes in definition and quality than to changes in apparent pitch of sounds. This means that the cutting off of side-bands or loss of harmonic content causes a mutation in the quality or definition of sound. To the acute listener's ear this is interpreted as poor fidelity of reproduction even though the fundamentals of speech or music have many semblances of recognition. Thus, for example, a dynamic speaker will sound "boomy" on speech reproduction when frequencies above 1000 cycles are partly attenuated. (Too much use of the tone control.) This effect is very noticeable because the high frequencies so necessary for articulation have been mutated. It is distortion of this nature that depletes the timbre of music when the overtones, musical beats and artistic effects are eliminated, which are so necessary to the character and definition of reproduced sound.

### Effects of Music Upon the Listener

Characterization of music is founded upon rhythm and beat, the latter being defined as the beginning instant of a certain time interval in music. The rapidity or slowness of a passage depends upon the lapse of time between beats; hence, there are so many beats to each bar. This grouping gives music a large part of its rhythmic character. Musically, the succession of beats generally changes between bars which causes an emotional feeling to be conveyed to the listener; this may be analytically interpreted as being a psychological reaction. Thus, for example, slow music, appealing to one's esthetic and cultural faculties, has many beats to each bar and is most effective with changes in sound amplitude or largeness of tone. Witness, for illustration, how deeply one can be moved by some of the emotional passages of Wagner's "Liebestod." In comparison, faster music, being much more lighter in character, contains fewer beats to each bar and depends largely upon rhythmic and articulatory values for effects. Definition of these orders may be found in the faster passages of Liszt's "Liebestraum" or his "Hungarian Rhapsody No. 2."

In most cases of either slow or fast music the reactionary feeling is largely conveyed in the base and middle registers by either largeness of tone or by rhythm and definition. In commercial radio receivers more consideration is given to the bass register because (1) that the rhythmic and largeness of tone qualities are expressed in a greater degree in the lower audio bands, and (2) that the ear is more susceptible to being intrigued by the upper harmonic components of this register. This last effect, when predominant, practically psychologizes the listener into hearing simulated fundamental notes and tones which are actually non-existent in loudspeaker reproduction.

### Meaning of Definition

Fine definition or articulation is only obtained when the upper harmonic content of any fundamental frequency contains at least three harmonics, that is, a fundamental and two overtones. These harmonics must be reproduced with high fidelity, else the definition suffers. Incomplete harmonic response in reproduced music can make a comparatively pure tone sound thin, harsh and squeaky. Thus, for example, the shrill whistle of a piccolo has a frequency (tone) of 4608 cycles; yet not an overtone (2nd or 3rd harmonic) is transmitted nor reproduced by any radio medium in this country. If this fact be coupled with the 8 kilocycle tuning systems incorporated in some commercial receivers then even the reception of the fundamental cannot be heard.

Long ago it had been maintained that definition can only be obtained by transmitting on a wave-band double the present 10 kilocycles now required by law. Experimental broadcasts made on wider channels have proven the definition can be obtained providing a wave-band be wide enough to accommodate transmission of most all the harmonic content of the musical spectrum. As long as the present broadcasting conditions prevail, the listener can never be able to appreciate what value of definition means to electro-mechanically reproduced music. Definition gives to music what perspective gives to the eye—depth, symmetry, and feeling of proportion and value. Close one eye, and immediately the impression becomes flat, like that of a photograph. With reproduced music, articulation must not be mutated else the value of definition is masked or irretrievably lost.

### Low-Frequency Response

The usual piston types of dynamic speakers radiate more psychological sound effects than possibly any other types of electro-mechanical reproducers. It is of interest to note that heavy emphasis of the bass in most common small dynamic speakers is approached by shock transient low-frequency audio impulses whose frequency amplitudes are greater than the normal forced-frequency distortion of the speaker piston (diaphragm). These shock effects create an illusionary or psychological bass response so that to the listener the bass will have a better loudness effect a low levels.

In practice, it is believed by many that by increasing the baffle area of a small dynamic speaker there will be an appreciable increase in the lowering of the bass frequency response. While this may sound true, the effect is wholly psychological. The idea is predicated upon the fact that the bass does sound louder; this is correct, but actually the "loudness efficiency" of the lower register has been increased which gives the illusion of greater frequency range. The increased baffle area does not increase the speaker frequency response because increasing the baffle area only results in (1) decreasing the steady state distortion factor, (2) increasing the radiation power of the fundamental or natural period of the piston, and (3) increasing the transient bass effect during shock excitation which produces added psychological response. The listener is thus fooled into hearing fundamental bass notes and tones that are non-existent simply because his ear happens to be very

*Paul Whiteman, one of the best known orchestra leaders on the radio*

sensitive to the upper harmonics of the lower register.

### Size of Baffle

To determine the size of a baffle necessary to make a dynamic speaker efficiently radiate its lowest frequency, the designer or user must first find the bass resonance response of the unit; this may be secured by consulting a manufacturers curve drawn from the steady state frequency characteristics of the unit under consideration. In general, there will be a pronounced peak, or sudden rise, in the curve between 50 and 200 cycles which

(Continued on Page 20)

# INTERMEDIATE AIRWAY STATIONS

By DAVID T. WILLIAMS

IT IS no longer impossible for the average sea-going operator to find employment on land if he so desires. The Federal Airways embrace many thousand miles of very solid and stationary terra-firma and employ many operators in the maintenance and operation of radio and other aids to air navigation. One such enterprising operator may find himself high in the Sierras or Rockies learning to use a pair of skiis in temperatures around 20 below while another erstwhile sea-going man looks with disgust at a Western desert dotted with yucca bushes and sage brush as he jots down a temperature reading of 110 on his hourly weather report form. At any rate, his first assignment is likely to be a lonesome one as the more desirable stations near centers of population are gained by seniority in service. In isolated areas good quarters are usually furnished the operators (or "keepers" as they are called at the Intermediate stations) at a minimum charge which includes fuel, water, lights, etc. and enables the married operator to have his family with him. At less remote stations the personnel rent houses in the vicinity of the station and drive to work in their own cars. A keeper and two assistant keepers operate the communication facilities, keep the landing field in condition as far as possible, and keep other aids such as the revolving lighted beacon, wind cone, and boundary lights in operation.

### What Happens At Stations

These radio and teletype stations assist air navigation by furnishing the pilot with constant and reliable weather information and also directional guidance during the flight. Weather observations (which include general sky condition, ceiling, visibility, wind direction and velocity, temperature, and barometric pressure) are taken hourly at the various stations along an entire airway and transmitted by teletype in sequence order according to their location on the airway. Thus, when the transmission is completed each station has a fresh weather report at hand from every other station on the airway.

Certain stations, chosen according to their location, are equipped with radiophone transmitters and broadcast the sequence of weather observations to the ships in flight. The frequency used for this broadcast is the same as that of the directional radio range signals to which a pilot flying the airway would be listening. It is therefore unnecessary for the pilot to detune his receiver to hear the weather broadcasts. The range signals are interrupted during the weather broadcast, the duration of which is usually less than five minutes. The intermediate frequency range of from 260 to 350 kilocycles is used by Commerce stations for these broadcasts.

The radio ranges transmitting directional beacon signals enable flyers to complete many flights in safety which could not otherwise be attempted. When the plane is on its course steady long dashes are received by the pilot. If he is off course to one side, an "A" signal will predominate in signal strength. If he is off course to the other side, an "N" signal will be heard more distinctly. He is therefore able to hold his course through fog or rain when the visibility is low and no other means of determining his position are available.

Intermediate fields having no other radio communication facilities are usually equipped with either Class A or Class B radio beacons. The former is of low power output (7½ watts) and is used to transmit non-directional signals whenever the ceiling is other than unlimited. These stations have an assigned signal characteristic for each station thus enabling the pilot to determine which Intermediate field he is passing over and also his approximate distance from the field by the comparative signal strength. The Class B station is, in fact, a miniature radio range which transmits directional "on course" and "off course" signals similar to the larger ranges, thus furnishing guidance to pilots in addition to the "location signal" such as transmitted by a Class A station. Both types may also be operated as radiophone transmitters and good communication is often effected over distances as great as 50 miles or more.

Airway stations not on the teletype circuit use radio phone or code in transmitting their hourly weather reports and other messages to some station which is on the circuit. The station receiving the report then enters it in the regular weather sequence when transmitted on the teletype.

### The Life Is Great

Although there are few landings at most stations, the life at even the most

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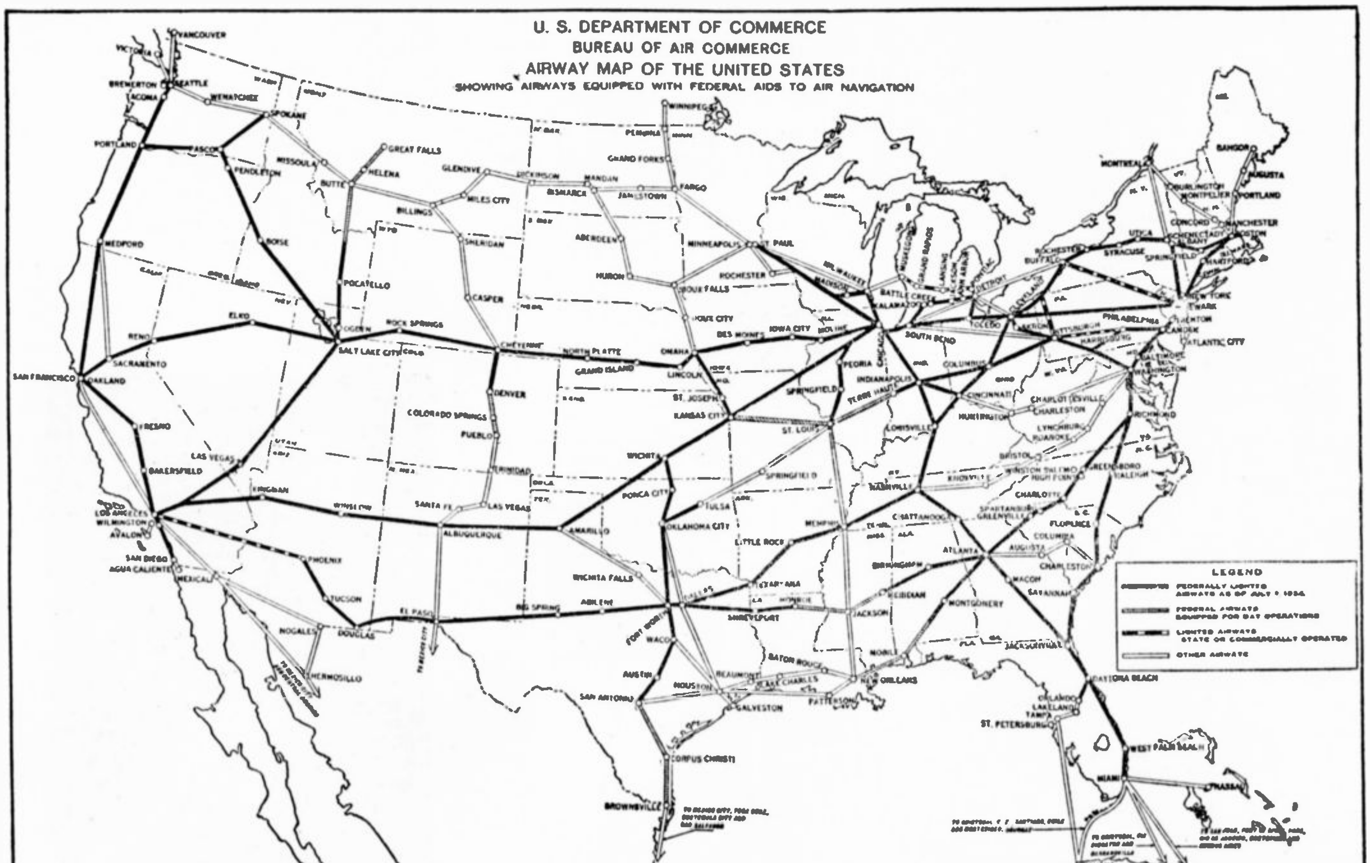



*Airways equipped with Federal aids to air navigation.*

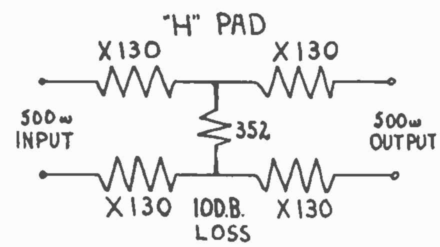
# THE CALCULATION OF "H" AND "T" ATTENUATION PADS SIMPLIFIED

By C. J. LEIPERT

HOW often has the occasion arisen for some sort of fixed resistance to cut down the amount of level or energy being fed from one source to another. Yet, when any old resistance is used, the experimenter realizes that his quality has "gone bad,'' simply because he has neglected to use the proper impedance match to enable the proper transference of energy to take place.

It is with this angle in view that the writer has here endeavored to present a simplified method of doing away with a needless discourse on mathematics removing the mysteries and presenting it in an understandable manner. Conclusive results will be obtained merely by referring to the table and employing a few simple figures with which we are all acquainted.

The reader will then be able to point with pride to his "H" or "T" type pads




which can be assembled very easily. The same pads are at present being used successfully by the largest radio broadcasting companies where high quality is a paramount factor.

These "H'' and "T'' type resistance pads—more commonly called attenuation pads, have the added feature of being available for use in practically all phases of audio-frequency work such as input to microphone amplifiers, between line isolating transformers and input to grid transformers, output of amplifiers to line —in centralized radio and also in public-address work. The reader must not overlook the wattage requirements when using the pads in high level circuits. The best procedure would be to allow an additional 50% for safety-first for maximum wattage dissipation.

**Table and Formulae for Calculating Resistance Values in H and T Type Attenuation Pads**

| DB | K=1'/1 | Yk | Xk |
|---|---|---|---|
| 1 | 1.122 | 4.48 | .0566 |
| 2 | 1.159 | 2.17 | .15 |
| 3 | 1.413 | 1.43 | .17 |

| DB | K=1'/1 | Yk | Xk |
|---|---|---|---|
| 4 | 1.58 | 1.055 | .223 |
| 5 | 1.778 | .829 | .28 |
| 6 | 1.995 | .667 | .333 |
| 7 | 2.24 | .563 | .3805 |
| 8 | 2.51 | .473 | .43 |
| 9 | 2.82 | .409 | .476 |
| 10 | 3.16 | .352 | .52 |
| 11 | 3.55 | .308 | .56 |
| 12 | 3.98 | .269 | .598 |
| 13 | 4.47 | .235 | .635 |
| 14 | 5.01 | .208 | .667 |
| 15 | 5.62 | .184 | .699 |
| 16 | 6.31 | .162 | .726 |
| 17 | 7.05 | .1445 | .753 |
| 18 | 7.94 | .1282 | .776 |
| 19 | 8.91 | .1144 | .789 |
| 20 | 10.00 | .1011 | .818 |
| 21 | 11.21 | .09 | .836 |
| 22 | 12.58 | .08 | .853 |
| 23 | 14.12 | .0711 | .868 |
| 24 | 15.85 | .0636 | .881 |
| 25 | 17.75 | .0565 | .894 |
| 26 | 19.95 | .0005 | .906 |
| 27 | 22.40 | .0448 | .914 |
| 28 | 25.10 | .04 | .923 |
| 29 | 28.20 | .0356 | .93 |
| 30 | 31.60 | .0316 | .939 |
| 31 | 35.50 | .0282 | .951 |
| 32 | 39.90 | .0251 | .951 |
| 33 | 44.60 | .0225 | .955 |
| 34 | 50.00 | .0201 | .96 |
| 35 | 56.20 | .01785 | .965 |
| 36 | 63.00 | .0159 | .968 |
| 37 | 70.80 | .01415 | .972 |
| 38 | 79.30 | .0126 | .975 |
| 39 | 89.10 | .0125 | .978 |
| 40 | 100.00 | .01 | .98 |
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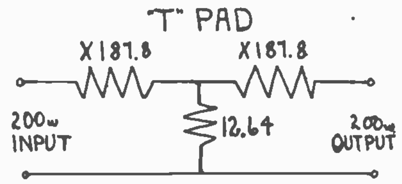



When using the above tables one must consider that the input and output impedances are the same. See Figure 1.

H PAD

$$X = \frac{Z}{2}\,\frac{(K-I)}{(K+I)} = \frac{Z}{2}\,(X^k)$$

$$K = \frac{I'}{I}$$

$$Y = 2Z\,\frac{K}{K^2-I} = 2Z\,(Y^k)'$$

$$K = \text{AntiLog}\,\frac{DB}{20}$$

$$Y = \frac{K}{K-I}$$

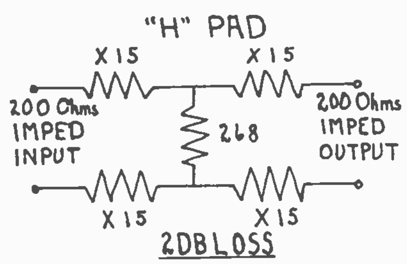
T PAD

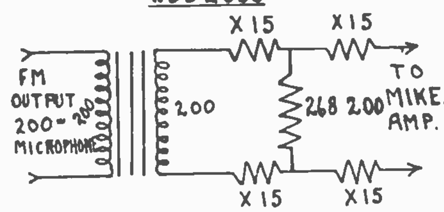
$$X = Z\,\frac{K-I}{K+I} = Z\,(X^k)$$

$$Y = 2Z\,\frac{K}{K^2-I} = 2Z\,(Y^k)$$

$$X^k = \frac{K-I}{K+I}$$

We first solve for our Y member. We want a pad with an impedance of 200 ohms in and 200 ohms output with a 2 DB drop or attenuation. This ($Y^k$) factor is found in the ($Y^k$) column opposite 2DB. It is 2.17. Now, this 2.17 is multiplied as follows: (2DB)X(200 Z)X 2.17 which gives us a total of 268 ohms for the Y member.

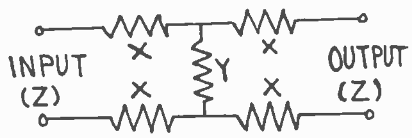



Solving the X member we merely get the value of one of the X members although there are four X members in the H type pad. By running our finger down the ($X^k$) column until we reach 2DB we obtain the factor of .15. We then divide our 2DB loss which we want into the 200 ohm impedance which is

100, in turn we multiply this by .15 making the result 15 ohms. Quite simple when it means but a moment's work on the part of the reader. The transformer and pad arrangement is just a suggestion of one usage of the attentuation.

In order to get a clearer understanding of these simple problems a 500 ohm attenuation pad with a 10 DB drop is now encountered. We first find the value of the Y member. In the ($Y^k$) column—opposite 10DB, the factor .151 is found.

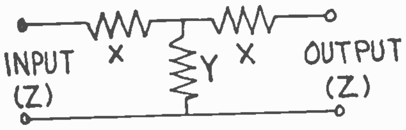



"H" PAD

According to the formula the conclusion is arrived at as follows: 2X5000 ohms X.352 which equals 352 ohms for the Y member. The X member consulting ($X^k$) column (opposite 10DB)—the factor .52 is obtained. We get the answer as follows: 500 ohms divided by 2 represents a quotient of 250. This is multiplied by .52 and the result is 130 ohms for each of the four X members of the H type pad.

THE "T" TYPE PAD

The T type pad will no doubt suit the pocket books of many experimenters more than the H type because it lacks two horizontal X members, hence being cheaper to build. It has a good overall frequency response. The T type pad has now attracted our attention for solution. It is a 200 to 200 ohm impedance "T" type attenuation pad with a 30 DB loss. The reader should take particular notice of the two X members on only one side of the line. When working this X member problem the figure 2 is dispensed




"T" PAD

with because we have halved the number of X members, so by merely multiplying our impedance by the factor (from the table) will give the proper value of the X members which are only two in number. The formula for the "T" type pad is consulted—looking in the ($X^k$) column opposite the 30DB figure we derive the factor of .939. All that is necessary to find the result is to multiply the impedance by this factor—200 X .939 equals 187.8 for the wto X members.

The Y member is now worked out by using the formula as given earlier which is 2Z ($Y^k$). In the ($Y^k$) column—opposite 30DB—we see .0316 which is multiplied by 2X200 ohms—the result being 12.64 for the Y member.

The extreme simplicity of these tables and formulae can be readily appreciated by the reader after a few of the attenuation pads have been worked out.

We can prove with a reasonable degree of accuracy the results obtained in the above "H" or "T" pad by merely adding our X member and Y member which gives a very close approximation. For instance the last "T" pad problem had an X member value of 187.8 while the Y value was 12.64 ohms—adding both gives us the value of 200.44 ohms, our input and output impedance, proving that our results have been worked out correctly.

It will be noted that after the reader works out several problems of different DB losses that as the attenuation factor is increased (DB loss) the resistance of the X members is increased and that of the Y member decreased. Or taking it another way as the attenuation factor is decreased the Y member resistance increases while the resistance values of the X members decrease.

Any of the more reputable resistor manufacturing firms can furnish the resistances needed if none are available in the workshop of the proper values.

# FACILITIES PROVIDED BY THE U. S. COAST GUARD FOR RENDERING AID TO VESSELS IN DISTRESS

THE United States Coast Guard is a military branch of the Government maintained for the purpose of enforcing the navigation and other maritime laws under the jurisdiction of the United States, rendering assistance to vessels in distress, saving life and property, destroying derelicts, and removing obstructions and menaces to navigation. These duties include the International Ice Patrol, the Bering Sea Patrol, flood relief work, patrol of regattas and marine parades, and rendering medical relief to deep-sea fishermen and to the natives of Alaska.

The Coast Guard makes no charge for its services to vessels in distress and will respond promptly to all proper requests for assistance so far as the distribution and condition of its facilities will permit. However, it is not the purpose of the Coast Guard to compete or interfere with commercial enterprise in ordinary towing and salvage operations, but to confine its assistance activities to cases of actual or potential distress.

Radio equipped vessels requiring assistance may obtain the services of the Coast Guard by transmitting a request on the international distress and calling frequency, 500 kilocycles (410 kilocycles on the Great Lakes), to "Any Coast Guard Unit" (radio call NCU), or to any shore radio station addressed to "Coast Guard." Shore radio stations will forward to the Coast Guard all information regarding vessels requiring assistance unless such information is contained in a message specifically addressed elsewhere.

If the following information is included in the original request for assistance it will place the responsible Coast Guard officer in a position to determine immediately the types and number of vessels required to render adequate aid; thus greatly facilitating the work of the Coast Guard, and avoiding any unnecessary delay in the dispatching of assistance.

1. Name, type and nationality of vessel.

2. Position, course and speed (including drift).

3. Nature of trouble and condition of vessel, sea and wind.

4. Number of persons on board.

5. State whether or not Coast Guard assistance is required.

In cases of extreme emergency, when an SOS is broadcast, it is requested that the following procedure be followed by the vessel in distress. Approximately 10 minutes after transmission of the original message, transmit slowly, on the distress frequency, "MO" and own radio call for three minutes. This will enable Coast Guard vessels and stations in the vicinity to obtain direction finder bearings and accurately plot the position of the distressed vessel.

# REMOTE TUNING CONTROLS FOR AIRCRAFT RADIO RECEIVERS

By B. O. BROWNE

*Member of Technical Staff, Bell Telephone Labs.*

WHEN commercial air lines began to operate over regular routes, a need was felt for some kind of guiding beacon to enable planes to fly a straight course in foggy weather when it was impossible to identify land marks. To meet this need the Department of Commerce set up series of radio beacons, approximately two hundred miles apart, on the various air lines of the country.

The radio receivers, employed to pick

up these beacon signals, were at first mounted in the pilot's cockpit where they would be accessible for tuning and other adjustments. This method was soon found to be very unsatisfactory because the space available in the cockpits of most airplanes at that time was rather limited. It was soon evident, therefore, that a remote-controlled radio receiver would be much more desirable.

To meet this situation, Bell Telephone Laboratories designed a system using a flexible shaft to couple a tuning control, mounted in the pilot's cockpit, to the radio receiver, which could be mounted in the tail or other convenient part of the airplane. This system proved very satisfactory until large high-speed airplanes, capable of transcontinental flights, came into use. Since the radio beacons are only two hundred miles apart, and are operated on sixteen different frequencies to avoid interference between them, these long flights would require retuning at very short intervals. The operator would have to know not only the frequency of the beacon he was to follow, but its location on the tuning dial of the receiver. Moreover the new airplane radio receivers have a high degree of selectivity to enable them to separate the many closely spaced channels of the present time, and this requires that the tuning be done very accurately. Since the radio equipment must be operated by the pilot or co-pilot along with his other numerous duties, this type of control also has become unsatisfactory. The most desirable form of control seemed one that could select a number of predetermined positions of the tuning dial by push-button or dial manipulation at the pilot's position.

A control of this type, capable of selecting six or eight positions, has been in use with certain broadcast receivers, but it is much too bulky and heavy for use on airplanes. It was obvious that a distinctly new type of control would have to be developed. Many methods were discussed and certain of the most promising were built and tested. As a result of this preliminary work a control system has now been developed, known as the 700A selector, which combines lightness and dependability with a large number of selective positions. It is designed to mount on the front of the 14A receiver with six screws, and may be operated from the pilot's position by either of two types of control unit.

A simplified schematic diagram of the new selector is shown in Figure 1. A worm-wheel is coupled to the shaft of the tuning condensers of the receiver and is rotated through a worm driven by a small motor operated off the 12-volt battery of the plane. The position at which this worm-wheel, and thus the tuning condensers, stop is controlled by two commutators at the selector and a control switch at the pilot's position. The scheme provides for stopping the tuning condenser at any one of 600 equally spaced positions around its complete 180° arc of motion. When the proper position is reached, the drive is stopped by the release of a magnetic clutch. As the clutch releases, it applies a brake to the drive shaft and at the same time opens the circuit to the motor.

The two commutators and the control switch, together with typical inter-connections between them which determine the stopping position, are shown schematically in the illustration, although to avoid crowding the drawing only a part of the total number of segments on the

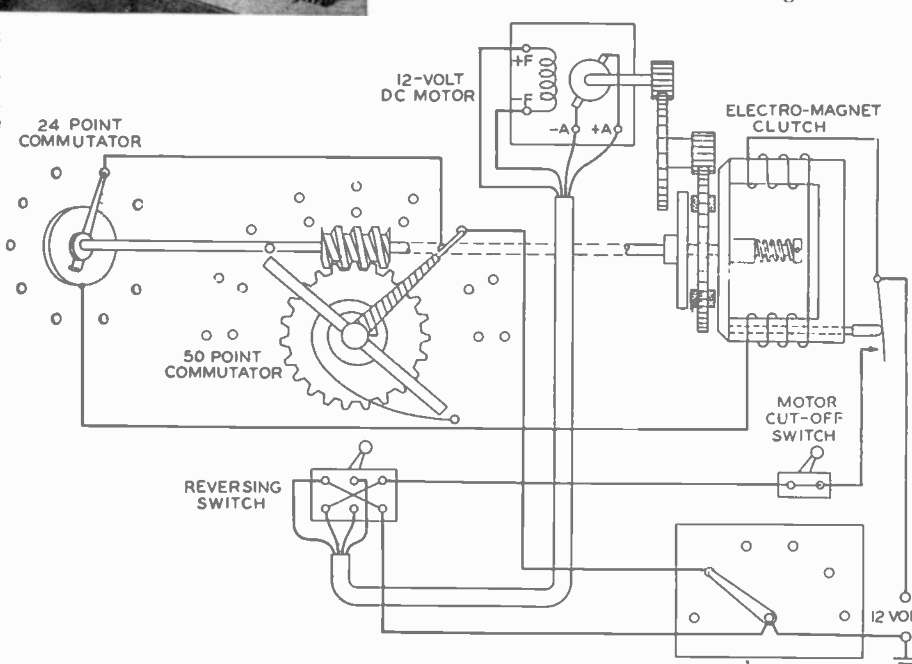



*Fig. 1—Diagrammatic arrangement of selector showing the two commutators and the method of interconnecting*

commutators are shown. One commutator has fifty pairs of segments and the brushes sliding over them move with the worm-wheel connected to the tuning condenser. The two brushes of this commutator are connected together so as to cross connect one pair of segments in each position. The size of segments and brushes are so proportioned that the brushes are always in contact with a pair of segments.

Segments of the second, or 24-point, commutator are located around the complete circle, and the brush sliding over them is driven by the worm-shaft. The tators is broken, the clutch will release, the motor circuit be closed, and the motor will drive the selector until another set of similarly established connections closes the circuit and operates the clutch. The wormwheel carries a cam which operates a switch to reverse the motor when the worm-wheel has been rotated to either one of its extreme positions.

Since it is imperative that the tuning condensers always stop at exactly the same position for any one setting of the control switch, no backlash between the worm and worm-wheel can be allowed. Regardless of the direction in which the worm-wheel and tuning condenser—the motor-driven worm merely acting as a release mechanism to control the rate of motion and the stopping position of the commutator.

The appearance of the selector is shown in Figure 2 and, with cover removed, in Figure 3. At the right of the former illustration is a 28-contact jack and plug used for connecting a 28-wire cable from the pilot's position to the selector. The terminals for both the commutators are brought to the front of the front panel of the selector so that the connections for setting up the

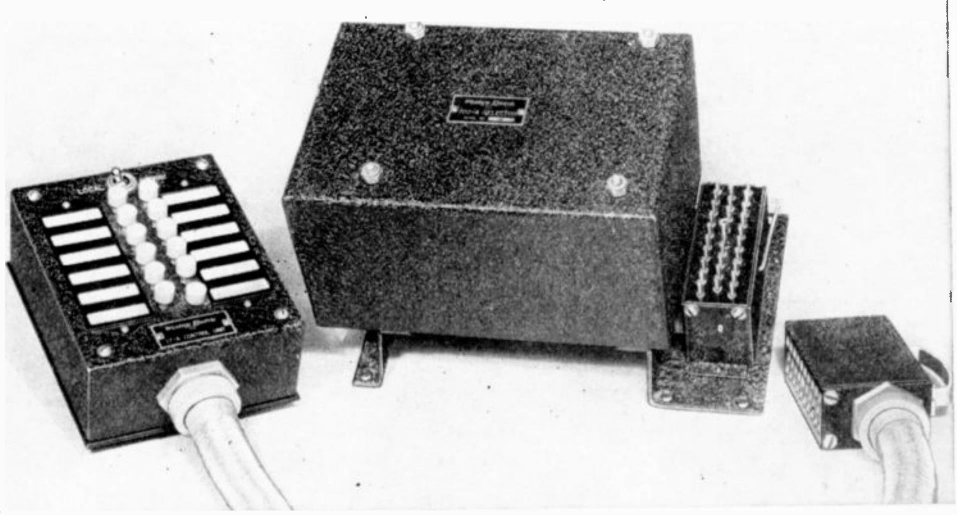


*Fig. 2—The selector is mounted within an enclosing metal cover and carries a 28-contact receptacle for the cable running to the pilot's position*

reduction ratio between the speed of the worm and the worm-wheel that drives the brushes of the 50-point commutator is such that the brush of the 24-point commutator makes one complete revolution while that of the 50-point commutator travels over two segments. Connections are made from segments of the 24-point commutator to the inner segments of the 50-point contact, and from the outer segments of the latter to points on the control switch at the pilot's station. Negative battery is connected to the arm of the control switch and positive battery to the clutch, while a connection from the other end of the clutch winding to the brush arm of the 24-point commutator completes the circuit.

The action of the selector may be readily understood by following through the process of setting up a position after the selector has been attached to the radio receiver. A small knob, attached to the free end of the worm-shaft, enables the tuning condensers to be turned by hand. The first step is to turn this knob until the desired beacon station is properly tuned in. A connection is then made between the point on the control dial that is to be used for selecting this station to the outer segment of the 50-point commutator on which the brush is now resting. A second connection is then made from the inner segment of this position of the 50-point commutator to the segment of the 24-point commutator where its brush is resting. If battery is now connected, the clutch will at once operate to lock the worm-shaft in its present position, and the circuit to the motor will be opened.

If the control switch at the pilot's position is now moved, the circuit through the clutch and the two commu- worm-wheel is being moved, the same side of the teeth of the wheel should always be in contact with the worm. This is brought about by a spiral spring, like the mainspring of a clock, which always tends to rotate the worm wheel in one direction. Thus for rotation in one direction the motor drives the worm-wheel against the action of the spring, and in the other direction the spring drives the various stations may readily be made. The dial-type switch is shown in the photograph which appears at the head of this article.

Since the number of stations that must be tuned-in will vary, two types of control stations have been provided. One, with twelve positions, consists of a bank of twelve interlocking push-button keys

(Continued on Page 17)

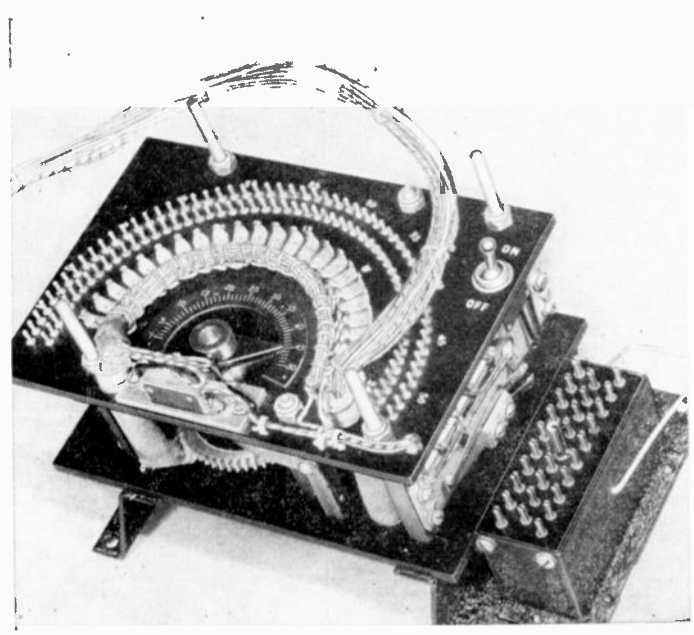



*Fig. 3—When the cover is removed, the terminals of the segments of both commutators are readily accessible*

# "In Baltimore"

By W. D. KELLY

R. E. Harper is the relief operator for WBAL Transmitter and Control Room. Harper is a graduate of Swarthmore.

Ed. Wallace Christilf, WBAL Xmtr Staff, has just bought himself a new Chevy.

W. J. Kelly, Chief Xmtr Opr. WBAL spent his vacation down in Ocean City, Maryland.

W. H. Bareham, formerly RCA Communications, is still holding down the job as Ass't Chief Xmtr Opr. at WBAL.

Ray Brunner, Chief of WBAL's Control Room, is down at Ocean City, Md., recuperating from a recent appendicitis operation.

W. E. B. Grant, the Ass't Chief Control Opr. WBAL is planning an ocean voyage for vacation to recuperate from frequency runs.

Johnny Mutch—the demon operator of W3BOY and WBAL controls is getting fat, having reached the 200 lb. class already.

George Porter Houston, 3rd, took his vacation last part of July. He didn't say where he went, but said that he had a wonderful time.

The Institute of Radio Confrees, a club of Baltimore Radio professionals, had a big time at their annual get together August 5th. The gang all met at WCAO studios and were given a police escort to Solmson's Shore down on Severn River, near Annapolis. The main event was a crab feast.

August Eckles of WCBM Xmtr staff returned from his honeymoon to the World's Fair and points north and west.

Ed Laker of WCBM, who has had six amateur calls in as many districts, has the five meter bug and is building a delux transreceiver.

Frank Snyder, the speed demon on the wire at WCBM has gone in for a different kind of speed—bought himself a car.

Sammy Houston—WCBM control room—spent his vacation down Norfolk way visiting Virginia Beach and all the other beaches as well as Langley Field and taking a plane ride or two.

Bassford, of WCAO, is scheduled to do the light fantastic down the aisle September 15th.

Jones—WCAO Xmtr staff—did his turn as per schedule and was married in July down in Virginia where he spent his honeymoon.

WCAO has recently installed all new Jensen Dynamic speakers through the place and are also installing the new distortion equipment and the Cathode Ray business.

Charlie Lynch of WCAO has bugs in his new Chevy and is willing to trade it with anyone for a Plymouth or what have you?

After four months of study Charlie Seibold went down to see the R. I.'s at Fort McHenry and passed exams for amateur ticket. Now he is a full-fledged broadcast and telegraph man. Charlie watches meters at WCAO when not watching those in the ham outfit.

Jimmy Schultz, the chief Engr. at WCAO, also is looking forward to a big time out in Chi. He wants to see all the fair and all points radio between here and there.

WCBM has installed some of the new RCA Ribbon Mikes and the boys say they pick up lots of things with them—??

Norman O'Hearn is the relief control operator at WFBR during the vacation session.

A letter from W. Craig Brown down in Lima, Peru, says that he has just been appointed as Communications Supervisor for the Pan American Grace Airways.

Eddie Stover commemorated the recent addition to his family by the purchase of a tudor Ford.

Carlton Nopper is planning to get hooked-up in September and has planned a big trip to Chicago, the World's Fair and points in between.

Paul Ruckert, control room operator at WFBR, had a nice trip to Quebec—a nice uneventful trip (????). Announcer Hickman and the bulldog of the books, L. O. Grover, were his partners. They got back OK—but how!

Bill Kelly, chief control operator at WFBR, spent his vacation down Norfolk way—Willie says that he would have had a good time but the skeeters ate him up.

If "ED" is still in the broadcast game—please get in touch with "PU" in Baltimore.

Clement Purviance Holloway was recently appointed Ass't Chief Control Operator WFBR. He too is planning a bang-up vacation in October with a trip to Chicago and all the way stations.

Wm. Q. Ranft, Chief Engineer of WFBR, has just bought himself a brand new Chevy Coup and is planning a two weeks stay in Ocean City, Maryland.

By the time this goes to press WFBR will have had installed its new antenna—a 225 foot vertical radiator of the self-supporting kind, built by Blau Knox.

August 1st, WFBR's office force moved into their new quarters, the entire sixth floor of the building where the studios are located. It is really a nice looking place.

It is a hard job for the writer to get hold of new news of the sea going ops out of Baltimore and would appreciate a card from any of them telling their whereabouts and etc. Address care WFBR, Baltimore.

# 'Down Norfolk Way'

The Boys at WTAR? Well—here they are.

J. L. Grethu—Chief Engineer.
J. C. Peffer—Ass't Engineer.
W. L. Davis—Xmtr Engineer.
R. L. Kennedy—Xmtr Engineer.
C. R. Pattee—Control Operator.
M. M. Harrison—Control Operator.

At NCZ—These boys say "QTE."

C. O. Jones—Sine JC—Chief Radioman.
J. R. Erwin—Sine VX—Radioman 1st Cl.
M. K. Adams—Sine MA—Radioman 2nd C2.
K. W. Edwards—Sine KW—Radioman 2nd C2.

And at Poyners Hill—Oh, how lonely and still.

Butler—Sine H—Chief Radioman.
Bridges—Sine BR—Radioman 1st Cl.
English—Sine D—Radioman 2nd Cl.
Dunn—Sine Z—Radioman 2nd Cl.
Cowger—Sine DO—Radioman 3rd Cl.

## COPYING RADIO RANGE WEATHER

M. C. Wright, radio operator on the S. S. Nantucket, advises the Aeronautic Branch of the Department of Commerce that the steamship has been supplying information picked up from the broadways radio communication stations to casts of weather information by the air-passengers on the ship by posting these on the bulletin board. Passengers who are taking their automobiles along find the ship bulletin board announcements of weather conditions very valuable to them when the ship gets into port, and have a fair idea of what they are running into when touring with their cars.

## A NEW DEVELOPMENT

A complaint often voiced by pilots of planes is that the Department of Commerce beacon transmitters are interrupted often in their directional signals for voice communication. A method is now being developed whereby the signals will be continuous on the directional signals, and voice announcements will be made as formerly, but no interruption will occur. Only one frequency is assigned to each airway station of the department and the directional signals are stopped for three minute weather reports or other information each hour, thirty minutes past the hour. A rule calls for the pilot asking for continuous service where danger requires it, but by the new method being developed the pilot may set his radio compass and watch the course which becomes visible instead of audible. He may then also listen to the weather broadcasts or other announcements. The new system will require two transmitters at the point of sending operating on the same frequency, but the voice signals will differ in modulation from the radio beacon signals. Picked up in the airplane by the single receiving set, the voice modulations will be directed into the airman's headphones, and the modulations representing the radio beacon signals will go into the converter actuating the needle pointer on the instrument board, clearly indicating an "off" or "on course" path.

## TELETYPE NOW RADIOTYPE

Something in the way of successful experiments in radio typewriter communication is reported by the Department of Commerce. In actual operation using radio instead of wire for transmitting typewriter intelligence, it has been found that a weather map with tabulated data could be completed in 7½ minutes, whereas in the older form of wire signal it took 15 minutes for the same material. If this is developed to actual reliability, it will have a telling effect in the case of police departments with connections to nearby or neighbor states where teletype is usually taken advantage of. Many states have extensive private wire line leases for this purpose the same as the Department of Commerce which is experimenting to do away with this expense.

# THE U.S. NAVAL VOLUNTEER COMMUNICATION RESERVE

By FRED L. ULRICH, U.S.N.R.

IN beginning, let me quote those famous words "Courage is half the battle won before it's started.'' In this scientific world of today we also quote some famous words, namely, "Reliable and efficient means of communication, and half the battle is won.'' Our leaders are well aware today that this item is one of the most important factors in our first line of defense, therefore our purpose of organizing the Volunteer Communication Reserve is an endeavor to procure and train officers and men who will be available in time of war or other national emergency. The World War demonstrated the necessity of the naval service having at its disposal a large number of officers qualified for communication duty and a much larger number of men trained as radio operators.

While considerable headway has been made towards the establishment of a Volunteer Communication Reserve, only a small percentage of the radio operators necessary in time of war, in addition to those now in the regular Navy, have been enrolled. These operators will be required immediately on declaration of war, due to the large number of vessels the Navy will place in commission and the commercial radio stations that the Navy will take over.

There are two general classes of operators—professionals and amateurs. Many of the professional operators would continue in their present duty at stations taken over by the Navy for war operations. Such men would necessarily enlist in the Navy for this purpose and it is desirable that they join the Naval Reserve at this time, rather than wait until hostilities are imminent.

The amateur operators are well equipped to become proficient naval radiomen with a minimum amount of training, and it is highly desirable that as many of this class as possible be enrolled in the Naval Reserve. No duty is required of a member of a Volunteer Communication Reserve, but from the great number that undergo training the

*This silver cup was won by Section One of the Volunteer Communication Reserves. It was given by the officers of the Communication Office, Third Naval District.*

*A typical amateur station. The operator communicating with Naval Headquarters during radio drill. Note neat and efficient layout.*

Bureau feels that the Volunteer Reserve, as a whole, is much interested in such training that may be offered by the Navy.

To provide training for those Volunteer Reservists who desire to undertake it, a communication organization is maintained in each Naval District, and a reserve officer is designated as Volunteer Communication Reserve Commander. The District is divided into Sections, and the Section further divided into Units. After an application has been received, the applicant will be notified when and where to report for physical examination.

Each Naval District has a Master Control Radio Station with naval call letters. Many Section headquarters are equipped with radio transmitters and the organization contemplates that all Section headquarters have such transmitters. Regular drill in naval procedure is carried on through the use of these transmitters and those members of the Communication Reserve who volunteer for this training receive this drill with their own receiving sets. In localities where a number of Communication Reservists are available, it is practicable to form Units for instructions and drill. This has been accomplished in several instances and the results have been most gratifying. Unit and Section Commanders are appointed who possess high frequency transmitters and receivers in order that Units may be drilled by their Commanders.

Enlistment of Naval Reservists in each District is in the hands of the Commandant of that District, and correspondence relating thereto should be addressed to the Commandant of the District in which the applicant resides. Applicants for enlistment should write to or call at the office of the Commandant. The only steps then necessary will be to fill out in duplicate the application forms which the Commandant will furnish and to undergo a physical examination at District Headquarters, and Naval Recruiting Stations, or regular Navy establishment to which a medical officer is attached. Fleet Reserve organizations on their specified drill nights are also able to effect the enlistments and physical examinations of prospective members of the Volunteer Communication Reserve. In the event that none of these facilities are readily accessible to the applicant, the Commandant will make other arrangements for applicants' enlistments when advised of the circumstances.

Systematic instruction in Naval Communication Procedure is afforded by the Navy Department in order to stimulate and sustain interest in Naval Radio. The Navy Department sends regularly certain printed matter on communication subjects which are of especial interest to all Communication Reservists. Both Morse and Continental code instruction classes are maintained at various places and times for beginners and those who desire to increase their sending and receiving speeds. Also, sets of Navy Training Courses are supplied to those reservists who request them, in order that they may be fully cognizant of the duties of their rating or for advancement to the next higher rating. The extent to which a man partakes of the instruction available is entirely voluntary, and, like any other organization, training and benefits derived therefrom depend wholly on the effort expended by the individual.

**Ratings.** Amateur and commercial operators, holding valid radio licenses, designation below will be considered eligible professionally for enlistment in Class V-3 and may be enlisted in ratings indicated without examination other than physical.

Commercial, Extra First Class, Chief Radioman
Commercial, First Class, Radioman 1st Class
Commercial, Second Class, Radioman 2nd Class
Commercial, Third Class, Radioman 3rd Class
Commercial, Broadcast (Unlimited) Radioman 2nd Class
Commercial, Broadcast (Limited), Sea 2c for Radioman
Commercial, Radiophone Class, Sea 2c for Radioman
Amateur, Extra First Class, Radioman 2nd Class
Amateur, Class, Radioman 3rd Class
Amateur Temporary, Class, Sea 1c for Radioman

The minimum code speed requirements for enrollment are as follows:

CONTINENTAL CODE

Chief Radioman, V-3—send-receive—20 words per minute mixed code in 5 character groups.
Radioman 1st Class—send-receive—20 words per minute mixed code in 5 character groups.
Radioman 2nd Class—send-receive—16 words per minute mixed code in 5 character groups.
Radioman 3rd Class—send-receive—15 words per minute mixed code in 5 character groups.
Seaman 1st Class for Radioman—send-receive—5 words per minute (plain English).
Seaman 2nd Class for Radioman—send-receive—0 words per minute.

Qualifications for Chief and First Class rating will include ability to send and receive in American Morse using telegraph sounder at 15 words per minute. First enlistments shall not be made in the rating of Chief Radioman, previous naval service shall be required.

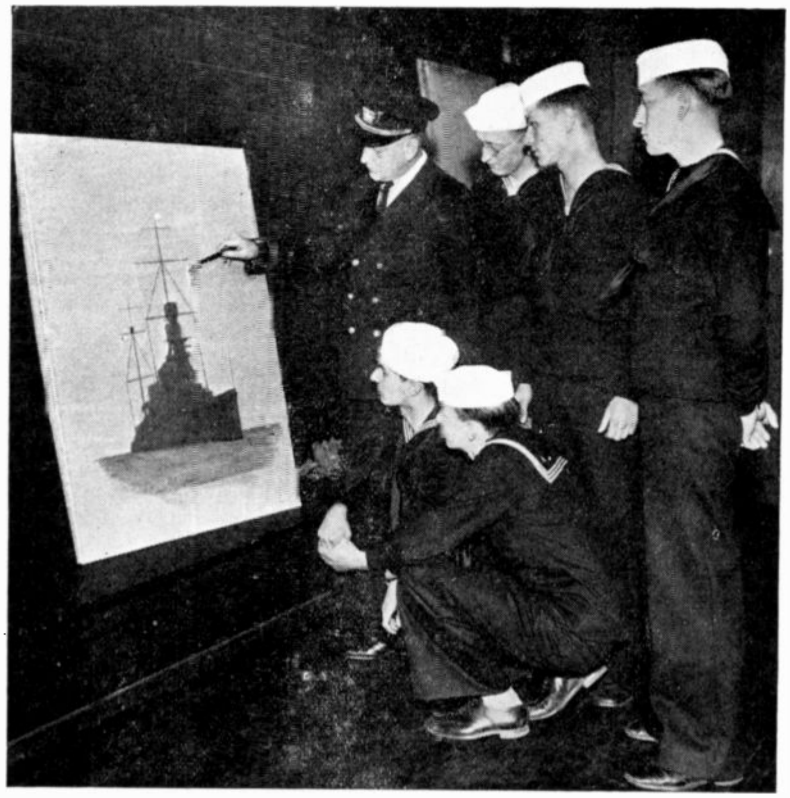
Radio operators with either commercial or amateur licenses, radio engineers, and telegraphers, and others who are especially interested in the radio field or military communication systems, by joining the Volunteer Communication Naval Reserve are afforded:

(1) Identification with the United States Naval Service.

(2) The opportunity to so prepare one's self as to receive the best possible assignment in case of a national emergency.

(3) Temporary training duty of two weeks yearly with pay at a Naval Radio shore station or aviation base, or a two week's cruise if and when funds permit, vacancies exist, and the Commandant approves.

(4) The opportunity to learn Navy Radio Procedure and communication methods.



*Lt. W. C. Freeman, U.S.N.R., is instructing a group of the V.C.R. in flag signals.*

(5) Interesting weekly drills by radio.

(6) Advancement in rating when properly qualified.

(7) A Certificate from the Secretary of the Navy for those officers and men who own amateur radio stations, which Certificate authorizes participation in the Naval Reserve radio drills.

(8) Copies of the following publications are supplied: Amateur Radio Stations of the United States (Dept of Commerce—when in print), Monthly Communication Bulletins of the Navy Dept., Third Naval District, Volunteer Communication Reserve Bulletin, Weekly Drill Report, U. S. Navy Training Courses for Radiomen, Communication Instructions, U. S. Navy (complete); U. S. Navy handbooks, boat books, manuals, etc.

(9) Opportunity to acquire scientific knowledge along the lines of a hobby which can be followed at home.

(10) The opportunity to learn Morse telegraphy for those whose locations permit their attendance at evening classes at headquarters, 3rd Naval Dist., N. Y. C.

(11) The opportunity to learn Continental Code and Naval communication procedure at classes held at headquarters 3rd Dist., N. Y. C.

(12) The opportunity through liason with the American Red Cross as well as the Navy and Naval Reserve communication systems to perform valuable service in time of local emergency.

(13) New friendships and new contacts with men interested in the communication field.

The following staff officers of the Volunteer Communication Reserve, Third Naval District, are well known throughout the radio world.

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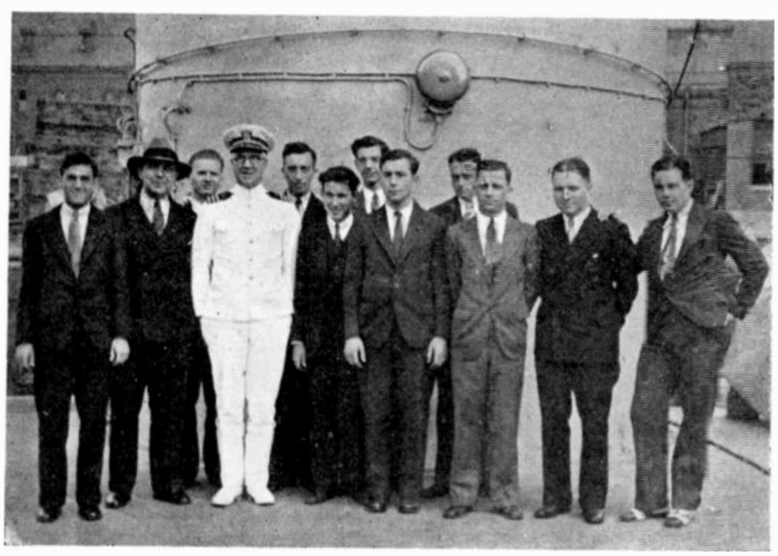


*A group of radio amateurs of the Volunteer Communication Reserve make a cruise on one of Uncle Sam's latest cruisers, the U.S.S. Chester.*

# COMMUNICATION SYSTEM FOR THE ITALIAN SQUADRON TRANSATLANTIC FLIGHT*

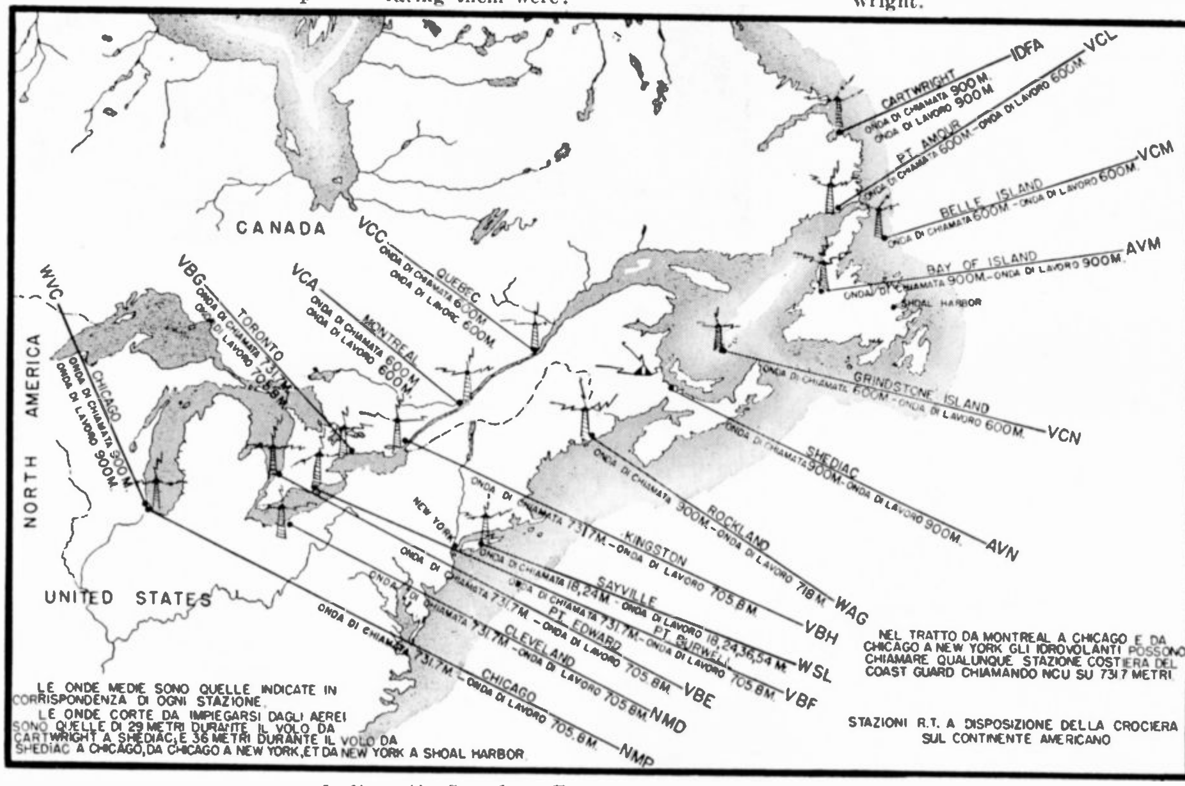
By ELLERY W. STONE

*Lieutenant-Commander U.S.N.R., Operating Vice President, Mackay Radio and Telegraph Co.*

ON July 1st, 1933, a squadron of twenty-five large Italian military seaplanes of the Royal Italian Air Force under the command of General Italo Balbo, Air Minister, took off from their base at Orbetello, Italy, on a transatlantic flight which was to take them to Chicago and back to Rome.

The seaplanes were Savoia-Marchetti S.55 X flying boats, each powered with two Isotta-Fraschini 880 hp. water cooled motors, and two three-blade propellers. The planes were capable of a maximum speed of 150 knots, with a cruising speed of 124 knots. Their cruising range was about 40% above that required by the longest distance to be flown between any two consecutive bases. The flying weight of each plane fully loaded was about 11.5 tons. Each plane was manned by a commander pilot, a second pilot, a radio operator, and a mechanician. Some planes had on board an extra man for special duties. All personnel were officers and non-commissioned officers of the R.I.A.F.

The entire flight had been divided into thirteen legs, thus affording fourteen landing bases where the squadron would be able to find shelter, fuel, communication facilities and general assistance. The fourteen bases and the distances separating them were:




*Italian Air Squadron Emergency Communication Chart*

Reproduction of a chart furnished by the International Telephone and Telegraph Corporation to pilots of the Italian Air Squadron for purposes of emergency communication while flying over the North American continent. It indicates locations, call letters, and calling and working wave-lengths of radio stations in the area over which the flight between Cartwright, Chicago, New York and Shoal Harbor took place.

For contacting the International Telephone and Telegraph Communication Center in New York, a wave-length of 29 meters was used during the flight from Cartwright to Shediac, and 36 meters from Shediac to Chicago, Chicago to New York, and New York to Shoal Harbor.

During the flight from Montreal to Chicago and from Chicago to New York, any of the United States Coast Guard Stations could be reached by calling NCU on 731.7 meters, but no occasion for such emergency communication arose.

With the aid of this chart, the most advantageous station for communication from any point in the area could be selected at a glance.

| | | |
|---|---|---|
| Orbetello-Amsterdam ....about | 870 | miles |
| Amsterdam-Londonderry ........ | 630 | " |
| Londonderry-Reykjavik .......... | 930 | " |
| Reykjavik-Cartwright ............ | 1,500 | " |
| Cartwright-Shediac ............... | 800 | " |
| Shediac-Montreal .................. | 500 | " |
| Montreal-Chicago ................... | 870 | " |
| Chicago-New York ................. | 950 | " |
| New York-Shediac ................. | 725 | " |
| Shediac-Shoal Harbor.............. | 650 | " |
| Shoal Harbor-Azores ............. | 1,525 | " |
| Azores-Lisbon ......................... | 968 | " |
| Lisbon-Rome ............................ | 1,351 | " |

In addition to the above, an emergency base, located at Julianehaab, Greenland, was only to be used if necessity compelled. This base would have afforded to the squadron the same facilities as other bases, but its main purpose was that of providing the flight with a miniature weather bureau well equipped and well manned, situated far enough north, where weather conditions are generally bad and very unstable, to permit the preparation of weather forecasts for the most hazardous of the thirteen legs—the "hop" from Reykjavik to Cartwright.

Each base was under the command of a specially detailed Italian Air Officer and was manned by men of the Royal Italian Air Force.

The International Telephone and Telegraph Corporation became interested in this historic flight late in 1932 when one of the System representatives in Europe, Mr. H. H. Buttner, a Vice President of Mackay Radio and Telegraph

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* Reproduced from "Electrical Communication" July, 1934.

Company, was called to Rome to discuss with General Balbo, then Air Minister, tentative arrangements for the communications organization to serve the needs of the flight. The appointment of the I. T. T. as the communication agency of the flight was made on January 4th, 1933, and subsequently, General Aldo Pellegrini, Director of the Royal Air Force Training School in Orbetello, and Colonel Mario Infante, Director of Communication Services of the Air Ministry, were detailed to come to New York to select sites for the North American bases and to confer with the communication officials of the I. T. T. for the purpose of organizing the most ambitious chain of radio, cable, and wire communications ever attempted for an aerial venture—in fact, for any world event.

The author of the present paper was detailed by the late Mr. Hernand Behn, then President of the I. T. T., to organize the radio, cable, and telegraph set-up of the International System in the execution of the role entrusted to us by the Italian Government.

Plans were evolved for the intricate problem of providing and assuring:

a) Continuous, fast, and reliable two-way radio telegraphic communications between the flying squadron, the landing bases, and the Italian Air Ministry in Rome throughout the entire duration of the flight.

b) Speedy and accurate weather reports and weather forecasts to the squadron; such reports to be collected from vessels at sea in areas extending as far north as Labrador, Greenland and Iceland, and as far south as might be needed to cover the return route via Shoal Harbor, Azores and Lisbon. Hourly weather reports from land points and coastal stations along the proposed course of the seaplanes over the American Continent.

c) The conveyance of these reports to the United States Weather Bureau in New York for translation into accurate forecasts by Doctor James Kimball, a meteorologist who has figured prominently in supplying weather data for virtually all transatlantic flights.

d) The transmission of weather fore-

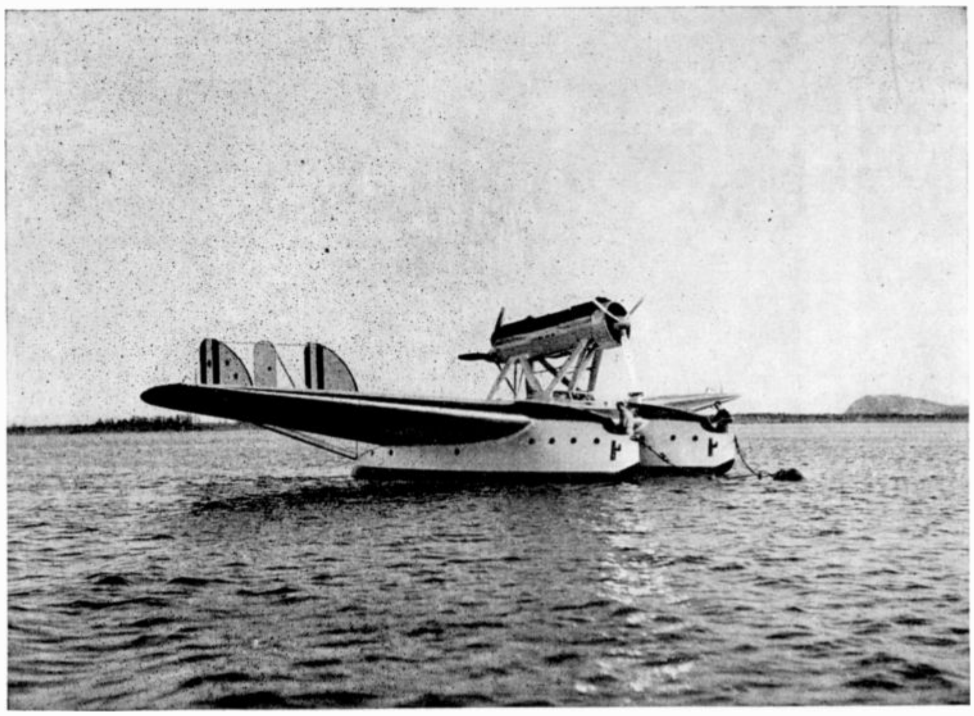
*Lieut. Col. Mario Infante, R.I. A.F., and Lieut. Commander Ellery W. Stone, U.S.N.R., at the International Telephone and Telegraph Corporation Control Center of the "Crociera."*

*Conference of the High Officers of the Cruise: From Left to Right: Capt. Recagno, Capt. Nannini, Gen. Pellegrini, His Excellency Gen. Balbo, Lieut. Col. Longo, Capt. Giordano, Capt. Baldini, Capt. Biani and Lieut. Col. Cagna.*

casts to the Commander of the squadron at predetermined hours, and the preparation and transmission of special weather bulletins at such other times as the Commander of the "Crociera" might request.

On the rapidity, coordination and reliability of all these services depended the safety of the fliers and the success of the flight.

The I. T. T. had at its disposal the extensive network which it possesses in the Western Hemisphere; a network comprising the high power Atlantic coastal and transoceanic stations of the Mackay Radio System, the high speed undersea cables of the Commercial Cable Company between North America and Europe, and the land lines of the Postal Telegraph



*Seaplane "Savoia Marchetta S. 55 X."*

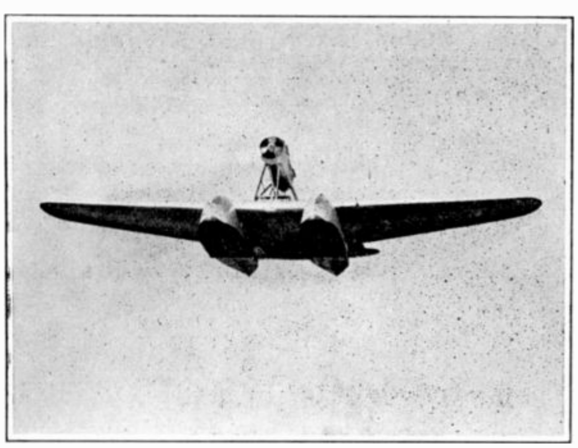
Company with its connections to the telegraph system of the Canadian Pacific Railways in Canada.

The Italian Air Ministry had at its disposal two of the R. A. F. land radio stations in Italy, the radio sets in each plane of the squadron, and also some portable field radio sets. In addition, the Ministry enlisted the assistance of the Italcable Company of Italy, which has submarine cables connecting Italy, Spain, and the Azores with the cables of the Commercial Cable Company. The Ministry also secured the loan of two submarines of the Italian Royal Navy, the "Millelire" and the "Balilla," and chartered a number of vessels including the yacht "Alice" and several trawlers. All these ships were equipped with intermediate and short-wave radio apparatus suitable to the discharge of the particular duties assigned to each vessel.

To supplement other facilities and to provide the flying squadron with signals for radio compass bearings, the relaying of dispatches and emergency assistance, three trawlers were stationed at regular intervals on the course between Londonderry and Reykjavik, and four trawlers and two submarines on the course between Reykjavik and Cartwright.

## Communication Facilities

Regular commercial communications were at best only seasonal and sporadic at certain places along the route of the flight, while at others there existed no communication facilities of any kind. Complete wire, cable, and radio facilities were available only at a few of the base sites. Studies were made of the location and characteristics of all available communication facilities along the proposed flight course and steps were taken to fill in the gaps, through the provision of additional facilities, so as to form an uninterrupted chain of communications.



*Seaplane "Savoia Marchetti S. 55 X."*

The seaplanes themselves were equipped with highly efficient and compact radio telegraph sets. Each consisted of a 400-watt transmitter and receiver capable of operation on both low and high frequencies (500 to 2500 meters and 22 to 99 meters). Each plane also carried a special receiver for radio compass use.

The efficiency of this military equipment can be gauged by the fact that during pre-flight tests two of the planes were able to hold two-way communication with Mackay Radio station WSL at Sayville, Long Island. Worthy of note in this instance is the fact that the planes were lying on the waters of Orbetello Bay, 4,000 miles away, and shielded from WSL by the rising hills of Orbetello.

In conformity with the Italian military procedure, and in order to assure uninterrupted communication at all times, all assisting vessels and bases were instructed to keep constant watch during actual flight hours and to relay on request those messages which through any cause could not be sent or received directly to or from the seaplanes or any base. The same watches were maintained by the author and his staff at the New York control center.

In addition, it was found necessary and extremely helpful to obtain the assistance and cooperation of the Ministry of Posts and Telegraphs of Newfoundland as well as the Canadian Pacific Railway Company of Canada. Mr. W. D. Neil, General Manager of Communications of the C. P. R., not only responded very willingly but obtained the aid of the Canadian National Railways for the prompt transmission of messages to and from the base of the "Crociera" in Shediac over the C. N. R. land lines to Moncton.

Through the cooperation of Comdr. C. P. Edwards, Director of Radio Service of the Canadian Government Department of Marine, the facilities of the coastal stations of the Canadian Government and the Canadian Marconi Company also were made available.

### Wavelengths Assigned

In order to avoid interference from commercial coastal radio stations and from ships at sea, various wavelengths were assigned to the different "Crociera" services as follows:

To communications from assisting vessels and land bases to and from the flying seaplanes, 840 meters.

To communications exclusively between the seaplanes themselves, 900 meters.

To radio compass signals from assisting vessels and Royal Air Force field stations, 900 meters.

To radio compass signals from the yacht "Alice," 1050 meters.

The yacht "Alice," which was to act as base ship at Cartwright during the westward flight, and as base ship at Shoal Harbor during the eastward flight, arrived at New York toward the end of April. As had been prearranged, conferences were held with the Italian officers detailed to the operation of the ship's radio station and plans formulated whereby, from the start of the ship's voyage to the north, daily schedules would be worked out between the ship and Mackay Radio stations WSL and WAG, Rockland, Me. This procedure was necessary to determine the optimum frequencies for the various distances and hourly schedules involved.

These and other tests proved to be particularly difficult, due to magnetic and electrical storms to the northward, similar storms near New York, heavy static, and interference. As a result of this work, the following conclusions were reached:

WAG could best communicate with the yacht "Alice" on 718 meters and 2,420 meters.

WSL found that from 1,800 G. M. T. to 2,200 G. M. T. it could use with advantage 23.84 meters for transmission to the "Alice" and 29 meters for reception. From 2,200 G. M. T. to 1,800 G. M. T., 35.76 meters proved better for transmission, while a wavelength of 39 meters was better for reception.

AVN and AVM could contact WAG easily enough on 840 meters, while AVS could not be relied upon to contact directly either WAG or WSL on long wave; magnetic disturbances, fading, and low power being the adverse factors. A wavelength of 29 meters, however, proved satisfactory.

AVR and AVL could not rely on continuous contact with WSL but could receive WSL on 17.87 and 23.84 meters during the day and on 35.76 and 54.04 meters during the night.

All the base radio stations and the trawlers could, however, communicate promptly by relay with WSL. (Distances between the vessels averaged 250 miles.)

ABO and IKM in Italy, being permanent land stations, could communicate easily with WSL on the following wavelengths:

WSL would transmit on 17 and 24 meters during the day and receive on 18 and 29 meters; during the night it would transmit on 36 and 54 meters. There would be a period between darkness and daylight when 29 and 36 meters gave best results.

The optimum wavelengths for use between the seaplanes and WSL during the flight over the North American continent between Cartwright, Shediac, Montreal, Chicago, New York, and Shoal Harbor were determined by a very practical experiment. Col. Infante and R. A. F. Radio Operators Ponticelli and Mercalli, equipped with short-wave receivers similar to those of the planes, undertook an automobile trip from New York to Chicago, Montreal, Shediac, Cartwright, and return. At predeterminied intervals, they stopped enroute and noted reception from WSL on various frequencies for the various legs of the North American course. The results of these tests determined the assignment of the following wavelengths for communications between the seaplanes and WSL:

26 meters from Cartwright to Shediac

36 meters from Shediac to Chicago, Chicago to New York, and New York to Shoal Harbor

29 meters for greater distances.

WSL had no difficulty in contacting the squadron at any time along the entire course of the flight. The reasons for this were: first, the high power of the transmitting station; second, the fact that when necessary WSL was able to transmit on four transmitters simultaneously, each on a different frequency, thus enabling the receiving operator at any point to select the optimum frequency for his location from the four frequencies used, namely: 16780 kc. (17.87 m.), 12585 kc. (23.84 m.), 8390 kc. (35.76 m.), and 5555 kc. (54.04 m.).

The carrying out of these tests and contact work lasted from the first week in May to the end of June, 1933. WAG and WSL were on the air at practically all hours on this assignment, and their staffs had to be increased considerably in order not to delay the normal commercial work of these stations.

### Collection of Weather Data

The New York control center was entrusted with the collection of information pertaining to meteorological conditions for that portion of the flight west of the 35 meridian, and the procuring of this data from all points adjacent to the course of the flight presented a problem demanding considerable preparation. Reports were received from ships at sea either directly or through the Weather Bureau at Washington, from C. P. R. stations, from all bases in Labrador, from Mackay Radio and Commercial Cable stations, and from many Postal Telegraph stations located near the Canadian border between Chicago and New York. Arrangements were made with the Canadian Weather Bureau and the Canadian Department of Marine for the collection and transmission of weather reports by the Canadian and Newfoundland Government weather stations directly to Mackay Radio coastal stations, or by relay between designated Government stations. All such information was immediately turned over to Dr. Kimball of the local Weather Bureau and Professor Montanari, meteorologist of the Royal Air Force.

### Emergencies

Another phase covered by the communication system was that of preparing for emergency messages. In order to provide immediate assistance to any unit of the seaplane squadron while over North American waters, it was arranged that the Director of Naval Intelligence, the Director of Naval Communications, and the Chief Signal Officer of the Army in Washington would be made joint addresses for all bulletins released relating to the flight movements. This would have permitted prompt action by the United States Army and Navy in case of distress.

The Commander of the Eastern Area of the United States Coast Guard was also kept informed of the progress of the flight in the event that the services of the Coast Guard should be required to render assistance to a disabled seaplane. The Coast Guard radio stations NMP in Chicago, and NMD in Cleveland kept constant watch during the actual flying time from Montreal to Chicago and New York.

The Director of Naval Communications ordered the Atlantic Coast naval radio stations north of New York, as auxiliaries to Mackay Radio, to keep constant watch during the "hops" from Cartwright to Shediac, and from New York to Shoal Harbor. The squadron, however, was never out of communication with the I. T. T. control center and, happily, no disaster occurred requiring the assistance of the military services.

### Communication Log of the Flight

Below are given briefly a few excerpts from the log kept at the control center and from the many bulletins issued to the Army, Navy, Coast Guard, newspapers, and broadcasting stations by Mackay Radio during the period of the forty-three days from the start to the finish of the "Crociera." Actual time spent in flying the 12,000-mile stretch was 103 hours.

All time given is E. S. T., 75th Meridian.

July 1st

0:10 A. M. Mackay Radio reports that the 25 seaplanes took off from Orbetello for Amsterdam.

8 00 A. M. One plane capsized in landing at Amsterdam.

8:10 A. M. Mackay Radio now ad-

(Continued on Page 20)

## MEMORANDUM FOR SHIP MEN

The Radio Commission adopted the following rules to become effective immediately:

289a. The operation of radio stations on frequencies below 28,000 kilocycles on board any vessel in the territorial waters and inland waters of the United States shall be in accordance with the following limitations:

(1) The frequencies used shall be those allocated for use by mobile stations by the existing International Regulations.

(2) The use of radio equipment shall not interfere with the normal communication of other radio services.

(3) Only messages originating on ships with passengers or members of the crew may be transmitted; i. e., no message shall be handled unless it is one that would be normally routed in the mobile service.

(4) Except for the handling of emergency communications, damped wave transmitting apparatus shall not be used on board a ship alongside the dock or at anchor in a harbor of the United States.

289b. Except for the handling of emergency communications relating to the safe navigation of the vessel, and the handling of messages relating to ships in distress, the privileges granted by Rule 289a are extended only to those foreign ships which belong to countries granting similar privileges to American ships in their territorial and inland waters.

289c. The use of radio by foreign men-of-war in United States ports and territorial waters may be authorized on frequencies allocated to the mobile service by the International Regulations in force, upon condition that no interference will result to the service carried on by other stations. Normally, requests from foreign men-of-war to use their radio equipment for communications while in United States ports and territorial waters shall be made to one of the Naval District Commandants, or, after arrival in port, to the Senior U. S. Naval Officer present. The headquarters of District Commandants concerned are located at Boston, New York, Philadelphia, Norfolk, Charleston (South Carolina), San Diego, San Francisco, Seattle, Pearl Harbor, T. H., Balboa, C. Z., and Cavite, P. I. In addition to having senior naval officers stationed at these places, the Navy has officers performing various duties at practically all other important United States ports. When a Naval officer is not present, requests shall be made to the port authorities, or to the Navy Department, Washington, D. C. The authority to grant such requests is lodged in the official who is authorized to receive the request.

384a. In the case of an amateur licensee whose station is licensed to a regularly commissioned or enlisted member of the United States Naval Reserve, the Commandant of the naval district in which such reservist resides may authorize in his discretion the use of the call letter prefix "N," in lieu of the prefix "W," or "K," assigned in the license issued by the Commission, providel that such "N" prefix shall be used only when operating in the frequency bands 1715-2000 kilocycles and 3500-4000 kilocycles in accordance with instructions to be issued by the Navy Department.

## FEDERAL COMMUNICATIONS COMMISSION IS ORGANIZED

The federal Communications Commission organized its Division July 17th in keeping with the Communications Act. Three divisions composed of three members each were created, with Chairman E. O. Sykes serving on each division.

Division No. 1—Broadcasting
Commissioner Gary, Chairman.
Commissioner Brown, Vice Chairman.
Commissioner Sykes.

Division No. 2—Telegraph
Commissioner Stewart, Chairman.
Commissioner Payne, Vice Chairman.
Commissioner Sykes.

Division No. 3—Telephone.
Commissioner Walker, Chairman.
Commissioner Case, Vice Chairman.
Commissioner Sykes.

The Broadcast Division shall have and exercise jurisdiction over all matters relating to or connected with broadcasting.

The Telegraph Division shall have and exercise jurisdiction over all matters relating to or connected with record communication by wire, radio or cable, and all forms and classes of fixed and mobile radiotelegraph services and amateur services.

The Telephone Division shall have and exercise jurisdiction over all matters relating to, or connected with telephone communication (other than broadcasting) by wire, radio or cable, including all forms of fixed and mobile radio telephone service except as otherwise specifically provided for.

## STATIONS ASK HEARING

WHM, Nashville; KFI, Los Angeles; WGN, Chicago; WJR, Detroit; WLW, Cincinnati; WOAI, San Antonio; WSB, Atlanta; WFAA, Dallas; WBAP, Fort Worth; WHAS, Louisville; KNX, Hollywood; WHAM, Rochester; and WLS Chicago, have asked the Federal Communications Commission for a technical study for one year under a radio engineer and report to the Commission on the clear channel system.

Each of the stations operates at present on a clear channel and of course it is their desire to protect their interests in asking the study.

## AT CROWN POINT

### By Fred Hall

WCY, the Radiomarine Station at Cleveland, is heard consistently up and down the Great Lakes. It is located at 2404 Bradley Road, West Dover, Ohio, suburb of Cleveland. Mr. H. L. Clark is manager and is assisted by Mr. W. T. Thomas (TX) and Mr. Virgil Lewis (VL). Mr. Clark's sine is (FJ).

The GL Naval Reserve boats can be heard quite frequently now. They are out on their annual summer cruises.

NMP, the CG stn at Chicago is heard occasionally.

## SOME RECENT MARINE NEWS

"SLT" are the identification letters for "Sea Letter Telegram" service inaugurated June 14th by Radiomarine Corporation. "SLT" messages are posted from the Coastal station to destination when received from ship station. Through rate is frs. 7.50 for 25 words or less, tolls are divided forty percent to the ship station and sixty percent to Coast Station, latter paying posting.

The Director of Radio Service, Ottawa, Canada, complains to our own Commission that reports from Great Lakes Coast Stations show that vessels of United States registry frequently transmit their names in an incomplete manner.

South Pass Radio Direction Finder Station for vessels entering Mobile, Pensacola, and Gulfport will find the bearings "to be fairly reliable" says the Eighth U. S. Naval District Communication Officer, claiming reservation as the area is an uncalibrated sector.

The Lighthouse Service will be glad to receive reports from navigators as to their experience in using radio bearings as follows:

It is of the highest importance, in using radio bearings for approach, that a sufficient distance before reaching a lightship the course be set to pass safely clear. The navigator may readily check his position with respect to the lightship radiobeacon when steering to pass to one side, by taking successive radio bearings off from time to time. Also, in approaching, it is possible by radio cross bearings to obtain the distance off, at least approximately.

Copies of the revised edition of the Rules and Regulations of the Radio Commission are available from the Superintendent of Documents, Government Printing Office at a cost of 30 cents.

The Bureau of the International Telecommunications Union, Berne, Switzerland, issues many publications that are of wide interest. Some of them are "List of Coast Stations and Ship Stations," "List of Broadcasting Stations," "List of Call Letters of Fixed, Land, and Mobile Stations," "List of Stations Performing Special Services," and "List of Aeronautical Stations and Aircraft Stations."

Medical Advice to ship masters on Atlantic Coast, Gulf and River St. Lawrence, Hudson Bay and Hudson Straight, may be had by addressing "Radiomedical" routing via nearest coast station, which will refer the message to the nearest medical authority of the Department of Pensions and National Health and transmit the reply to the ship.

The July, 1934, Bell System Technical Journal, which can be secured from The American Telephone and Telegraph Company, 195 Broadway, New York City, for 50c, has some very interesting articles among which are "The Compandor—An Aid Against Static in Radio Telephony," "The Effect of Background Noise in Shared Channel Broadcasting," "Wide Band Open Wire Program System," "Some Improvements in Quartz Crystal Circuit Elements," "A Theory of Scanning and Its Relation to the Characteristics of the Transmitted Signal in Telephotography and Television," and "Line Filter for Program System."

# MEN WHO ARE MAKING RADIO TODAY

## No. 1. OSCAR BYRAM HANSON.

IF THERE is a single figure in broadcasting today more interesting than Oscar Byram Hanson, Chief Engineer of the National Broadcasting Company, we miss our guess.

In him is represented everything that a radio man will call complete. Starting out an amateur in 1912, he later attended the old Marconi school in New York City, at present continued as the RCA Institute. He and Mr. J. R. Poppele, now Chief Engineer of WOR, were at the school at the same time. The sinking of the S. S. Titanic in 1912, when it rammed into an iceberg, and the important part wireless played in the disaster is given credit for first interesting him in radio.

Completing his course in what was then known as wireless he obtained his operator's license, and went to sea. He was on the S. S. Bermucian, and later the S. S. Stephano when it was torpedoed off Nantucket Light in October, 1916. From 1917 to 1920 he worked in the testing department of the Marconi Company at Aldene, N. J., often called Roselle Park. He climbed in that position to Chief Testing Engineer and in 1920 resigned for a short turn at sea again.

When radio broadcasting as we know it now came into the spotlight, O. B., as he is known to his associates today, climbed right into it, becoming associated with WAAM, pioneer of Newark, N. J., where he installed the station. Applying himself as he always has, he continued in the station until 1922, when he was offered and accepted a position as assistant to plant engineer at WEAF, then owned and operated by The American Telephone and Telegraph Company. When the National Broadcasting Company was formed in 1926, taking over WEAF, Hanson went along to the new company. He today has the title Chief Engineer of the National Broadcasting Company, having directed all operating activities at NBC since it was formed.

He supervised the designing and equipping of the former NBC studios at 711 Fifth Avenue, New York, the NBC Chicago studios, and the present NBC studios at Radio City.

One of his most recent works is a twenty-six page book entitled "The NBC Studios at Radio City, New York—A Technical Description."

Mr. Hanson admits 38 years of age. He is a bachelor, and lives at Westport, Conn. Much of his time is spent in travel as his duties call him everywhere that the five present networks of NBC operate.

Some of Mr. Hanson's peculiarities, if they may be called such, is continued application to detail, and constant hard work. He is never satisfied with just the surface of anything, but has cultivated the habit of investigating everything to the most minute detail. Of a naturally nervous temperament, Mr. Hanson keeps his hands and fingers continually active in some part of his work, accomplishing more than two average beings, but appearing to be impatient at all times with his own accomplishments, always trying to cover more ground in any given day.

*Oscar Byram Hanson*

He was born in Huddersfield, England, the son of a British woolen manufacturer. His early education was in England. He then came to the United States at 16 years of age as he says himself with the determination to become an architect. His first employment was with the Underwood Typewriter Company, at Hartford, Conn. On account of the death of his father this was in his early teens.

An early interest in photography as a hobby which he still continues, together with an active working on his nights off as a relief moving picture operator is helping Mr. Hanson in his present work on television experiments for the broadcasting company.

Aviation came in for its part in Mr. Hanson's interests. As a point of his thoroughness, he bought a three place biplane, mounted it in his garage, took it completely apart and put it together again. He then took it into the air and continued at it until he became a competent pilot. That is all gone with now though, as he sold the plane a few years ago, and spends much of his time travelling all over the country as a paying passenger in the present day air liners. Aviation radio is one thing that he still keeps right at, partly because of his work, but also because he enjoys it. He was recently commissioned a reserve captain in the U. S. Army, as a result of his contributions to airplane radio work.

The NBC in their regular press release on Mr. Hanson recognizes the usual oversight of the technical man in the following: "He heads the group of unknown and unsung technicians who devote themselves to the practical side of the magic that brings the Metropolitan Opera Company, Paul Whiteman, Rudy Vallee, the celebrities of the day and the leaders of the nation into your home." But, this situation is being corrected a little, as one of our leading National Weeklies is now preparing a complete article on Mr. Hanson, and you will soon be given the opportunity of reading this.

Beside being a man of many activities while at the daily grind of work, Mr. Hanson still finds time to be a man of many and varied hobbies and finds time here and there for his small cabin cruiser, horseback riding, and a dozen or so other sports that give him an outlet for his nervous energy. A tall, spare man, with horn rimmed glasses, and studious appearance completes our picture of Mr. Hanson, but just between us, on a party, you would never know him from our description of him.

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## Intermediate Airway Stations

(Continued from Page 6)

isolated station is not entirely uneventful. Well-known and famous people from various walks of life oft times travel by plane, thus affording the keepers at these stations an opportunity to meet people whom they would not come into contact with otherwise. In this way the writer has met Mr. and Mrs. Charles Lindbergh and several other well known and interesting people. Sometimes when the field is made unsafe for landing by heavy rain or snow the keeper has to don his boots and heavy weather clothing and replace the white boundary lights with red ones, in this way indicating the portions of the field which are unsafe for landing.

Approximately three days a month are spent on the field with hoe or shovel filling in tail-skid ruts or removing lowly weeds from its surface. This work, though apparently necessary, affronts an operator's professional pride. It is at such times that he is most likely to indulge in thoughts of heaving decks and distant ports and places.

## Factors Affecting Sound Reproduction

(Continued from Page 5)

is indicative of the bass resonant point. To radiate this resonant frequency (means the lowest bass response efficiently heard) the baffle must have a radius of not less than one-quarter wavelength. The optimum size of the baffle is found by using the simple formula

$$\frac{V}{f_r} = (\lambda) \text{ wavelength in feet}$$

$$\frac{\lambda}{4} = \text{baffle radius in feet}$$

where V equals the optimum velocity of sound (1200 ft/sec.) at ordinary temperatures; $f_r$, the bass resonant point of the speaker; and ($\lambda$) 'lambda,' the wavelength of the sound wave.

Increasing the baffle area beyond a quarter wavelength will in no manner bring about a greater bass response. The use of mammoth baffles to secure heavy bass response below the bass resonant point of ANY loudspeaker are worse than useless especially if the bass resonant point is of 200 or more cycles.

**Selecting Dynamic Speakers**

It is now considered poor policy to select a small dynamic speaker for reproduction of high audio-frequencies. This is because the register above 3000 cycles has been deliberately attenuated in small common speakers in order to augment the 3000 cycle response of the piston. This sacrifice is purposely done to increase the middle high-frequency peak which lies between 1500 and 3000 cycles. The suppression of frequencies beyond 3000 cycles is based upon the old but still prevalent idea that receiver distortion, plus noise, is considered objectionable beyond this point. It is upon this premise that distortion or so-called tone controls were invented so as to attenuate the poorly reproduced "highs" and give preference to the lower register.

To obtain high-frequency response in sound reproduction, one of the speakers (it is almost imperative that two reproducers be used, one for high and the other for low-frequency reproduction) have a natural cut-off of not less than 1000 cycles (2000 would be better), have a rising characteristic up to at least 8000 cycles with as few peaks as possible, yet have uniform response, not be shrilly or over accentuate certain high-frequency components. The unit should have a good power factor so as to limit the rise in response of the associated low-frequency speaker with increasing frequency. From the stringency of these qualifications it is apparent that the usual types of dynamic speaker, either large or small, are not fitted for high-frequency service. It is here that the new types of high-frequency speakers find application.

At present there are two types of high-frequency units, the dynamic and the piezo-electric. Each unit uses a small type of exponential horn as a coupling media for sound energy. The cut-off frequency of the dynamic has been designed for 3000 cycles, and that of the piezo-electric unit for 1000. The dynamic requires a special electrical network to divide the transmission between the high and low-frequency reproducers, also some method of field excitation must be supplied. In comparison, the piezo unit requires no such electrical network or field excitation. However, each unit has been designed to meet some specified service, therefore, it is difficult to comment on the relative merits of each, because both are equally efficient as true high-frequency reproducers.

With the advent of the new high-frequency speakers, together with the many engineering refinements incorporated in commercial radio receivers, it is not hard to conceive that the search for the ideal electro-acoustic reproducing combination has been found.

## Communication System For Italian Squadron Transatlantic Flight

(Continued from Page 17)

vised from Amsterdam capsized plane wrecked, one of the crew missing, pilot and commander saved by two Dutch Marine Cadets.

8:25 A. M. Mackay Radio now reports that Sergeant Quintavalli of the wrecked plane is dead; Captain Baldini, Lieutenants Novelli and Demetrio injured and fifth man slightly hurt.

July 2nd

2:30 A. M. Gen. Balbo took off from Amsterdam for Londonderry. The 23 other planes of the squadron followed immediately.

8:55 A. M. Squadron landed at Londonderry.

July 5th

7:40 A. M. Squadron took off from Londonderry for Reykjavik.

2:15 P. M. Report from Gen. Balbo to Mackay Radio states Italian Squadron landed at Reykjavik. Squadron faces a stop of a few days on account of adverse weather conditions over Atlantic.

The I. T. T. control center, which up to this time had been concerned mostly with dispatching the great volume of messages to and from the Italian Ministry in Rome, and bases in Amsterdam and Londonderry, and to the squadron, now became directly responsible for the collection of weather reports and the transmission of forecasts preparatory to the long and hazardous transatlantic flight from Reykjavik to Cartwright.

Bulletins were required twice a day while the seaplanes were resting at the bases, every two hours while the planes were preparing to start, and every hour (or oftener if requested) while the planes were actually flying.

The United States Weather Bureau in New York had been connected with the I. T. T. control center by special wires, and the hourly weather reports from the designated observation points soon began to pour in. Forecasts were then transmitted in Italian to the Commander of the squadron regularly and accurately. On July 8th, WSL received from AVR (Reykjavik) a message addressed to the author, in which Gen. Balbo expressed his satisfaction and his thanks for the "speed and accuracy" of the communication services.

July 12th

2:15 A. M. Mackay Radio advises that squadron took off from Reykjavik for Cartwright.

8:15 A. M. Squadron passed over Italian submarine "Millelire" at Lat. 57.2 North, Long. 46.5 West, approximately 950 miles from Reykjavik.

11:20 A. M. Italian Squadron now two hundred miles from Cartwright. All is well.

1:50 P. M. Mackay Radio announces that Gen. Balbo landed safely at Cartwright.

4:20 P. M. The eighth and final squad of three planes now landed at Cartwright. This completes the landing of the 24 seaplanes under the command of Gen. Balbo and concludes an outstanding achievement in aviation history. The number of planes safely brought across the Atlantic is more than twice that of any previous flight.

July 13th

8:30 A. M. Gen. Balbo's leading squadron took off from Cartwright for Shediac.

1:00 P. M. Squadron bucking strong wind and is shaping its course to Magdalen Island in the Gulf of St. Lawrence.

2:37 P. M. Mackay Radio announces Gen. Balbo landed at Shediac. Sea calm, weather good.

3:00 P. M. All of the seaplanes have landed safely. Squadron has completed about 4500 miles of its 7000-mile flight to Chicago.

July 14th

8:51 A. M. Gen. Balbo took off from Shediac for Montreal.

11:00 A. M. Gen. Balbo has radioed that he is abeam of Lake Millicent, Maine, and at this point they were having a beautiful view of an immense forest. Mackay Radio has just delivered to the General a congratulatory message from Premier Mussolini. What is believed to be a record was achieved today by Mackay Radio in the handling of the message from Premier Mussolini in Rome to Gen. Balbo in flight over Maine. The entire transmission took exactly three minutes, and the reply from the General to Premier Mussolini (a few minutes later) was handled with the same speed.

1:10 P. M. Planes landing at Montreal.

July 15th

10:14 A. M. Gen. Balbo took off from Montreal for Chicago.

10:49 A. M. Mackay Radio announces that the sixth squadron has just taken off. Just delivered to Gen. Balbo's flagship a radiogram recommending a change in the course 60 miles to the northward to avoid thunder-storm on the course Toledo, Cleveland, Erie. Gen. Balbo will radio his exact course later, to enable the United States Army escort of forty pursuit planes to meet him at the point where he will enter United States territory.

1:25 P. M. Mackay Radio reports that Gen. Balbo radioed that he was over Lake Simcoe at 1:05 P. M. pointing for Nottawasaga Bay and thence to Southampton on the east shore of Lake Huron. He advised that he would fly south along the east shore of Lake Huron and would enter the United States at Port Huron.

3:45 P. M. Gen. Balbo has just sent a message to the Italian Government stating that he passed over Toledo escorted by a squadron of American Army combat planes flying in splendid and close formation.

5:30 P. M. Circling over Chicago then landing.

(Continued on Page 22)

# CORRESPONDENCE SECTION

Mr. Editor:

Have been reading the correspondence section ever since CQ made its initial appearance and studying the proposals made by various writers. I have some opinions which, I think, are pertinent at present.

The fact that radio men have failed to fully appreciate the necessity of organization is regrettable, and more responsible than any other factor for the deplorable condition of this business. The complete unionization of this profession is now an absolute necessity as every thinking radio man well knows. ALL radio men employed or unemployed at present MUST form into one solid unit and present a united front. Marine men should be grouped into one class, and broadcast into another. The interests of each shall be understood and fully protected.

A union of radio men could be more effective in obtaining its demands than a superficial glance might indicate. In the first place radio operators are licensed, and the usual method of breaking strikes by hiring all applicants is disposed of. In regard to the ship lines boasts, they could, in the event of a strike refill their ships on short notice, let's take a look at the method used by the building trades union in combatting this evil. This union, by the way, is one of the strongest and most respected organizations of its kind. When they call a strike no one doubts its word and when some stranger makes the social error of applying for strike-breaking duty he is invariably found in some alley in a dazed condition, wiser and harboring a deeper respect for the building trades. They always learn quickly and profit by their mistakes. This method could be used to the advantage of the radio man as well, since there are too many men who seem to think, as the radio schools would tell us, radio operating is a lot of fun with a chance to travel thrown in, too. Radio operating is a business and any man who thinks it's a lot of fun should remain an amateur.

The union must also remove the totally unsatisfactory method of placing radiomen. This reform should be made without regard for the operating company, since by their past actions they do not warrant any consideration whatever. The union shall have "static rooms" and a call for an operator shall be handled or referred to the union which shall stand squarely behind the man. Then when the operator has a grievance, fancied or real, someone will do more than just "pass the buck." The method outlined above could also be used to keep operators in line.

In view of the widespread unemployment at present all men "on the beach" should be included in this union without any dues or charges of any kind for the time being, to disarm them of the "can't afford it now" alibi and to obtain the complete organization necessary for this drive.

Another detrimental practice, which must for the benefit of the largest number of radiomen, be removed is the practice of old-timers after having deserted operating for a better job ashore, to dust off the old license and again apply for a job with the other men who stuck by. The union shall keep an accurate file of all active and inactive men and any man with a "better" job and inactive in the marine field for a period of two years shall be disqualified for a similar period.

These are not radical reforms, but are patterned after successful organizations and could be easily instituted and would help in bringing back decent conditions to the radio operating filed. In short, the radio man fully realizes the operating or the steamship company is not interested in his welfare and he must FIGHT asking no quarter and GIVING none for the benefits unions can and do afford.

Please accept my thanks for interest you have shown in behalf of the radioman and allow me to wish you continued success for your splendid magazine.

Yours truly,

P. J. A.

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Dear Sir:

Having just completed reading your June, 1934, issue of "Commercial Radio" I wish to make the following statements and suggestions which I trust you will take in good faith, being an old sea operator myself and naturally being interested after spending more than seven years pounding brass from the "lousiest" freighters to finally the best of the U. S. lines before knocking off and entering broadcasting, the latter being my vocation for the past six or seven years. While not wishing to criticize your publication, I believe my qualifications enable me to suggest what I believe will materially improve the interest of your magazine for the entire radio engineering industry, that is, unless you wish to cater only to the sea-going Op.

I would eliminate entirely fiction articles, even though dealing with radio, the newsstands are crowded with cheap periodicals many of which incorporate radio stories superior to yours of the June issue. Your technical articles are excellent and of the right trend for the average broadcast or sea operator and I suggest more of them with each issue.

Why not a page or two monthly giving the biography of today's leading men in the industry, and I don't mean DeForest, Marconi, Sarnoff, Armstrong, or that gang, but the men like Hanson of N.B.C. —Cohan or Chamberlain of C.B.S.—men that are well known thruout the broadcast industry (though not famous) and of which I am certain most of the sea ops have heard spoken of some time or other, I do not specifically mean the above men but of that type. We have had entirely too much eulogizing and elaboration on the "Fathers" of radio and a distinct absence of any mention of the men that are making radio today.

Why not have chief engineers of stations submit their audio or transmitter layout with explanations of their functions or any "trick" operations they have installed themselves.

To stimulate interest why not a "Query Column." Undoubtedly there are hundreds of men, similar to my own case, who have lost trace of brother operators of years ago and who have often wondered where they "landed" and how.

Excerpts from the Communications Commission Rulings where regulations are pertinent to technical operations also would prove valuable, these rulings are issued intermittently and while often of not vital importance they are interesting.

Articles on High Fidelity and Directional Antennas are both of much import at the present time and undoubtedly will reach actual operating proportions within a short period.

On page six of the June issue you head a column "In Baltimore." I enjoyed reading it, though not knowing any of the men listed. But why only Baltimore? How about a half dozen sea port cities or six or eight large cities thruout the country giving the personnel activity of the various broadcast stations.

Again I wish to assure you that the aforementioned is written in all good faith. I thoroughly enjoyed "Commercial Radio" but I do believe it has much room for improvement inasmuch as interest to the broadcasting or sea operator is concerned.

Very truly yours,

L. B.

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FEDERAL RADIO COMMISSION
Washington, D. C.
June 12, 1934.

Gentlemen:

The International Telecommunication Convention of Madrid, 1932, and the General Radio Regulations annexed thereto, have now been formally ratified by the United States Government and became effective on June 12, 1934, superseding the International Radiotelegraph Convention and General Regulations of Washington, 1927.

A number of changes affecting all classes of stations are made in the new Convention and General Radio Regulations. These changes are of importance to all persons engaged in the operation of radio stations and should be given careful consideration and study.

In order to assure compliance with all the provisions of the new Convention and General Radio Regulations, a copy of this Convention and General Radio Regulations should be available in each radio station. This is mandatory in the case of ship stations.

The International Telecommunication Convention of Madrid, 1932, and General Radio Regulations annexed thereto, may be purchased at the Superintendent of Documents, Government Printing Office, Washington, D. C., at thirty cents per copy.

Very truly yours,
Herbert L. Pettey,
Secretary

## Communication System For Italian Squadron Transatlantic Flight

(Continued from Page 20)

July 19th

7:42 A. M. Gen. Balbo took off from Chicago for New York.

1:20 P. M. Mackay Radio announces that a message from Major General Haskell, commanding the New York National Guard, was transmitted to Gen. Balbo's plane requesting the Italian Commander to fly his squadron over the National Guard encampment at Peekskill, N. Y. Gen. Haskell stated the Guard would fire a salute as the Italian Squadron passed over. Gen. Balbo, however, was not able to change his course so as to accept this invitation.

2:55 P. M. Gen. Balbo landing at Floyd Bennett Field.

July 25th

9:01 A. M. Gen. Balbo's squadron takes off from New York for Shediac.

12:50 P. M. Gen. Balbo transmitted to Mackay Radio several messages of thanks addressed, respectively, to: the President of the United States; the Mayor of New York; the Mayor of Chicago; the Secretary of War, and the Secretary of the Navy.

1:15 P. M. The plane I-GALL has been forced to land off the coast at Rockland, Maine, on account of an oil leak. The plane is in radio communication with the Mackay station at that point and will again take off as soon as it can obtain additional oil.

2:37 P. M. Gen. Balbo's squadron landing at Shediac.

3:15 P. M. The plane I-GALL took off from Rockland, Maine, for Shediac.

4:30 P. M. All planes are now safely landed at Shediac.

July 26th

8:31 A. M. The squadron took off from Shediac for Shoal Harbor, Newfoundland.

9:20 A. M. The plane I-ROVI was forced to land at Cape Traverse due to minor trouble to the water pump.

11:40 A. M. Squadron landed at Shoal Harbor.

July 27th

7:13 A. M. Plane I-ROVI took off from Cape Traverse for Shoal Harbor. Pump trouble repaired.

10:10 A. M. I-ROVI landed at Shoal Harbor.

August 8th

2:45 A. M. Gen. Balbo's squadron took off from Shoal Harbor for the Azores.

6:05 A. M. Gen. Balbo radioed that squadron was 450 miles out of Shoal Harbor. He had ordered nine planes to land at Horta and the remaining fifteen at Ponta Delgada in the Azores.

1:25 P. M. Gen. Pelligrini with nine planes is now landing at Horta.

2:00 P. M. Gen. Balbo and his fifteen planes are now landing at Ponta Delgada.

August 9th

2:20 A. M. Gen. Pellegrini's squadron took off from Horta.

3:30 A. M. Gen. Balbo's squadron took off from Ponta Delgada.

4:30 A. M. I-BALB (Balbo flagship) calls IKM but is unable to contact. WSL contacts I-BALB immediately and Gen. Balbo radios that the plane I-RANI capsized in taking off from Ponta Delgada and that Capt. Ranieri, Sergeant Major Cremaschi and Sergeant Boveri only bruised. Second pilot Lieut. Squaglia suffering from concussion of the brain. The other planes, still on the water, would take off immediately and join the squadron. Thus 23 planes would fly to Lisbon. This dispatch forwarded immediately by cable to the Air Ministry.

4:40 A. M. It was announced that Lieut. Squaglia had died.

10:30 A. M. Entire squadron lands safely at Lisbon.

August 12th

1:40 A. M. Squadron took off from Lisbon on its way to Rome.

8:40 A. M. Over Majorca Island and reported by I. T. T. radiotelephone station there to Madrid, thence by radiotelegraph to WSL.

12:25 P. M. Circling over Rome.

12:45 P. M. Mackay Radio announces that Gen. Balbo's squadron has landed at Ostia amid thunderous applause from hundreds of thousands of spectators. Gen. Balbo and his brave men have covered in mass formation over 12,000 miles, thus ending the most remarkable feat in the history of aviation.

The I. T. T. is indebted to the radio station of the Vatican City for the step-by-step instantaneous description of the events as they took place when the planes were arriving at Ostia, circling Rome, and landing at Fiumicino (Ostia).

The success of the Balbo flight was a brilliant affirmation of Italy's progress under the present regime and a striking proof of the efficiency of Italian aviation. It forecasts what the future may have in store for aerial navigation and once again demonstrates the great value of reliable and fast communications to ships of the air.

We should like at this time to pay tribute to the brilliant ability and splendid cooperation of Col. Mario Infante, without whose untiring efforts the success of this communication problem could not have been realized. Appreciation is also due to Col. Paolo Sbernadora, Air Attache of the Royal Italian Embassy at Washington; Mr. W. D. Neil, General Manager of Communications of the Canadian Pacific Railway Company; Comdr. C. P. Edwards, Director of Radio Service of the Canadian Government; the Canadian Marconi Company, and the Minister of Posts and Telegraphs of Newfoundland for their splendid cooperation and that of their respective organizations.

## Remote Tuning Controls For Aircraft

(Continued from Page 10)

mounted in a protective housing. A unit of this type with 24 positions would be too large for airplane use, and so a 24-position dial switch was developed for use where more than twelve positions are required. The new system thus provides a very simple tuning procedure. The pilot merely has to push a button or turn a dial to the desired position—the rest is done for him automatically and quickly.

## The U. S. Naval Volunteer Communication Reserve

(Continued from Page 13)

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VOLUNTEER COMMUNICATION RESERVE COMMANDER AND STAFF

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Lieut. W. G. H. Finch, C-V(S), USNR. Executive Officer

Lieut-Comdr. C. J. Weaver, C-V(S), USNR., Aide for International Communications

Lieut. T. E. Nivison, C-V(S), USNR., Aide for International and Marine Communication

Lieut. F. Muller, C-V(S), USNR., Aide for Marine Communications

Lieut. J. L. Reinartz, C-V(S), USNR., Aide for Amateur and Fleet Reserve

Lieut. W. C. Freeman, C-V(S), USNR., Aide for Network Communications

Lieut-Comdr. W. D. Taylor, USN District Communication Officer, Inspector-Instructor, V.C.R.

Lieut. O. G. Cope, USN.,
Chief Radio Elec. A. A. Farlow, USN., Liason Officers, V.C.R.

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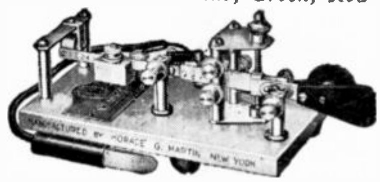

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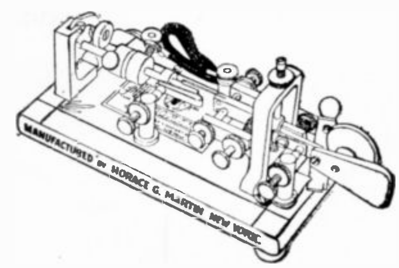

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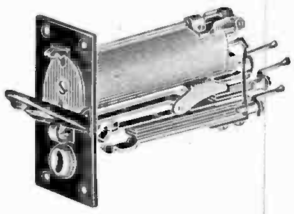

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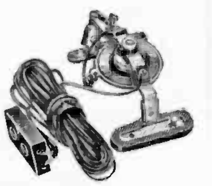

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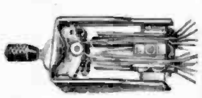

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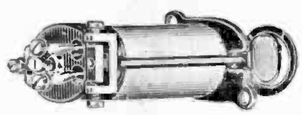

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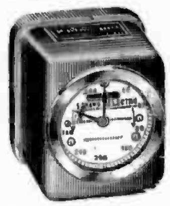

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